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A multi-modular approach to gradual change in grammaticalization[1]

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Examining four constructions in three languages (English quantificational nouns, Japanese subordinating conjunctions, Cantonese coverbs, Japanese deverbal postpositions), this paper shows that semantic properties can change faster than syntactic properties in gradual processes of grammaticalization. In each of these cases, the syntactic properties of one category become associated with the semantic properties of a different category when an item undergoes semantic change, leading to the appearance of mixed categorial properties. We propose that this sort of change is best captured using a multi-modular framework (Sadock 1991, Yuasa 2005), which allows changes to affect semantics independently of syntax, and which shows clearly that the relevant items and constructions still conform to the separate structural constraints of syntax and semantics, despite the unusual combination of properties. These findings are important for theories of grammaticalization because they suggest that the cover term 'decategorialization' (the loss of grammatical properties associated with the source category) must be understood in terms of at least two separate processes: (1) the effects of semantic change on an item's distribution; and (2) the effects of frequency (Bybee & Hopper 2001) and Pressure for Structure–Concept Iconicity (Newmeyer 1998) on an item's syntactic categorization. Our case studies show that the first kind of decategorialization effects can occur even in the absence of the second kind. Implications of these findings, including possible reasons for both the instability and the long-term retention of mismatch constructions, are also considered.

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1. Introduction

Grammaticalization is often said to involve gradual change (Givón 1979, Hopper 1991, Bybee, Perkins & Pagliuca 1994, Haspelmath 1998, Bybee & Hopper 2001, Denison 2001, Brems 2003, Traugott 2003). However, the interrelation of grammatical factors in the gradual process of grammaticalization is controversial, and it requires further serious investigation (Heine 2003: 600). In this paper, we examine four cases of grammaticalization (English quantificational nouns, Japanese subordinating conjunction markers, Cantonese coverbs, and Japanese deverbal postpositions) and address the following questions: (i) how syntax and semantics interrelate in the gradual process of grammaticalization, especially with respect to phenomena known as 'decategorialization'; (ii) why changes may occur independently in syntax and semantics; (iii) why grammaticalization takes place among existing grammatical categories (instead of creating completely novel categories); (iv) why syntactic changes often follow from semantic changes; and (v) why syntactic properties may be retained for many years following semantic change, allowing for mismatch within the synchronic system. In response to the first three questions, we propose that the parallel architecture of grammar, as proposed in Sadock (1991), shapes the structure of language both synchronically and diachronically and that it sheds light on the nature of the gradual change in grammaticalization.

The ways in which grammatical factors interact in grammaticalization have been actively discussed, but the issue is far from being fully resolved. Some propose that semantics and syntax change together (Lehmann 1982, Bybee et al. 1994, Hopper & Traugott 2003, Traugott 2003). For example, Bybee et al. propose that 'the development of grammatical material is characterized by the dynamic coevolution of meaning and form' (1994: 20). Sometimes, it is proposed that syntactic change is independent of semantic change (Lightfoot 1979) or that any order of changes is possible (Newmeyer 1998). More often, it is suggested that semantics changes faster than syntax and that semantic change helps drive syntactic change (Timberlake 1977, Fleischman 1982, Lehmann 1982, Brinton 1988, Heine et al. 1991, Rubba 1994, Haspelmath 1999, Harris 2003, Heine 2003, Traugott 2003, Bisang 2004).

While maintaining the possibility that different orders of changes are possible (Newmeyer 1998: 248–251), our investigation focuses on cases of the last type, where semantics changes faster than syntax. Through the analysis of four case studies, we show that semantic change can occur in the absence of syntactic change, leading to cases of 'mismatch' between syntax and semantics. These mismatch cases appear to involve partial 'decategorialization' (Hopper & Traugott 2003: 106–115), since some but not all of the grammatical properties of the original category are lost. Although not unusual, these cases are especially instructive because they underscore the

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need to consistently and systematically delineate the domains of syntax and semantics in the analysis of their interaction.

In Autolexical Grammar (Sadock 1991, Yuasa 2005) and similar multi-modular theories such as Parallel Architecture (Jackendoff 2002, Culicover & Jackendoff 2005), grammatical phenomena are systematically sorted out into syntactic and semantic modules. Some grammatical phenomena such as the binding of anaphors are treated as semantic, while other phenomena such as syntactic categories and case distinctions are treated as syntactic. An important aspect of our approach is that SEMANTIC CONSTRAINTS DIRECTLY AFFECT AN ITEM'S DISTRIBUTION, INDEPENDENTLY OF THE SYNTAX, to a much greater extent than in mainstream formal syntactic theories (e.g. Chomsky 1995). Thus, we make a distinction between an item's DISTRIBUTION, which can be affected by a number of different factors including semantics, and its (purely) syntactic properties, which result specifically from its syntactic category, its morphosyntactic features, or other constraints within the syntax module.[2]

Since the distribution of a given word or morpheme may be independently controlled by syntax and semantics, a multi-modular approach allows us to show that most of the effects of decategorialization in our data are due to semantic change and follow directly from constraints within the semantic system. Furthermore, we show that in the absence of syntactic reanalysis, syntactic properties of the source construction may be retained even when those properties no longer serve any semantic function. Thus, we argue that the appearance of partial decategorialization in our data follows from the independent effects of semantic change and syntactic retention.

The claim that syntactic change is completely independent of semantic change, as proposed by Lightfoot (1979), is often criticized because such a claim 'provides no reasoned account for the extensive evidence that grammaticalization affects similar classes of lexical items in similar ways across a wide number of languages' (Hopper & Traugott 2003: 75). We propose that while syntax and semantics form independent systems, categories whose representations are associated through correspondence rules across different levels of grammatical structure are categorial prototypes (Yuasa 2005), and prototypical associations are more stable than non-prototypical ones and often preferred (the principle of Pressure for Structure–Concept Iconicity, Newmeyer 1998: 129f.). Therefore, while our analysis predicts each level of grammar to change independently, it also explains why certain semantic changes often lead, eventually, to certain changes in syntactic category or syntactic constituency.

[2] This distinction is especially significant for our treatment of subject–verb agreement in English – a phenomenon whereby agreement marking can be a manifestation *either* of a morphosyntactic feature *or* of a semantic feature (or more typically, both), depending on the type of NP in subject position.

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The structure of this paper is as follows. In section 2, we present four case studies of grammaticalization from English, Chinese, and Japanese and show that semantic properties systematically change faster than syntactic properties. In section 3, we first outline the theoretical assumptions that we adopt in our analysis and then show how the parallel architecture of grammar together with the notion of prototype explains important aspects of the interrelation between form and meaning in gradual processes of grammaticalization. We discuss some of the implications of our analysis in section 4 and conclude the paper in section 5.

2. Four case studies of grammaticalization

2.1 *English quantificational nouns*

When occurring in the configuration [(Det) N of N], the English nouns *lot*, *bunch*, *heap*, and *load* are polysemous and multi-functional.[3] The nouns *lot*, *bunch*, and *heap* can denote either a grouping of individuals or a large quantity, as shown by the ambiguity of *bunch* in (1):

(1) (a) She gave me a bunch of bananas. (ambiguous)
(b) She gave me several bananas. (quantifier reading only)

As noted by Francis (1999) and Yuasa & Francis (2003), the quantity sense of these nouns can be closely paraphrased using quantifiers such as *many*, *much*, or *several*, as in (1b).

Langacker (1991), Francis (1999), Brems (2003), and Yuasa & Francis (2003) note that the multi-functionality of these words in modern-day English is the result of ongoing processes of grammaticalization. In particular, the collective interpretation of these nouns has been extended to a more abstract quantificational meaning (semantic generalization), and some of the typical morphosyntactic and distributional properties associated with the head nouns of binominal noun phrases have been lost (decategorialization). An interesting aspect of these words is that they still retain at least some noun-like syntactic and morphosyntactic properties even in their quantificational usage. That is, it appears that semantic change has progressed at a faster rate than syntactic change, leaving us with a synchronic situation in which some uses of these words show mixed properties of nouns and quantifiers. In this section, we will discuss the diachronic development and synchronic properties of English quantificational nouns (henceforth QNs).

[3] QNs may also be used in the configuration [(Det) N of Det N], as in *a bunch of the/those bananas*. This construction has a meaning and a distribution very similar to that of the quantifiers *many*, *several*, *and few*, as in *many of the/those bananas*. The distribution of this construction differs from that of the [Det N of N] construction and will not be considered in this paper.

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2.1.1 *Diachronic development of English quantificational nouns*

As is typical in grammaticalization, each word has its own peculiar history, and different QNs have developed in somewhat different ways. However, the general path of change is similar enough, and the current usage overlaps to such an extent, that we can treat them together as a class. Here, we will briefly describe the history of the word *bunch* to illustrate the diachronic development of English QNs.

During the Middle English period and beyond, the word *bunch* could refer to 'a collection or cluster of things of the same kind, either growing together (as a bunch of grapes), or fastened closely together in any way (as a bunch of flowers, a bunch of keys)' (OED). We will refer to this sense as the 'bundle' sense, as in (2a–b):

(2) (a) And for thy bed tak now ane bunche of stro. (1593, CMEPV)[4]
(b) On his craven crest, A bounch of heares discolourd diversly. (1590, OED)

A more general meaning referring to a group or collection of people or things (which are not necessarily bundled together) is also attested at around the same time. We will refer to this meaning as the 'collective' sense of *bunch*, as in (3a–b).

(3) (a) Two friars are bargaining for a bunch of cherubs. (OED, 1832)
(b) See what persons God hath picked out of all the bunch of the Prophets, Judges, and Kings. (OED, 1622)

It was apparently this collective meaning that gave rise to the purely quantificational meaning that we find in modern-day examples such as (4a–c) from the Switchboard Corpus. Note that in (4a–b), *bunch* is used preceding a mass noun, and therefore cannot be interpreted in the collective sense of (3a–b) above.[5]

(4) (a) I mean, he, he well he said he went up in the attic and looked around and he was like, oh my God, he says, looks like a bunch of spaghetti up there. (SC)
(b) Yeah, well, down by Lake Texoma there's a bunch of wooded area. (SC)

[4] CMEPV = Corpus of Middle English Prose and Verse. OED = Oxford English Dictionary on-line. SC = Switchboard Corpus.

[5] An anonymous reviewer points out that examples like (4a–b), in which *bunch* occurs with a mass noun, are impossible for many speakers of English. For those speakers, the noun *bunch* retains its original restriction to combine only with countable nouns despite its purely quantificational meaning. In contrast, the noun *lot* can combine freely with mass nouns (e.g., *a lot of water*).

