Lexical Items and Zero Morphology[*]

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1. Introduction

In this paper I explore the problem of the second language acquisition of zero morphology, but in particular how this relates to knowledge of lexical items. While the study of the acquisition of zero morphology is not new, given recent views of argument structure and event structure as exemplified by the work done by Hale & Keyser (1993), interest in the extent to which languages have zero morphemes has increased significantly. In order to focus the discussion, in this short paper, I will concentrate on the problem of telicity[1] — where and how it is encoded cross-linguistically and what sort of problems this might raise for second language acquisition.

2. Background

Given Hale and Keyser's (1993) view of l-syntax, lexical entries such as *shelve* or *thin* in the example sentences given in (1) below involve zero morphology, where certain syntactic heads, presumably headed by zero-morphemes, are needed to introduce the arguments and part of the event structure. A phrase structure indicating these zero heads is given in (2).

(1) a.   The librarian shelved the books.
    b.   The chef thinned the soup.

(2)   Hale & Keyser: *shelve* $=[[[\sqrt{shelf_N}+0_P]+0_v]+0_v]$
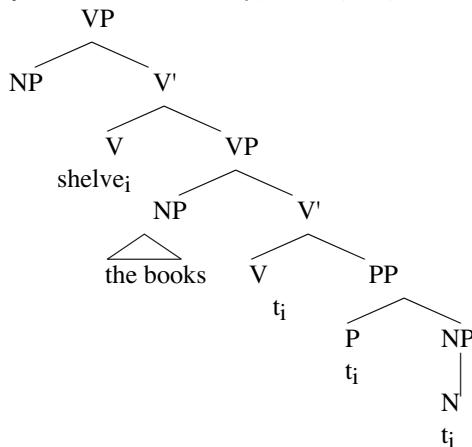
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[1] Though I will use the term 'telicity' throughout, at certain points the semantic contribution of the morphemes will be closer to 'boundedness' in the sense of Depraetere (1995) or 'termination' in the sense of Smith (1991). Because I want to collapse the two notions, I will label them all, perhaps misleadingly, 'telicity'.

I want to extend this idea of zero morphemes being used to determine event structure to the notion of telicity or boundedness. It is clear that languages differ in terms of how and whether telicity is encoded. In English, an event is telic given the appropriate choice of verb and internal arguments. As the examples below show, if one of these components fails to provide a measure, the event is atelic, allowing use of the phrase 'for X time'. In (3), where the verb itself is telic, an object of a specified quantity ([+SQA] of Verkuyl 1989:81) is sufficient to make the whole event telic.[2] With a bare plural, however, the event is atelic.

(3)   a.   *eat DP_{sg}* – telic
          The children ate <u>the muffin</u> ($\sqrt{}$in three minutes/*for three minutes).
     b.   *eat DP_{barepl}* – atelic
          The children ate <u>muffins</u> (*in three minutes/$\sqrt{}$for three minutes).

In (4), the verb *push* is not itself telic and a singular object is not sufficient to create a telic event. The verb *push* needs to have a telic goal phrase as in (4b) to create a telic event. But just as above, the event becomes atelic with a bare plural object.

(4)   a.   *push DP_{sg}* -- atelic
          The children pushed the cart (*in three minutes/$\sqrt{}$for three minutes).
     b.   *push DP_{sg} PP* -- telic
          The children pushed the cart to the wall ($\sqrt{}$in three minutes/*for three minutes).
     c.   *push DP_{barepl} PP* -- atelic
          The children pushed carts to the wall (*in three minutes/$\sqrt{}$for three minutes).

If all languages treated telicity the same way, then both first and second language acquisition would not present a great problem to the learner. However, languages vary considerably. For example, Malagasy and Chinese both need special marking on the verbs to ensure that an event has been completed. (The Malagasy verb forms are given to the right of the examples.)

(5)   Malagasy
        a.   namory   ny ankizy   ny mpampianatra   (n+an+$\sqrt{}$vory)
            PST.an.meet the children the teachers
            'The teachers gathered the children'

        b.   ... nefa   tsy nanana fotoana izy
               but   NEG PST.have time   they
            '... but they didn't have time.'

(6)   a.   **naha**vory   ny ankizy   ny mpampianatra   (n+a+ha+$\sqrt{}$vory)
           PST.a.ha.meet   the children   the teachers
           'The teachers gathered the children.'

        b. *   .... nefa tsy nanana fotoana izy
            ' .... but they didn't have time.'

(7) a.   wo zuotian   xie-le   yifeng xin,   keshi mei xie-wan
        I   yesterday write-LE   one-CL letter, but   not write-finish
        ?'I wrote a letter yesterday, but I didn't finish it.'

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[2] In fact, [+SQA] may not be the best characterization of this since 'some muffins', while not a specified quantity still makes the predicate telic.

b. * wo zuotian   xie-wan-le   yi