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(c) … went through and interviewed a bunch of jurors in some of the big cases, and in many cases looking at what had, at the evidence afterwards as to whether the decision was right, went back to the jurors, uh, based on the deliberations. (SC)

We hypothesize that *bunch* underwent the following semantic extensions, both of which involve generalization of meaning (or semantic 'bleaching'): bundle > collection > large quantity. In the first extension from bundle to collection, the meaning of 'attachment' is lost, and in the second extension from collection to large quantity, the meaning of 'grouping' is lost. Since the historical evidence is ambiguous, it is also possible that the quantity meaning is derived directly from the bundle meaning. In either case, Langacker (1991: 88) offers a plausible description of the semantic changes that took place. He argues that the quantity meaning of *bunch* and similar nouns is likely to have developed through a process of metonymy whereby an attribute of the original object denoted by the noun has become its primary denotation. In the case of *bunch*, the typically large size or large number of items in the bundle or grouping has become the primary denotation of the word, and the original sense of spatial contiguity and attachment has faded. The shift in meaning then allows the word *bunch* to collocate with a wider range of nouns than before, including mass nouns as in (4a–b). Concurrent with this change in lexical semantic content was a change in semantic function: what had been the semantic head of a nominal expression came to function as a quantifier of the following noun. The details of this shift in semantic function are given in the following section.

2.1.2 *Quantificational nouns in contemporary English*

Sadock (1990), Francis (1999) and Yuasa and Francis (2003) discuss the grammatical properties of English QNs, showing that QNs are not fully grammaticalized: even the purest quantifier uses of words like *lot*, *bunch*, and *heap* retain some of the key syntactic properties of head nouns, suggesting that change has progressed more fully in semantics than in syntax. Like ordinary head nouns, QNs appear to occur in the typical head noun position of a binominal NP and may co-occur with determiners (5a–c), adjectives (rather than adverbs) (5c), PP complements (5a–c), and plural number marking (5d).

(5) (a) I know **a lot of people** who may watch the TV news in the evening but don't spend the time to actually read a newspaper. (SC)
(b) And there were **a bunch of kids**, you know, and **a bunch of schools**. (SC)
(c) I guess, uh, Barry Manilow comes to mind for some reason there's, there's not **a whole lot of his stuff** that I'm real crazy about, but he does have some things. (SC)
(d) But it's got **lots of good recipes** so I was thinking about trying to sell that on the side just for fun. (SC)

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In contrast, ordinary quantifiers such as *many*, *much* and *several* cannot occur in these positions even though their meanings are similar:

(6) (a) *I know **a many of people** who may watch the TV news.
(b) *And there were **a several of kids**, you know, and **a several of schools**.
(c) *There's not **a whole much of his stuff** that I'm real crazy about.
(d) *It's got **manies** of good recipes.

Instead, these quantifiers must occur in adjective-like configurations in which they are modifiers of the following noun and are themselves modified by intensifying adverbs as in (7c) rather than adjectives. Number marking must be omitted (7d).

(7) (a) I know **many people** who may watch the TV news.
(b) And there were **several kids**, you know, and **several schools**.
(c) There's not **very much of his stuff** that I'm real crazy about.
(d) It's got **many good recipes**.

Thus, QNs pattern like head nouns in several respects and they are clearly distinct from adjectives or quantifiers in terms of their position in phrase structure.

In Yuasa & Francis (2003), we show that QNs have a more limited distribution than ordinary head nouns, but we argue that these patterns are derivable from semantics without reference to syntactic structure. We claim that QNs differ from other common nouns in that they no longer function as the semantic head of the noun phrase but rather act as quantifiers of the following noun. We define semantic head of a noun phrase as the bearer of the referential index for the noun phrase, which allows the noun phrase to act as an antecedent for a pronoun or anaphor. Unlike the collective nouns from which they are historically derived, QNs do not bear any referential index. For example, the phrase *bunch of bananas* in (8a) can serve as an antecedent to the pronoun *one* only if *bunch of bananas* is interpreted as a unit (i.e., the bundle meaning) but not if *bunch* is interpreted as a quantifier of *bananas*. If *bunch* is interpreted as a quantifier, the pronoun *one* can then only refer to a single banana, in which case the noun *bananas* bears the referential index relevant for the interpretation of *one*.

(8) (a) Bill bought a bunch of bananas, but Fred actually picked one off the tree.
(b) Bill bought a box of chocolates, and Fred also bought one from the same store.

Although *bunch* here patterns syntactically with *box* in (8b), it is clear that the meaning of *bunch* is what ultimately prevents it from being the antecedent of *one* in a quantifier interpretation.

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We understand this lack of a referential index to be derived from a more basic property of QNs – they lack a 'criterion of identity' (Baker 2003: 101–109). Following Baker (2003), Sadock (1990), and Gupta (1980), we assume that common nouns (including abstract nouns) normally bear a 'criterion of identity' which sets a standard for determining whether two things are the same or not. For example, it makes sense to say that a glass contains the same water as it did yesterday because the noun *water* has a criterion of identity. However, it makes no sense to say that a bowl contains the same bunch as it did yesterday unless *bunch* is interpreted in its bundle sense rather than its quantity sense. The ability of nouns to act as antecedents to pronouns is derived from this more basic criterion of identity, according to Baker (2003: 125). Following Sadock (1990: 271f.), we assume that nouns bearing a criterion of identity belong to the formal semantic category CN ('common noun').[6]

This criterion of identity is also what allows nouns to be counted, measured, or quantified.[7] Again, we can see that QNs such as *bunch* lack this property. In (9), the noun *bunches* can only be understood in its bundle sense because the QN *bunch* cannot itself be quantified.

(9) Bill bought several bunches of bananas.

Having lost their criterion of identity, QNs have taken on the semantic category of quantifiers which specify the amount of some object or substance denoted by the following noun. Formally, they belong to the category Q-1, which means that they select a common noun (CN), bearing its own criterion of identity, as their argument (e.g., *bananas* in (9) above). Because they are semantically gradable, QNs also allow modification by intensifiers (Sadock 1990: 276f.). Just as gradable quantifiers such as *many* and *much* can be modified by intensifying adverbs such as *very*, *too*, and *so*, QNs can be modified by a few adjectives such as *big* and *whole*, which are capable of expressing an intensifying meaning. This is just what we would expect, given the syntactic requirement that nouns be modified by adjectives combined with the semantic requirement that quantifiers be modified by intensifiers.[8,9]

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[6] Technically, the semantic category CN includes the noun plus its modifiers and complements, if any. Determiners and quantifiers are not included as part of CN, but rather they belong to the category Q-1 and select CN as their argument.

[7] Formally, this restriction is expressed in terms of the definition of quantifier (Q-1), since Q-1 selects CN as its argument to form an expression of category Q, corresponding to NP in syntax.

[8] It is also possible for QNs to be preceded by quality-denoting adjectives, as in the phrase *a boring bunch of geriatrics* (Brems 2003: 300). In this case, the adjective semantically modifies *geriatrics* rather than *bunch*. This is again consistent with an analysis in which QNs are syntactically the head noun, thus permitting adjectives but not adverbs in the pre-modifier slot.

[9] An anonymous reviewer suggests that the change with *bunch* could be explained simply by the loss of the lexical semantic feature [+bundle]. While it is true that the QN *bunch* has

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Before concluding this section, we must note two additional phenomena, PP-preposing and subject–verb agreement, which have sometimes been taken as evidence that QNs and other similar nouns are *not* syntactic heads, despite their other head-like properties.[10] Aarts (2001: 264–266) argues that the syntactic head noun should allow preposing and coordination of its PP complement, but observes that QNs such as *bunch* do not allow this:

(10) (a) *I don't know many teachers there, but of students, I know a bunch.
(b) ??I know a bunch of students and of teachers.

However, we note that the 'bundle' interpretation of *bunch* shows a similar pattern in (11a–b):

(11) (a) *I didn't buy any bunches of grapes, but of bananas, I bought a bunch.
(b) ??I bought a bunch of bananas and of grapes.

These examples suggest that the source construction may have already imposed some restrictions on PP-preposing and (to a lesser degree) coordination.[11]

The subject–verb agreement facts are challenging for any analysis of QNs. Brems (2003) points out that *bunch* in its 'bundle' interpretation, as in (12a),

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lost its bundle meaning, such a specific explanation will make it difficult to treat other similar cases uniformly. For example, the noun *load* also developed a quantifier sense, resulting in similar restrictions on its distribution. But the original meaning of *load* did not include any bundle feature, since a load could refer to an undifferentiated mass (e.g., a load of dirt). Furthermore, in Section 2.2.2, we show that some Japanese subordinating conjunctions that originated as nouns can no longer serve as the antecedent of a pronoun or anaphor, and we argue that this is due to the loss of the noun's criterion of identity. When unrelated constructions in unrelated languages show similar patterns of change (e.g., ability to refer, ability to be modified, etc.), we can capture the regularity of such changes best if we assume categorial mismatch between syntax and semantics. The loss of certain lexical semantic features such as [+bundle] in the case of *bunch* can perhaps be viewed as a precursor to the loss of the criterion of identity, but it does not constitute a full explanation in itself.

[10] Following Denison's (2002, 2005) analysis of degree modifier constructions such as *a bit of a bore*, Traugott (2006) notes that *a lot of* can be substituted by a single word such as *many*. We attribute this property to the fact that *a lot of* corresponds to a semantic constituent. Traugott also notes that *a lot* can be used as an adjunct, as in *I liked it a lot*. Since NPs with appropriate meanings can be used as adjuncts in English (e.g., *They will leave this week*), we do not take this to be evidence of syntactic reanalysis.

[11] Yuasa & Francis (2003: 193) note that some other types of binominal NPs appear to disallow preposing of the PP complement, as in: **Of the book, we met the author*. This may reflect a more general restriction on the preposing of *of*-phrases which does not depend on the headedness of the noun that precedes them, as suggested by an anonymous reviewer.

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controls subject–verb agreement, while *bunch* in its quantifier interpretation, as in (12b), does not.[12]

(12) (a) The fox, unable to reach a **bunch** of grapes that **hangs** too high, decides that they were sour anyway.
(b) There's now a whole bunch of **studies** from different cities that **show** the same thing. (Brems 2003: 293)

Brems takes examples such as (12b), for which the QN definitely does not control subject–verb agreement, to be 'fully grammaticalized quantifier uses' of the items under investigation (2003: 294).[13] Although we have already shown that QNs are *not* fully grammaticalized, such agreement facts appear problematic for our analysis, since subject–verb agreement is often assumed to be determined by the syntactic head.[14] The notion of syntactic head is not at all straightforward, however. In addition to the head-like properties of QNs shown in (5a–d) above, Wright & Kathol (2003: 380) observe that QNs act as heads with respect to noun–determiner concord despite the fact that they do not control subject–verb agreement. For example, even though the finite verb in (12b) agrees in number with the second noun, *studies*, the singular determiner *a* agrees with the singular QN, *bunch*.[15] This dissociation between subject–verb agreement and determiner–noun concord can be seen clearly in the following minimal pairs:

(13) (a) A **bunch** of bananas **is** on the table. (bundle sense)
(b) A bunch of **bananas are** on the table. (quantity sense)
(c) Tons of **food was** distributed to the orphanage. (quantity sense)
(d) **Tons** of food **were** distributed to the orphanage. (unit sense)

In (13a), the singular number on the verb forces us to assume the literal ('bundle') interpretation of *bunch*, whereas the plural number in (13b) allows only the quantifier interpretation. Similarly, the singular number on the verb in (13c) forces the quantifier interpretation of *tons* (a large amount), while the

[12] As Brems (2003: 293) acknowledges, this criterion is limited to cases in which the quantified NP functions as the subject, and the number specification of the two nouns of the binominal NP differs.

[13] In example (12b), we are only concerned with agreement within the relative clause. We note that in the matrix clause, existential *there* is followed by a singular form of the verb *be*. It is common in informal spoken English to have singular agreement with existential *there* regardless of the number of the NP following *be* (Wolfram & Schilling-Estes 1998: 335). This appears to be the case in (12b), since singular agreement with *there* would be just as acceptable (in informal usage) with a plural NP such as *bunches of studies* or *several studies*.

[14] This point was also brought up by Elizabeth Traugott (personal communication).

[15] Note that if *bunch* were changed to a numeral or quantifier, as in (i), the determiner would need to agree in number with *studies*:

(i) There's now **these**/***a** five **studies** from different cities that show the same thing.

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plural number in (13d) allows only the literal interpretation where *ton* is a unit of weight.[16]

Working within an HPSG framework (Pollard & Sag 1994), Wright & Kathol (2003: 383–387) propose that the QN is the 'base' (in our terms, the syntactic head) which determines number concord and constituent structure WITHIN the noun phrase, but that the non-base (the second noun) exceptionally determines the external distribution and number specification of the phrase as a whole. This analysis thus relaxes the usual requirement for the base (syntactic head) of a phrase to determine its external distribution and allows items such as QNs to be lexically specified as 'transparent' with respect to phrase-level syntactic properties. Adapting this general idea to a multi-modular theory, we may suggest that the lexically-specified 'transparency' of QNs forces subject–verb agreement to be linked directly to the referential index of the noun phrase, and thus to be determined by the semantic head. According to this analysis, QNs are quantifiers in semantics, without any referential index of their own, but head nouns in syntax, bearing a syntactic index which determines number concord with the preceding determiner, if any. However, we acknowledge that it is difficult to determine conclusively whether subject–verb agreement is linked directly to the referential index or whether it is somehow mediated by the syntax.[17] Either way, it is clear that QNs retain many of the syntactic properties of head nouns and differ significantly from adjective-like quantifiers such as *many* and *several*.

We conclude that the semantic function of QNs has fully changed from head noun (CN, bearing a criterion of identity) to quantifier (Q-1, selecting CN as its argument), but that QNs have retained the syntactic category and (internal) phrase structure properties of the source construction.

[16] If we add a plural determiner, such as *those* before *tons*, only the literal interpretation is possible, and the verb must agree with the first noun, *tons*. McCawley (1987) suggests that definite determiners are not possible in certain mismatch constructions because they draw too much attention to the mismatch. The determiner *a* is acceptable in (13b) because it is semantically empty in this context apart from its number specification. Definite determiners such as *those* cannot be semantically empty.

[17] Recent psycholinguistic studies by Kathleen Eberhard, Kathryn Bock, and colleagues have shown that verb number is much less likely than pronoun number to be a direct reflection of the semantic number of the controlling NP (Eberhard et al. 2005, Bock et al. 2006). However, consistent with the constraint-based approaches of Eggert (2002), Morgan & Green (2005), and others, their research confirms that 'semantic agreement' does occur in some cases. For example, a coordinated NP such as *ham and eggs* triggers either singular or plural marking on the verb depending on the meaning of the intended referent, regardless of the number specification of the two nouns. Eberhard et al. suggest that plural agreement with phrases such as *a number of boys* may be a direct reflection of the initial 'marking' of semantic number (2005: 538). This is fully consistent with our multi-modular analysis.

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2.2 *Japanese subordinating conjunction markers*

It is widely attested that nouns diachronically change into subordinating conjunctions (Heine, Claudi & Hünnemeyer 1991: 118). For example, the English subordinating conjunction *while* originated as a noun *hwile*, which means a length of time, and became a subordinating conjunction through grammaticalization (Traugott & König 1991, Hopper & Traugott 2003).

In the present section, we examine Japanese subordinating conjunction markers, as shown in (14).[18]

(14) (a) Inazuma-ga hikat-ta-**totan**-ni, kaminari-ga ochi-ta.
lightning-NOM flash-PAST-as.soon.as thunder-NOM rumble-PAST
'As soon as lightning flashed, a peal of thunder broke.'
(b) Sanzan kangae-ta-**ageku**-ni, shigoto-o yame-ta.
thoroughly think-PAST-finally.after job-ACC quit-PAST
'After I thought about it thoroughly, I quit my job.'

Interestingly, while they still retain some noun-like syntactic properties, these markers no longer have the normal semantic function of nouns. Hence, just like the English quantificational nouns discussed in the previous section, we suggest that the semantic properties of these subordinating conjunction markers have changed much faster than their syntactic properties.

2.2.1 *Origin of Japanese subordinating conjunction markers*

There is a variety of subordinating conjunction markers in Japanese, and some markers such as *totan* 'as soon as' originated as nouns (Muraki 2005). Initially, *totan* meant 'moment' or 'instance' (Nihon Kokugo Daijiten 1935).

(15) Gyoji osae-te, tadaima-no-wa, **totan**-no ware-nite,
referee weigh.in-PTCP right.now-GEN-CONT instance-GEN draw-because
shobu-shire-zu-to mooshi-keru.
winner-know-NEG-COMP say-EVI
'The referee weighed in and evidently said that as for the one just now, it was an instant draw and there is no winner.' (Joruri, Hakoneyama-gassen)

These original meanings of *totan* such as 'moment' or 'instance' are no longer transparent in the current usage. Hence, unlike the Japanese nouns

[18] The abbreviations used in our Japanese examples are as follows: ACC 'accusative', COMP 'complementizer', CONT 'contrastive', DAT 'dative', EVI 'evidential', GEN 'genitive', NEG 'negative', NOM 'nominative', NOMZ 'nominalizer', PASS 'passive', PAST 'past', POL 'polite', PRES 'present', PTCP 'participle', SFP 'sentence-final particle', TOP 'topic'.

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for 'moment' such as *shunkan*, *totan* does not occur freely in this sense in contemporary Japanese.

(16) Sono shashin-wa doroboo-ga shinnyuu-su-ru
the picture-TOP burglar-NOM break.in-do-PRES
shunkan/***totan**-o torae-te i-ru.
moment-ACC capture-PTCP be-PRES
'The picture captures the moment when the burglar tries to break in.'

Another subordinating conjunction marker, *ageku* 'finally after', also originated as a noun, and it initially meant the last fourteen-syllable verse of a Japanese poem, *haiku* and *renga* (Koojien 1976). When *ageku* refers to a final fourteen-syllable verse, it can still function as a regular noun, allowing modification by genitives or adjectives, as shown in (17a–b), and pronominal coreference, as shown in (17c).

(17) (a) saigo-no **ageku**-made yoku utawareteiru uta
last-GEN last.14.syllable.verse-till well read poem
'a poem that reads well till the very last fourteen-syllable verse'
(b) Ii hokku-to **ageku**-no jooken
good first.17.syllable.verse-and last.14.syllable.verse-GEN condition
'conditions for a good first seventeen-syllable verse and last fourteen-syllable verse'
(c) Sono uta-no **ageku**-wa yoku dekite iru
that poem-GEN last.14.syllable.verse-TOP well made is
kara, sore-o kaki-naosu-hitsuyoo-wa ari-masen.
because it-ACC write-correct-necessity-TOP have-NEG
'Because the last fourteen-syllable verse of the poem is written well, it does not need to be rewritten.'

However, when used as a subordinating conjunction marker, the behavior of *ageku* differs significantly from that seen in (17) above.

2.2.2 *Subordinating conjunction markers in contemporary Japanese*

As pointed out in Yuasa 1998, Yuasa & Francis 2003, and Yuasa 2005, the current properties of these subordinating conjunction markers are peculiarly mixed, and they deviate from those of both prototypical nouns and subordinating conjunction markers in contemporary Japanese. For example, although these subordinating conjunction markers originate as nouns, they have lost their criterion of identity and no longer function as head nouns bearing a referential index and belonging to the category CN in semantics. Rather, they have become predicates which express how the main proposition and the subordinate proposition relate to each other. Following Yuasa (2005: 160), we assume that they belong to the semantic category

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M(Prop)-I. That is, they are predicates which select one internal argument (the subordinate proposition) and modify the proposition expressed by the main clause.[19]

Unlike regular nouns, these subordinating conjunction markers can neither be modified by adjectives (18) nor function as the antecedent of a pronoun (19).

(18) (a) ketteiteki-na **shunkan**/***totan**
decisive moment/as.soon.as
'the decisive moment'
(b) *subarashii [yoku kangae-ta **ageku**]
wonderful well think-PAST finally.after
'(intended) *wonderful [after I thought it through]'

(19) (a) Doroboo-o tsukamaet-ta **totan**-ni, nagu-rare-te, **sore**-o
burglar-ACC capture-PAST as.soon.as hit-PASS-PTCP it-ACC
mattaku omoidas-e-na-i.
at all remember-can-NEG-PRES
'As soon as we caught the burglar, I was hit, and I cannot remember it (= the fact that we caught the burglar, ≠ the moment).'
(b) Yoku kangae-ta-**ageku**-ni kimemashi-ta. **Sore**-ga
well think-PAST-finally.after decide-PAST it-NOM
yo-katta-no-des-u.
good-PAST-NOMZ-be-PRES
'After I thought it through, I made my decision. It (= the fact that I thought it through, ≠ *ageku*) was a nice thing to do.'

As in the case of English QNs, the inability of these subordinating conjunctions to act as antecedents to pronouns follows from the fact that they have no criterion of identity. The semantics of these markers also prevents them from being modified by adjectives. Although this semantic restriction on modification is caused by a lexical property of these subordinating conjunctions, it is not idiosyncratic. Rather, it is the direct result of a systematic change in semantic category.[20]

[19] In Autolexical Grammar, modifiers, represented as M(x), are special predicates which combine with x and return x as their value (Sadock 1991: 25). M(Prop)-I is an operator which combines with one argument (the subordinate proposition) and returns M(Prop) (the subordinate clause) as its value. M(Prop) then combines with the proposition expressed by the main clause and returns Prop as its value. This formalism does not specify the type of internal argument selected by the subordinating conjunction.

[20] We do not wish to claim that bearing a criterion of identity NECESSARILY allows for modification by adjectives. For example, an anonymous reviewer points out that *tame* 'sake' also fails to occur with adjectives. We leave open the possibility that this restriction is due to lexical properties of *tame* that do not relate to its semantic category.

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In the following examples, it may appear that these subordinating conjunctions can be modified by a demonstrative determiner.

(20) (a) Suzuki-ga 3-ji-ni kaette ki-ta. Sono/*ano
Suzuki-NOM 3-o'clock-at return come-PAST that/that
tootan-ni ame-ga futte ki-ta.
as.soon.as rain-NOM fall come-PAST
'Suzuki came home at 3:00. Soon after that (=after Suzuki came home at 3:00), it started raining.'

(b) Sasaki-wa monku-o iitsuzuke-ta. Sono/*ano
Sasaki-TOP complaint-ACC continue-PAST that/that
ageku-ni kaette shimat-ta.
finally.after go.home have-PAST
'Sasaki continued complaining. After that (=after Sasaki continued complaining), he went home.'

However, we claim that the occurrence of the demonstrative *sono* 'that' in these examples is permitted because the demonstrative is used here pronominally to refer to a proposition. In (20a–b), the demonstrative *sono* does not modify *totan* and *ageku*, but rather it refers to the proposition given in the previous sentence. As also shown in (20a–b), not all demonstratives can refer to a proposition, and the examples become ungrammatical if *totan* and *ageku* occur with other demonstratives, such as *ano*.

Although these subordinating conjunction markers have lost their criterion of identity in semantics, they still retain noun-like properties in syntax. Three sources of evidence are as follows. First, when adjectival nouns occur before these subordinating conjunction markers, they have to take the pre-nominal form, as shown in (21). In (22), we show that adjectival nouns normally take the pre-nominal form *-na* before a noun and have the sentence-final form *da* at the end of sentence or before a regular subordinating conjunction marker.

(21) ?Kuruma-ga hidoku **fuchoo-na**/***da** **ageku**-ni,
car-NOM extremely poor.condition while
keetai-made koshoo shi-ta.[21]
cell.phone-even break.do-PAST
'While my car has been in extremely poor condition, even my cell phone broke!'

[21] The predicates in the subordinate clause headed by *ageku* are mostly active predicates; hence this sentence sounds a little awkward. The marker *totan* also requires the predicate in its subordinate clause to be active; hence there will not be an example with adjectival nouns for the marker *totan*.

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(22) (a) **kiree-na** hana
beautiful flower
'beautiful flower'
(b) Hana-ga **kiree-da** kara, kai-mashoo.
flower-NOM beautiful because buy-shall
'Let's buy these flowers, because they are beautiful.'

Second, these subordinating conjunction markers allow a case alternation (*ga-no* conversion) which occurs only in a clause headed by a noun. In (23a), the nominative *ga* optionally alternates with the genitive *no* in a relative clause. As shown in (23b), this does not happen in a regular subordinate clause. However, the subordinate clause headed by *totan* in (23c) does allow this alternation.

(23) (a) [kodomo-**ga**/**no** suki-na] **neko**
child-NOM/GEN love cat
'the cat that the child loves'
(b) [Kodomo-**ga**/***no** suki-da-**kara**] neko-o kaimashi-ta.
child-NOM/GEN like-because cat-ACC adopt-PAST
'We adopted a cat, because my child likes them.'
(c) [Inazuma-**ga**/**no** hikat-ta-**totan**-ni] kaminari-ga ochi-ta.
lightning-NOM/GEN flash-PAST-as.soon.as thunder-NOM rumble-PAST
'As soon as lightning flashed, a peal of thunder broke.'

Third, subordinating conjunctions such as *totan* and *ageku* can optionally occur with a dummy postposition, *-ni*, which does not contribute to the meaning of these subordinating conjunctions. An example is given in (23c) above. This parallels regular nouns, which are normally followed by postpositions to indicate grammatical relations. In summary, it seems that these subordinating conjunctions still retain some noun-like properties in syntax, while the meanings of the original nouns are lost.

Some other subordinating conjunction markers also originated as nouns and went through a similar process of grammaticalization. For example, Ono (1953) proposes that the marker *kara* 'because' was originally a noun meaning blood relation. Although there seems to be some disagreement among researchers as to exactly what the noun *kara* meant, Matsumura (1969: 361) concludes that all of the analyses to date uniformly suggest that the subordinating conjunction maker *kara* started as a noun. In Manyoshuu (8th century), we find examples where the marker functions as a subordinating conjunction marker while retaining some noun-like properties in syntax (Konoshima 1983: 117). In (24), the marker *kara* follows the genitive marker *-no* and precedes the postposition *-ni*, although it semantically relates the main proposition with the subordinate proposition.

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(24) Asu-yori-wa tsugite kikoemu hototogisu
tomorrow-from-CONT ceaselessly be.heard cuckoo
hitoyo-no kara-ni koiwatarukamo.
one.night-GEN reason-of long
'From tomorrow, the voice of the cuckoo will be heard. Because of this one night, I while away in longing …!'[22] (Manyooshuu 18: 4069)

Yamaguchi (1980) reports that cases like (24) had disappeared by the Medieval Period. As shown in (25) below, the marker *kara* no longer retains any of the original noun-like properties in contemporary Japanese: (i) neither the pre-nominal form of adjectival nouns nor the genitive marker *-no* can precede *kara*; (ii) other postpositions cannot follow *kara*; and (iii) *ga-no* conversion does not take place within a subordinate clause headed by *kara*. These points are illustrated in (25a–c).

(25) (a) [Sore-***no**/**da** **kara**] ashita kite kudasai.
it-GEN/be because tomorrow come please
'Because of that, please come tomorrow.'
(a′) Sono hon-wa [ninki-***na**/**da** **kara**] motto
the book-TOP popular because more
chuumon shimashi-ta-yo!
order do-PAST-SFP
'I order more copies of this book, because it is so popular.'
(b) *Sono hon-wa [ninki-da **kara**]-**ni** motto
the book-TOP popular because-at more
chuumon shimashi-ta-yo!
order do-PAST-SFP
'I order more copies of this book, because it is so popular.'
(c) [Sono hon-**ga**/***no** ninki-da-**kara**] ano
the book-NOM/GEN popular-be-because that
hon-mo ure-ru daroo.
book-also sell-PRES will
'Because this book is popular, that book will also sell.'

What distinguishes the subordinating conjunction marker *kara* from the markers such as *totan* or *ageku*, which we have discussed in this section, is that *kara* seems to have already passed the stage where the properties of prototypical nouns and subordinating conjunction markers are mixed, so that it can now be considered a fully grammaticalized subordinating conjunction. On the other hand, markers such as *totan* or *ageku* are still on their way to being grammaticalized to subordinating conjunction markers from nouns, and hence their categorial status is not straightforward, since syntax and semantics do not change at the same rate.

[22] Translated by Naomi Fukumori (personal communication).

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2.3 *Cantonese coverbs*

The term 'coverb' is used in Chinese linguistics to refer to a set of transitive verbs that have preposition-like relational meanings and typically occur in serial verb constructions with one or more other verbs. Here, we will discuss a subset of coverbs in Cantonese for which the coverb phrase (i.e., the coverb plus its object) precedes and modifies the main VP of the clause in an asymmetrical serial construction (cf. Matthews 2006). In (26), for example, the coverb phrase *hai go gaan sezilau* 'at that office' (with coverb *hai*) precedes and modifies the main VP *gin haak* 'see client'.[23]

(26) Keoidei jigaa hai go gaan sezilau gin haak.
they now at that CL office see client
'They are meeting clients in that office right now.'

Coverbs are derived historically from transitive verbs and many of them are still homophonous with main verbs in modern Mandarin (Li & Thompson 1981, Hwang 2000) and Cantonese (Matthews & Yip 1994, Ansaldo 1999, Matthews 2006). For example, the Cantonese coverb *hai* 'at' in (26) can also be used as the main verb of the clause in the sense 'be at', as in (27).

(27) Keoidei jigaa hai go gaan sezilau.
they now at that CL office
'They are in that office right now.'

Although coverbs have developed preposition-like functions as VP modifiers, they retain most of the categorial properties of verbs even in their coverb usage (Matthews & Yip 1994: 60–62, Francis & Matthews 2006). As in the case of English quantificational nouns, it appears that grammaticalization has progressed more fully in semantics than in syntax, resulting in the appearance of mixed verbal and prepositional properties. In this section, we will elaborate on the diachronic development and synchronic analysis of Cantonese coverbs.

2.3.1 *Diachronic development of Cantonese coverbs and semantic change*

Lord's (1993) cross-linguistic study of historical change in serial verb constructions shows that multi-verb constructions indicating two or more distinct events or sub-events are commonly reanalyzed as referring to a single event. Concomitant with this is the gradual development of certain verbs into

[23] Cantonese examples are given in the *JyutPing* romanization developed by the Linguistic Society of Hong Kong (Kwok et al. 1997). Tone marks are omitted except in giving the citation forms of individual lexical items. The abbreviations used in our Cantonese examples are as follows: 3SG 'third person singular pronoun', ASP 'aspect', CL 'classifier', PRT 'particle', and MOD 'modal'.

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prepositions, conjunctions, complementizers, or affixes when used in serial contexts. Although Lord's data are primarily from West African languages, she notes that the same kinds of processes are found in Chinese. Specifically, the constructions in which Chinese coverbs occur are derived from 'the typical patterns of logical and/or chronological serialization in Chinese' (Y. C. Li 1980: 276), and coverbs are currently in historical transition from verb to preposition status (Li & Thompson 1974, Hwang 2000).

Coverbs originated as transitive verbs with a range of different meanings indicating motion, location, path, direction, and other relational notions. Each verb has its own developmental path, and different verbs have developed into coverbs at different points in the history of Chinese (Y. C. Li 1980, Hwang 2000). Furthermore, some coverbs have grammaticalized more fully than others, resulting in individual variation among verbs (Li & Thompson 1974: 274, Hwang 2000: 71). However, a group of them share the same basic word order and semantic function in current usage, occurring in the V1 position of an asymmetrical serial verb construction of the form [V1 NP1 V2 (NP2)] and functioning as modifiers of the main verb, V2. We will consider these verbs together as a class, and we will refer to the construction described above as the coverb construction, keeping in mind that some items traditionally called coverbs occur in other serial constructions instead of, or in addition to, this one.

With the exception of *tung4* 'with' (< 'to be similar') and *jau4* 'from' (< 'to follow'), which today can only be used as coverbs, verbs such as *bong1* 'for' (< 'help'), *deoi3* 'toward' (< 'to face'), *gan1* 'with' (< 'to follow'), and *doi6* 'for, in place of' (< 'to replace') co-exist with homophonous main verbs bearing the original source meanings in modern-day Cantonese (Matthews & Yip 1994: 60–62, Matthews 2006, Li & Thompson 1981: 368f.). The lexical meanings of Cantonese coverbs are similar to the original source meanings, although in some cases the meanings have generalized to some extent. For example, the coverb use of *gan1* 'with' has lost the sense of motion inherent in the original meaning of 'follow', and can be used as in (28) in situations that do not involve motion.[24]

(28) A-Man gan go go sinsaang hok kam.
Ah Man follow that CL teacher learn piano
'Ah Man is learning the piano with that teacher.'

[24] Matthews (2006: 70) notes that even the main-verb use of *gan1* in Cantonese can mean simply '(be) with', as in the simple transitive clause in (i):

(i) ngo gan keoi.
I follow him
'I am with him.'

Thus, it is possible that the semantic change involved here took place independently of the occurrence of *gan1* in the coverb construction.

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In other cases, it is difficult to identify any change at all in the verb's lexical content. For example, there is scarcely any difference between *hai2* in (29a), which retains the relevant source meaning ('to be at'), and (29b), which illustrates the coverb usage ('at').

(29) (a) Keoi hai ukkei. (*hai2* as main verb)
s/he at home
'She is at home.'
(b) Keoi hai ukkei tai dinsi. (*hai2* as coverb)
s/he at home watch television
'She watches television at home.'

Lexical content must, however, be distinguished from the semantic function of coverbs within the coverb construction. While the lexical meaning of some verbs has remained the same, there is a clear difference in the semantic function of coverbs in the context of the coverb construction in (29b), as opposed to the simple transitive construction in (29a). When used as the main predicate of a transitive clause, verbs such as *hai2* 'to be at' license an external argument in subject position and an internal argument in direct object position. Formally, they are two-place predicates which belong to the category F-2 (Sadock 1991: 25).[25] When occurring in V1 position of the coverb construction, however, coverbs belong to the semantic category M(F-1)-1.[26] That is, coverbs lack an external argument of their own, and function together with their objects as modifiers of the predicate expressed by the verb phrase. Therefore it is the main verb (e.g., *tai2* 'watch' in (29b)), not the coverb, that semantically licenses the external argument in subject position.

The fact that the coverb phrase can be omitted without changing the basic propositional content of the clause indicates that coverbs are in fact modifiers of the following VP. For example, if we omit the coverb phrase in (29b), *hai ukkei* 'at home', the sentence still denotes an event of watching television. However, if we omit the main verb phrase, *tai dinsi* 'watch television', we are left with the sentence in (29a), which denotes an event of being at home.

[25] We remain neutral as to whether there are two lexical entries for verbs like *hai2* 'to be at' that seem to have the same lexical content when used as coverbs and as main verbs. It is possible that their lexical entries are underspecified, and that the differences in argument structure arise only when they are used in a particular construction.

[26] In the semantic formalism of Autolexical Grammar (Sadock 1991: 24f.), *hai2* in (29a) is a predicate of category F-2, which combines with an internal argument of category Q to form a predicate of category F-1, where Q corresponds to a syntactic NP and F-1 corresponds to a syntactic VP. In its coverb usage in (29b), *hai2* belongs to the category M(F-1)-1. This means that it combines with an internal argument of the category Q and returns M(F-1), which combines with F-1 (the main verb and its object) to return another F-1 (the entire verb phrase including the coverb phrase). This formalism captures the fact that adverbial modifiers predicate over events, not individuals, but without introducing additional event variables as in Davidson's (1967) approach (see also Chierchia & McConnell-Ginet 2000: 469–471).

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Furthermore, the behavior of coverbs with respect to sentence adverbs shows that they do not license an external argument of their own and therefore do not denote a distinct event predicated of the subject. In (30a) below, the adverb *hou2 siu2* 'rarely' modifies the single event of watching television at home. Example (30b) shows that the coverb construction does not allow an additional sentence adverb modifying *hai2 uk1kei2* 'at home'. Thus this sentence is unacceptable for the same reason as its English translation: the adverbs *seng4jat6* 'always' and *hou2 siu2* 'rarely' cannot sensibly be interpreted as modifying the same event.[27] In contrast, *hai2* 'to be at' is the main verb of a subordinate clause in (30c), thus licensing its own external argument and allowing modification by its own sentence adverb.

(30) (a) Keoi hou siu hai ukkei tai dinsi.
s/he very little at home watch television
'She rarely watches television at home.'
(b) *Keoi sengjat hai ukkei hou siu tai dinsi.
s/he always at home very little watch television
'*She rarely watches television always at home.'
(c) Seoijin keoi sengjat hai ukkei,
although s/he always at home
daanhai hou siu tai dinsi.
but very little watch television
'Although she is always at home, she rarely watches television.'

Thus, in the context of the coverb construction, the coverb serves the preposition-like function of licensing additional, optional information about the event denoted by the main verb (for example, its location), and only the main verb phrase is actually predicated of the individual denoted by the subject (cf. Butt 1997: 14).

According to Pulleyblank (1995: 47), coverbs developed in the context of the 'free serial verb construction' – a construction consisting of a sequence of two or more VPs sharing the same syntactic subject and expressing separate (but temporally, causally, or otherwise related) events. In terms of semantics, each VP contributes a distinct proposition predicated of the individual denoted by the shared subject. In Classical Chinese (551–221 BC), this free serial verb construction had coordinate syntax and could optionally occur with the conjunction *ér* 'and' between the last two conjuncts (1995: 45). The coverb construction, which also already existed in Classical Chinese, differed from the free serial verb construction in that one VP modified the

[27] Our native speaker consultants, Stella Kwan, Helen Ching, and Ritty Choi, point out that (30b) is possible, but only if there is a prosodic break following the first VP. In such a case, the second VP is interpreted as an independent clause with an implied subject, and the meaning is more like that of (30c): 'She is always at home (and she) rarely watches television'. However, the coverb construction, as in (30a), does not allow such a prosodic break following the first VP.

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other VP and did not express a separate event. In addition, the modifying VP had to contain one of a limited number of verbs with preposition-like meanings, and the conjunction *ér* 'and' was not normally used between the two conjuncts (Pulleyblank 1995: 47). Thus, the coverb construction in Classical Chinese already had the argument structure properties described above for modern Cantonese. [28] The coverb construction has become further limited in modern-day Mandarin and Cantonese in that normally the modifying VP (the coverb phrase) must precede the main VP, just like other adverbial modifiers (1995: 48). While it is unclear from the historical records whether the coverb construction actually developed directly from the free serial verb construction, we follow Pulleyblank's (1995) suggestion that this was a very plausible source.

Thus, it appears that the semantic development of coverbs involved a change in argument structure such that a serial verb construction expressing two or more distinct events predicated of the same subject was reanalyzed as a coverb construction expressing a single event modified by a phrase denoting location, path, benefactive, or similar notions. In some cases, there was also a generalization of the verb's lexical meaning. However, as we discuss in the following section, the basic syntactic structure of the coverb construction – sequential VPs with a shared (syntactic) subject – has been retained from the source construction.

2.3.2 *Syntax of coverbs in contemporary Cantonese*

With respect to their syntactic and morphosyntactic properties, Cantonese coverbs are much like other transitive verbs. As noted above, their occurrence in a serial verb construction apparently derives from the ability of any verb to occur in a 'free serial verb construction' expressing two or more events predicated of the same subject (Pulleyblank 1995: 47). Although coverb phrases no longer express a distinct event, Francis & Matthews (2006) show that the Cantonese coverb construction consists of a sequence of two VPs sharing the same subject. In addition, they argue that coverbs are in fact still verbs (not prepositions) with respect to their syntactic category. We will summarize the relevant arguments briefly here.

First of all, Cantonese coverbs occur in V1 position of the coverb construction, a kind of serial verb construction. Other serial verb constructions

[28] Historical records indicate that the first mass migrations of Han Chinese people to the Southern regions in which Cantonese is now spoken occurred during the Qin dynasty (221–206 BC) (Bauer & Benedict 1997: xxxix). This is just after the Classical Chinese period (551–221 BC). Thus we assume that Cantonese is a descendant of Classical Chinese. However, we acknowledge that dialect differences prior to the migrations may be a complicating factor.

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in Cantonese, such as those indicating sequences of events, occur with the same [V NP V (NP)] pattern, as in example (31):[29]

(31) Lei sik-zo faan fan-gaau.
you eat-ASP rice lie-sleep
'Eat and go to bed.' (Matthews 2006: 78)

Secondly, coverbs act as verbs with respect to A-not-A question formation – a method of forming yes-no questions in which the first syllable of the verb is reduplicated, and the negative particle *m-* 'not' is inserted between the two reduplicated syllables. The following examples in (32) show that A-not-A reduplication can occur on either the coverb or the main verb in a coverb construction:[30]

(32) (a) Lei tung-m-tung ngodei sik faan aa?
you with-not-with us eat rice PRT (coverb)
'Will you be eating with us?'
(b) Lei tung ngodei sik-m-sik faan aa?
you with us eat-not-eat rice PRT (main verb)
'Will you be eating with us?'

Finally, although aspect is usually marked on the main verb (V2) of a coverb construction, coverbs in V1 position allow aspect marking as well as a range of post-verbal particles indicating notions such as modality and quantification, as shown in (33a–c). Semantically, aspect takes scope over the entire sentence, regardless of the position of aspect marking in V1 or V2.

(33) (a) Ngo **tung-gwo** keoidei king-gai. (aspect marking)
I with-ASP them chat
'I've chatted with them.'
(b) Ngo m **tung dak** keoidei king-gai. (modal *dak*)
I not with MOD them chat
'I can't chat with them.'
(c) Ngo **tung saai** keoidei king-gai. (*saai* quantification)
I with all them chat
'I chat with all of them.'

In addition to their verbal properties, however, coverbs also have some preposition-like properties. First, coverb phrases are optional adjuncts to the

[29] Francis & Matthews (2006) show based on constituency tests that the [V NP V (NP)] pattern in a coverb construction does in fact consist of a sequence of two VPs, similar to serial constructions that express distinct events and presumably similar to the original source construction.

[30] Francis & Matthews (2005: 274) show that these processes cannot apply to non-verbal predicates such as predicate nominals without the support of a copular verb. Thus, they are an appropriate diagnostic for verbhood.

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following VP, and occur in the same pre-verbal position as VP-modifying adverbs. For example, the coverb phrase *gan go go sinsaang* 'with that teacher' in (34a) can be omitted entirely, or replaced by an adverb such as *jicin* 'formerly' in (34b). However, we note that this position is indistinguishable from the first VP position in a 'free serial verb construction' expressing a sequence of events.

(34) (a) A-Man (gan go go sinsaang) hok kam.
Ah Man follow that CL teacher learn piano
'Ah Man is learning the piano with that teacher'
(b) A-Man jicin hok kam.
Ah Man formerly learn piano
'Ah Man was learning the piano before.'

Secondly, coverbs generally do not allow 'stranding' of their objects under A′-movement (topicalization or relativization). As shown in (35), for example, the object of the coverb *tung* 'with' cannot be moved from its position following the coverb unless a resumptive pronoun is used (35b–c).[31]

(35) (a) Ngo tung A-John m suk.
I with A-John not familiar (basic coverb construction)
'I'm not familiar with John.'
(b) *A-John, ngo tung m suk.
A-John I with not familiar (topicalization with gap)
'John, I'm not familiar with.' (intended)
(c) A-John, ngo tung keoi m suk.
A-John I with 3SG not familiar
(topicalization with resumptive pronoun)
'John, I'm not familiar with him.'

Some authors have taken similar evidence from Mandarin to indicate that at least some items traditionally categorized as coverbs are in fact prepositions (e.g., Li & Thompson 1974, Y. A. Li 1990, Zhang 1990, McCawley 1992, Huang 1998). However, apart from stranding, Cantonese coverbs display all of the typical syntactic and morphosyntactic properties of verbs. Thus, Francis & Matthews (2006) argue that preposition-like properties of coverbs can be attributed to two factors that are independent of syntactic category: (1) the semantic status of coverb phrases as VP modifiers; and (2) an island

[31] An anonymous reviewer notes that some coverbs disallow extraction even when they are used as the main verb of a simple clause. For example, Francis & Matthews (2006: 796) found that sentences containing relative clauses in which the object of *hai* 'at' was extracted were rated only marginally more acceptable when *hai* was the only verb in the clause than when *hai* was used as the first verb of a coverb construction. Overall, however, they found that extraction with coverbs used as main verbs was significantly more acceptable than with coverbs used as the first verb in a coverb construction.

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constraint which bars extraction from a VP functioning as an adjunct to another VP. Although a semantic account of the extraction facts is quite plausible (cf. Culicover & Jackendoff 1997), there is no clear evidence to determine whether the island constraint applies in syntax or in semantics. If the constraint is syntactic, then coverb phrases must be treated as syntactic adjuncts, in which case a coverb phrase differs in its syntactic function from the first VP of the source construction, which was a coordinate VP. Nevertheless, since coverb phrases are clearly VPs (not PPs) in syntax and still occur in a position adjacent to another VP, it appears that most of the original syntactic properties of coverbs have been retained. Similar to the other cases discussed above, this situation can be understood as the result of semantic change in the argument structure of coverbs having occurred independently of any change in syntactic category.

2.4 *Japanese deverbal postpositions*

In this section, we present Japanese deverbal postpositions, which originated as verbs and became postpositions. This type of grammaticalization is frequently observed; the English word *considering*, for example, originated as a verb and can be used as a subordinating conjunction (Hopper & Traugott 2003).

(36) Considering (*having carefully considered) you are so short, your skill at basketball is unexpected. (conjunction)

As shown in (37), *considering* can also be used as a verbal participle, but Hopper & Traugott point out that it differs from the subordinating conjunction *considering* in the following respects: (i) the participle *considering* can be modified by an adverb such as *carefully*; (ii) it allows past tense; and (iii) the interpretation of the covert subject is controlled by the matrix subject.

(37) [PRO Carefully considering/Having carefully considered all the evidence] the panel delivered its verdict. (participle)

In this section, we present similar cases from Japanese where some verbs become postpositions, and suggest again that the semantic properties of these deverbal postpositions change faster than their syntactic properties.

2.4.1 *Verbal properties of Japanese deverbal postpositions*

Some examples of Japanese deverbal postpositions are given in (38).

(38) (a) Koronbasu-wa Shikago-**ni** **kurabe-te** atataka-i.
Columbus-TOP Chicago-to compare-PTCP warm-PRES
'(lit.) Columbus is warm comparing it to Chicago.'
'Columbus is warmer than Chicago.'

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(b) Kono gakkai-o Tokyoo-**ni** **oi-te** kaisai shi-mas-u.
this conference-ACC Tokyo-in place-PTCP hold do-POL-PRES
'(lit.) (We) will hold this conference placing (it) in Tokyo.'
'(We) will hold this conference in Tokyo.'

These deverbal postpositions originated as verbs (Muraki 1991, Matsumoto 1998, Iori et al. 2001). First, the participial form of regular verbs is morphologically identical to these deverbal postpositions, as shown in (39).

(39) (a) Nihonjin-wa yoku Tokyoo-o Nyuuyooku-**ni** **kurabe-te**
Japanese-TOP often Tokyo-ACC New York-to compare-PTCP
kangae-mas-u.
think-POL-PRES
'Japanese often think of Tokyo comparing it to New York.'
(b) Nimotsu-o soko-**ni** **oi-te** kochira-e ki-te kudasai.
bag-ACC there-at place-PTCP here-to come-PTCP please
'(After) having placed your bag there, please come here.'

Second, as Muraki (1991) points out, these deverbal postpositions appear with the case markers or postpositions that the original verbs subcategorize for. For example, the verb *meguru* 'to visit', shown in (40a), is a transitive verb that subcategorizes for a theme marked by the accusative marker *-o*, and the corresponding deverbal postposition *∼o megut-te* 'concerning/on' contains the accusative marker *-o*. Similarly, the verb *tsuku* 'to accompany' subcategorizes for an internal argument marked by a dative marker *-ni*; hence the dative marker *-ni* is part of the deverbal postposition *∼ni tsui-te* 'about', as shown in (40b). As shown in (41), regular postpositions subcategorize for arguments directly, and no case markers intervene between the postposition and its argument.

(40) (a) Ohenro-san-no ikkoo-wa 88-kasho-no reejoo-**o**
pilgrim-GEN group-TOP 88-places-GEN sacred.place-ACC
megut-te arui-ta. (participle)
visit-PTCP walk-PAST
'The group of pilgrims walked and visited 88 sacred places.'
(a′) Kono mondai-**o** **megut-te** ronsoo-ga oki-ta.
this issue-ACC visit-PTCP debate-NOM arise-PAST
(deverbal postposition)
'Concerning/on this issue, a controversy arose.'
(b) Hahaoya-ga itsumo kodomo-**ni** **tsui-te** ku-ru.
mother-MOM always child-to accompany-PTCP come-PRES
(participle)
'The mother always comes accompanying the child.'

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(b′) Kore-**ni** **tsui-te** hanashi-te kudasai.
this-to accompany-PTCP speak-PTCP please
(deverbal postposition)
'Please talk about this.'

(41) Daigaku-*o/*ni/Ø-kara kyonen sotsugyoo-shimashi-ta.
college-ACC/DAT/Ø-from last.year graduation-do-PAST
'(I) graduated from college last year.'

Note that these case markers and postpositions that appear in deverbal postpositions are fossilized, and they no longer have semantic content.

Third, regular verbs have two participle forms, the direct form *-te* and the polite form *-mashi-te*. The polite form *-mas* normally occurs only with verbs, but these deverbal postpositions can also appear in both forms (Muraki 1991, Matsumoto 1998).

(42) (a) Konkai-wa 30-kasho-**o** **meguri-mashi-te**, nokori-wa
this.time 30-places-ACC visit-POL-PTCP rest-TOP
zehi tsugi mawari-ta-i-to omoi-mas-u.
definitely next go-want-PRES-COMP think-POL-PRES (participle)
'We visited 30 places this time, and we definitely want to go to the other places next time.'

(b) Kono mondai-**o** **meguri-mashi-te** ronsoo-ga oki-te
this issue-ACC visit-POL-PTCP debate-NOM arise-PTCP
ori-mas-u.
be-POL-PRES (deverbal postposition)
'Concerning/on this issue, a controversy arose.'

Although these deverbal postpositions originated as verbs and look very similar to verbs (in the participial form), they do not have all of the properties of normal verbs. In the next section we examine how the properties of deverbal postpositions differ from those of prototypical verbs.

2.4.2 *Deverbal postpositions as postpositions*

If we examine these deverbal postpositions closely, we find that they differ semantically from normal verbs in the participial construction. When used in the participial construction, these verbs are two-place predicates (of formal category F-2) which license an internal argument (a direct object) and an implied external argument (a PRO subject). Together with their arguments, they express a distinct proposition (a subordinate clause) which functions as a modifier of the proposition denoted by the main clause. When used as deverbal postpositions, however, they no longer have any external argument, and the phrase containing the deverbal postposition no longer expresses a separate event. Like Cantonese coverbs, they act as modifiers of the main predicate and belong to the semantic category M(F-1)-1.

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These semantic changes have several consequences for the distribution of deverbal postpositions. First, deverbal postpositions can be paraphrased by ordinary postpositions such as *yori* 'than' and *de* 'in' (Muraki 1991).

(43) (a) Koronbasu-wa **Shikago-ni kurabe-te/Shikago-yori** atataka-i.
Columbus-TOP Chicago-to compare-PTCP/Chicago-than warm-PRES
'Columbus is warmer than Chicago.'

(b) Kono gakkai-o **Tokyoo-ni oi-te/Tokyo-de**
this conference-ACC Tokyo-in place-PTCP/Tokyo-in
kaisai shi-mas-u.
hold do-POL-PRES
'(We) will hold this conference in Tokyo.'

Second, because deverbal postpositions lack an implied PRO subject, their interpretation is not affected by the matrix clause subject, as shown by the acceptability of both active and passive sentences in (44b–b′). In contrast, in a participial construction the matrix subject controls the covert PRO subject, thus rendering the passive sentence in (44a′) unacceptable.

(44) (a) **Enjinia-wa** [**PRO** buruupurinto-o soba-**ni oi-te**]
engineer-TOP blueprint-ACC side-at place-PTCP
shorui-o shirabe-ta.
document-ACC check-PAST (participle)
'The engineer checked the document, having placed the blueprint beside him.'

(a′) ***Shorui-ga** [**PRO** buruupurinto-o soba-**ni oi-te**]
document-NOM blueprint-ACC side-at place-PTCP
enginia-niyotte shirabe-rare-ta.
engineer-by check-PASS-PAST (participle)
'*The document was checked by the engineer, having placed the blueprint beside him.'

(b) Kono gakkai-o Tokyoo-**ni oi-te** kaisai
this conference-ACC Tokyo-in place-PTCP hold
shi-mas-u.
do-POL-PRES (deverbal postposition)
'(We) will hold this conference in Tokyo.'

(b′) **Kono gakkai-ga** Tokyoo-**ni oi-te** kaisai
this conference-NOM Tokyo-in place-PTCP hold
s-are-ru.
do-PASS-PRES (deverbal postposition)
'This conference will be held in Tokyo.'

Third, unlike participial constructions, adverbs cannot modify deverbal postpositions (Matsumoto 1998).

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(45) (a) *Gakkai-o [**umaku** Tokyo-**ni** **oi-te**] kaisai
conference-ACC nicely Tokyo-in place-PTCP hold
su-ru.
do-PRES (deverbal postposition)
'*(We) will hold this conference [nicely in Tokyo].'

(b) Hanako-wa [PRO bruupurinto-o **imaku** soba-**ni** **oi-te**]
Hanako-TOP blueprint-ACC nicely side-in place-PTCP
mokee-o tsukut-ta.
scale model-ACC make-PAST (participle)
'Hanako made the scale model[, having placed the blueprint nicely beside her].'

Fourth, since aspectual expressions must take semantic scope over a proposition, and deverbal postpositions do not express a distinct proposition, deverbal postpositions do not occur with aspectual expressions such as *-hajime* 'start' (Muraki 1991).[32]

(46) (a) *Tokyo-**ni** **oki-hajime-te**
Tokyo-in place-start-PTCP (deverbal postposition)

(b) [PRO osake-o mise-**ni** **oki-hajime-te**]
liquor-ACC store-in place-start-PTCP (participle)
'having started to have some liquor in the store'

Fifth and finally, while the event expressed in a participial construction can be understood to take place prior to the event expressed in a matrix clause, deverbal postpositions do not evoke such temporal relations.

(47) (a) Kono gakkai-o [Tokyo-**ni** **oi-te**] kaisai
this conference-ACC Tokyo-in place-PTCP hold
su-ru.
do-PRES (deverbal postposition)
'(We) will hold this conference [in Tokyo].'

(b) Hanako-wa [PRO bruupurinto-o soba-**ni** **oi-te**]
Hanako-TOP blueprint-ACC side-in place-PTCP
mokee-o tsukut-ta.
scale-model-ACC make-PAST (participle)
'Hanako made the scale model[, having placed the blueprint beside her].'

[32] Contrary to Japanese deverbal postpositions, Chinese coverbs (discussed in section 2.3.2) do allow aspect marking that takes scope over the entire sentence. The Chinese coverbs, however, are different from the Japanese deverbal postpositions in that while Chinese coverb constructions originated as coordinate structures that express a sequence of events and allow aspect marking on V1 in Chinese, both deverbal postpositions and their original verbal gerunds in Japanese are subordinate to the main clause. Therefore, there is no reason for aspect marking of the main clause to occur in these subordinate constructions.

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The event expressed in a participial construction, as shown in (47b), is often assumed to take place prior to the event expressed in the matrix clause. Hence, in (47b), the act of placing the blueprint beside her takes place before Hanako starts working on the model. On the other hand, the example in (47a) involves only one event, and so the deverbal postposition cannot evoke an event that takes place prior to the event expressed in the matrix clause.

In the previous sections, we have shown that Japanese deverbal postpositions show morphosyntactic similarities to regular verbs. However, these deverbal postpositions are semantically distinct from the participle form of regular verbs in that they fail to license an external argument and do not express an event distinct from the event denoted by the main clause. In this respect they are similar to Cantonese coverbs. We again conclude that semantic properties can change faster than syntactic properties in the process of grammaticalization.

3. A MULTI-MODULAR APPROACH TO GRAMMATICALIZATION

In this section, we first briefly review the theoretical principles underlying our analysis and then discuss how these principles can help us understand the systematic nature of what is changed and what is retained in the four constructions discussed in section 2 above.

3.1 *Theoretical principles*

Our multi-modular approach posits separate generative modules or levels for syntax and semantics (Sadock 1991, Culicover & Jackendoff 2005, Yuasa 2005). The syntax module includes syntactic categories and relations (noun, verb, NP, VP, head, adjunct, complement, c-command, etc.), phrase structure rules, morphosyntactic features (e.g., case, number, person), while the semantics module includes semantic categories and relations (head, modifier, predicate, argument, operator, etc.) and co-reference relations such as control and binding. The major consequences of this approach are as follows: (i) a much smaller and simpler syntax as compared with derivational theories such as Minimalism (Sadock 1991, Jackendoff 2002, Culicover & Jackendoff 2005, Yuasa 2005); (ii) treatment of binding, control, and quantifier scope directly in semantics (Culicover & Jackendoff 2005); (iii) a simple, straightforward account of 'mismatch' cases where there is an incongruity between syntax and semantics, but systematicity within each level (Francis 1999, Yuasa & Francis 2003, Yuasa 2005); (iv) the possibility of independent historical changes in syntax and semantics, as shown in our case studies. We emphasize that in a multi-modular approach, the distribution of a word or morpheme is not necessarily determined by syntactic constraints alone; semantic constraints can directly affect an item's distribution, independently of the syntax.

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3.2 *Analysis of semantic change and syntactic retention*

The above case studies are in many ways compatible with mainstream cognitive and functionalist theories of grammaticalization (e.g., Bybee et al. 1994, Heine & Kuteva 2002, Bybee 2003, Hopper & Traugott 2003). Each of the changes that we have discussed is ongoing and gradual, and each one can be described as involving processes such as metonymy and semantic generalization, and as moving along a typical 'unidirectional' pathway from lexical item to grammatical item. For example, Cantonese coverbs and Japanese deverbal postpositions are derived from verbs, but have taken on some adposition-like properties. Hopper & Traugott (2003: 106–114) characterize such phenomena in terms of 'decategorialization' – the gradual loss of certain grammatical properties typically associated with the source category. We have shown, for example, that Japanese subordinating conjunctions can no longer occur in the full range of contexts available to ordinary nouns. Furthermore, these cases can be described synchronically in terms of 'layering' of polysemous items or constructions (Hopper & Traugott 2003: 124–126). Cantonese coverbs, Japanese deverbal postpositions, and English QNs continue to co-exist with homophonous forms to which they are historically related.

While mainstream grammaticalization theories contribute much insight into the development of these items and constructions, our multi-modular approach contributes an additional dimension to their analysis. In particular, this approach can provide a finer-grained and more systematic account of decategorialization and its synchronic consequences. In each of the four case studies we have examined, a semantic change has occurred, but syntactic properties lag behind the change of semantic properties.[33] The specific changes involved are summarized in table 1.

We can see from table 1 that syntax and semantics change independently and that these changes result in a mismatch between syntax and semantics. Specifically, the syntactic properties of one category are associated with semantic properties that are more typical of a different category. For example, a common noun functioning as the head of a noun phrase normally indicates an object or entity and has a criterion of identity. However, English QNs no longer have this semantic property, but rather quantify an object or entity expressed by another noun. Thus, they function semantically like quantifiers even though they retain many of the syntactic properties of countable common nouns.

Cases of mismatch such as these result in an unusual array of grammatical properties and are prime examples of decategorialization as described by Hopper and Traugott (2003: 106–115). What is often missing from discussions

[33] Newmeyer (1998: 252–259) also proposes that different levels of grammar can independently contribute to the processes associated with grammaticalization.

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Construction	Semantics	Syntax
English quantificational nouns	Semantic head of nominal > Quantifier of nominal	Head noun > Head noun
Japanese subordinating conjunctions	Semantic head of nominal > Modifier of main proposition	Head noun > Head noun
Cantonese coverbs	Main predicate > Modifier of main predicate	Serial VP > Serial VP
Japanese deverbal postpositions	Main predicate > Modifier of main predicate	Participial VP > Participial VP

Table 1
Semantic change and syntactic retention in four cases of grammaticalization

of decategorialization, however, is the highly systematic nature of what is changed and what is retained. We have shown that for all of these cases, most of the effects of decategorialization are a direct result of semantic change. For example, although Japanese subordinating conjunctions retain certain formal properties of nouns, they have lost their ability to be modified by adjectives and can only occur as the object of a single postposition *-ni* 'at' (which is semantically bleached in this context). In contrast, ordinary nouns can be modified by adjectives, and can occur with a wide range of postpositions. Similarly, English QNs have lost their ability to occur following numerals and definite determiners, and can only be modified by a small number of adjectives such as *whole* and *big*. Given a multi-modular view of grammar, the defective distribution of these constructions in comparison to the source constructions can be treated synchronically within the semantic system, with little or no reference to the syntactic system. For example, Japanese subordinating conjunctions fail to occur with adjectives because they are semantically incompatible with the existing adjectives in the language. Likewise, English QNs can only be modified by a few adjectives like *whole* and *big* because these are the only adjectives in English with the appropriate (intensifier) meanings.

Importantly, the four constructions discussed here, which are typologically and constructionally diverse, show similar patterns in terms of semantic and syntactic changes and display systematicity within the syntactic system independently of the semantic system. This suggests that a separate dimension of syntactic structure is needed to fully understand their behavior. In particular, we have shown that some of the syntactic properties that these

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constructions have retained have lost their semantic functionality, and appear to occur only to satisfy independently-needed syntactic constraints. For example, the determiner *a* and the preposition *of* in a QN phrase such as *a lot of people* have little if any semantic content, but function in the syntax to satisfy the constituent structure requirements of common nouns, which occur with determiners (when singular) and allow PP but not NP complements. Similarly, Japanese deverbal postpositions occur with the same case markers or postpositions that the original verb subcategorized for, even though these case markers and postpositions have become semantically bleached and no longer indicate any semantic relation of the deverbal postposition to its object. Thus, the case markers serve the purely syntactic function of satisfying the selectional requirements of the verb, and the requirement of transitive verbs in general to select case-marked complements.

In sum, most of the effects of decategorialization shown in our data can be attributed directly to constraints within the semantic system, given a view of semantics as a generative system with its own units and combinatoric principles. Similarly, the retention of syntactic properties such as categories, constituency, and case-marking even in the absence of semantic functionality can be attributed to constraints within the syntactic system.

4. Further issues in grammaticalization

The analysis presented in section 3 raises a number of questions regarding the nature of grammaticalization. This section briefly examines the implications of our study for four of these issues: (1) why syntactic changes typically follow from semantic changes; (2) why semantic change typically occurs before syntactic change and whether the reverse is possible; (3) why grammaticalization takes place among existing grammatical categories; (4) why syntactic properties can be retained for many years following semantic change, allowing for mismatch within the synchronic system.

4.1 *Why syntactic changes typically follow from semantic changes*

In many cases of grammaticalization, syntactic change catches up with semantic change, bringing form and meaning into closer alignment. Why should this be? One reason is frequency of use. In their cross-linguistic study of grammaticalization, Bybee, Perkins & Pagliuca (1994) found that semantic generalization often leads to high frequency of use, which in turn leads to phonological reduction and morphological fusion. Such formal reduction can, in turn, lead to syntactic reanalysis. For example, English *going to* was originally restricted to contexts involving change of location, but was semantically generalized to mean future intention. This allowed for a wider range of uses and a higher frequency of use, resulting eventually in morphological fusion (*going to* > *gonna*). The beginnings of such a process can be seen in our example of English QNs: as a consequence of frequent use, the phrase *a lot of*

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can be pronounced as *alotta* in casual speech. Eventually, *alotta* could be reanalyzed as a single word functioning as a quantifier, thus resolving the current mismatch between syntax and semantics.

An additional factor favoring syntactic change is a phenomenon that Newmeyer (1998: 129f.) calls PSCI – Pressure for Structure – Concept Iconicity. The basic idea is that languages tend to have predictable form–meaning correspondences to facilitate language processing and language acquisition. Such correspondences may take the form of categorial prototypes, as proposed by Yuasa (2005: 29) and Yuasa & Francis (2003).[34] Thus, mismatch cases which violate the prototypical form–meaning correspondence may be more difficult to learn and process than constructions which conform to the prototypical associations, and therefore may be susceptible to change. For example, Cantonese coverbs have retained the syntactic properties of verbs even after taking on the semantic function of modifiers. To resolve this mismatch, we would expect coverbs to eventually lose their verbal properties and be reanalyzed as prepositions. Something like this has already happened to the item *bei2* in Cantonese – an item which is sometimes called a 'coverb' but derives from a different type of serial verb construction and occurs following rather than preceding the main verb. The item *bei2* is historically derived from the verb *bei2*, which means 'give', but it is equivalent to the English word *to* when used in a dative construction to introduce an indirect object:

(48) Ngo maai ga che bei lei.
I sell CL car to you
'I sell the car to you.'

In this usage, *bei2* cannot combine with any aspect markers or verbal particles and shows none of the verbal properties of the coverbs discussed here. Thus, the indirect object marker *bei2* has arguably been reanalyzed as a true preposition (Matthews & Yip 1994: 407). However, unlike the case of English *alotta*, this item has not undergone phonological reduction or morphological fusion.[35] The principle of Pressure for Structure–Concept Iconicity can help explain syntactic change even in the absence of phonological reduction: items may undergo syntactic change to resolve a mismatch between syntax and semantics.

[34] However, Newmeyer (1998: 165–208) denies the existence of prototypes in grammar. For him, PSCI is a functional motivation external to the grammar.

[35] Bisang (2004) explains the lack of phonological reduction in grammaticalization as being a typological property of certain East Asian and Southeast Asian languages, including Chinese. Bisang observes that in these languages, grammaticalized items have a broad range of polysemous functions and that they are generally non-obligatory, and therefore occur less frequently than comparable markers in other languages, He argues that both of these factors contribute to the tendency for grammaticalized items to be expressed as full words rather than being reduced to clitics or bound morphemes (2004: 133f.).

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4.2 *Semantic change before syntactic change and vice versa*

The cases we have described so far involve semantically-driven grammaticalization (Brems 2003). In each case, a semantic extension motivates changes in the distribution of a given item or construction which can (but need not) eventually lead to a complete syntactic reanalysis. According to Traugott (2003), such a situation is typical of grammaticalization: 'A close investigation of historical texts points repeatedly to the occurrence of meaning change before syntactic reanalysis is possible' (2003: 636). Why should this be the case? Simply put, interpretive (hearer-based) processes such as pragmatic inference, metonymy, metaphor, and argument structure reduction can apply to a given utterance without changing its form. However, once such semantic or pragmatic extensions have been conventionalized through repeated use, the distribution of an item changes to fit its new meaning.

Although semantically-driven grammaticalization seems to be the norm, the multi-modular approach espoused here is also compatible with the possibility of syntactically-driven grammaticalization. Indeed, Klamer (2000) discusses cases which appear to involve syntactic change prior to semantic change. Whereas semantically-driven grammaticalization tends to be hearer-based, involving inferences that the speaker may or may not have intended, syntactically-driven grammaticalization tends to be speaker-based, deriving from a speaker's desire for economy in production and the tendency for loss of predictable information in discourse (Klamer 2000: 89). Specifically, Klamer (2000) describes the development of quote markers and complementizers from report verbs in the Austronesian languages Kambera, Buru, and Tukang Besi. In Buru, for example, the item *fen* originated as a verb meaning 'to say' (and continues to have this usage) but has developed additional functions as a quote marker which precedes direct quotations and as a complementizer which precedes the clausal complement of a verb of speaking, thinking, or perceiving. Klamer argues that the historical change that brought about the new functions of *fen* and similar items involved morphosyntactic change *followed* by semantic generalization. Specifically, she observes that subject-marking pronominal clitics can be dropped in certain discourse contexts where the meaning of the subject is clear (e.g., she-say I go > say I go). She argues that this discourse-based pro-drop created a mismatch, such that there was a semantic argument not expressed by any syntactic constituent.[36] Klamer hypothesizes that the PSCI (the Semantic Transparency Principle, in Klamer's terminology) motivated the relevant historical changes. Specifically, this missing subject in syntax motivated a semantic change whereby the external argument of the report verb

[36] Note that in Buru, there is no agreement or case marking other than the pronominal clitic to help listeners identify the subject.

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was eventually lost, bringing syntax and semantics again into closer conformity.

Klamer's (2000) analysis of the grammaticalization of quote markers and complementizers from verbs of saying provides an example of syntactically-driven grammaticalization in the sense that loss of an overt syntactic constituent motivated the eventual loss of the corresponding semantic argument. This can be contrasted with semantically-driven grammaticalization, whereby an invisible semantic change helps motivate eventual changes in syntactic structure. We conclude that both kinds of change are possible consequences of PSCI, and both kinds are compatible with a multi-modular view of grammaticalization.

4.3 *Why grammaticalization takes place among existing grammatical categories*

Why does grammaticalization take place among existing grammatical categories instead of creating completely novel categories? Traugott (2003: 644) points out that in grammaticalization, creation of entirely new syntactic structure does not normally occur. More typically, items or constructions are extended to new semantic contexts associated with other existing items or constructions, but remain embedded within the syntactic restrictions of the original items or constructions. This tendency is clearly borne out in our data.

Drawing on the analyses of Lakoff (1987) and Goldberg (1995), Yuasa (2005: 32) suggests that mismatch cases are less taxing to human cognition than completely novel categories. For example, Japanese subordinating conjunctions such as *totan* or *ageku* are hybrids of prototypical nouns and prototypical postpositions, as shown in (49).

(49)

		SYNTAX	SEMANTICS
(a)	Prototypical noun	N	common noun
(b)	Prototypical postposition	P	modifier
(c)	Mismatch (e.g., *totan*, *ageku*)	N	modifier

Note that while the correspondence of noun in syntax with modifier in semantics is idiosyncratic in (49c), their representations in syntax and semantics are those of prototypical categories. Lakoff (1987: 346f.) and Goldberg (1995: 69–72) claim that utilization of what is already familiar in grammar is common in language because it is an efficient use of cognitive resources. If grammar consists of parallel autonomous levels, categories like (49c) are much more economical than completely novel categories. Hence, we suggest that grammaticalization takes place among existing grammatical categories and results in mismatches, although such mismatches are less stable than prototypical categories and are subject to the PSCI.

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4.4 *Why are syntactic properties retained in the absence of semantic support?*

Given the effects of frequency and the PSCI, we would expect the mismatch cases discussed in section 2 above to resolve themselves, bringing form and meaning again into close alignment. In particular, we would expect non-functional morphemes and structures to eventually disappear or become fused together with other morphemes. We have noted, for example, that *a lot of* may be phonologically reduced to *alotta* in casual speech. What is especially interesting about these cases, though, is that much of the original syntactic structure of these constructions has been retained over many years, despite its lack of semantic functionality. Why should this be? Newmeyer (2005: 185–187) discusses three factors in the retention of the GEN–N word order in English, as in the phrase *John's book*, which also appear applicable to the current cases: (i) pressure of conventionality; (ii) functional differentiation between constructions (avoidance of synonymy); (iii) purely structural pressure, caused by the existence of neighboring constructions with the same syntactic properties.[37] We will discuss each of these in turn.

An obvious but nonetheless important factor in the retention of ANY construction is conventionality. Newmeyer states: 'Except in unusual historical circumstances, one's grammar reflects to an extremely high degree the grammars of those in one's speech community. The factor that best explains why a person's grammar has the properties that it has is *conventionality*' (Newmeyer 2005: 184). Undoubtedly, the most important reason people continue to use constructions with non-functional elements of structure is that they learn them from other speakers when they learn the language. Newmeyer (2005: 185), following Croft (2000), points out that the force of conventionality is motivated both by pressure for social conformity and by the tendency for mental routinization. This, of course, does not explain why some constructions change and others are retained, but it must be acknowledged as a powerful force both in language acquisition and in language use by adult speakers.

A second factor which can help explain long-term retention of syntactically non-functional patterns is the tendency for languages to avoid complete synonymy. In the case of English QNs, Brems (2003) observes that QNs are not completely synonymous with ordinary quantifiers because they tend to have an expressive quality not present in ordinary quantifiers, and she argues that this expressive quality is derived from semantic features that were retained from the source construction. For example, she observes that the QN *bunch* tends to collocate with negative human nouns such as *rednecks*,

[37] According to Newmeyer (2005: 185f.), the retention of GEN–N word order in English is unexpected from a functional point of view since English has otherwise become a primarily head-initial language, and Hawkins (2004) has shown that this kind of non-uniformity in word order is inefficient for parsing.

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no-hopers, *bastards*, and *do-nothings*. She attributes this to the semantic feature of 'unruliness' which is retained from the source construction and which originally pertained to a particular manner of arrangement among a collection of items. When used with the QN *bunch*, this sense of 'unruliness' has come to indicate a negative evaluation (or perhaps a sense of youthful vivaciousness, in the case of *a bunch of lads*) of the person or entity denoted by the following noun (Brems 2003: 298). This semantic feature thus distinguishes *bunch* from otherwise comparable quantifiers such as *several* or *many* and may thereby contribute to the retention of the QN construction in which *bunch* occurs.

A third factor which may contribute to retention of these 'mismatch' constructions is purely structural pressure from syntactically similar constructions. Using a connectionist network to model learning and morphological change, Hare & Elman (1995) found that English irregular verbs are easier to learn and more likely to be retained over successive generations when they are among a cluster of verbs with a similar irregular form (e.g., *sing–sang–sung*, *spring–sprang–sprung*, *ring–rang–rung*) than when they are not (e.g., *freeze–froze–frozen*). The authors show that their network closely resembles what happened in the history of English, and they propose that similarity or lack of similarity to existing forms was an important factor in whether particular irregular verb forms were retained in English. While similar studies have not been conducted with respect to syntactic retention, we can plausibly apply the same idea to our case studies. The English QN construction, for example, is one member of a family of binominal NP constructions of the same form. Other examples include collective NPs (*a bunch of grapes*), partitive NPs (*a cup of water*), and abstract binominal NPs (*the joy of cooking*). Similarly, the Cantonese coverb construction is a member of a family of serial verb constructions consisting of two or more sequential VPs within the same clause (cf. Matthews 2006). We hypothesize that the existence of several related constructions with the same syntactic constituent structure may help to reinforce retention of that structure even in cases where aspects of the structure fail to serve any obvious semantic function. Empirical confirmation of this hypothesis awaits further research.

As with any historical change, it is impossible to predict exactly which features will change and which will be retained. However, the three factors we have described here can at least help to motivate the patterns of syntactic retention that are shown in our data.

5. Conclusion

Our four cases studies have shown that semantic properties can change faster than syntactic properties in gradual processes of grammaticalization. We propose that this sort of change is best captured using a multi-modular, parallel-architecture framework (Sadock 1991, Yuasa 2005), which allows

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changes to affect semantic structure independently of syntactic structure. Although grammatical categories normally conform to certain prototypical correspondences (Croft 2001, Yuasa 2005), our case studies show that the syntactic properties of one category can become associated with the semantic properties of a different category when an item undergoes semantic change, leading to an unusual pattern of distribution. Importantly, the relevant items and constructions still conform to the separate structural constraints of syntax and of semantics, despite the unusual combination of properties. These findings are important for theories of grammaticalization because they suggest that the cover term 'decategorialization' must be understood in terms of at least two separate processes: (1) the effects of semantic generalization on an item's distribution; and (2) the effects of frequency and Pressure for Structure–Concept Iconicity on an item's syntactic categorization. Our case studies show that the first kind of decategorialization effects can occur even in the absence of the second kind.

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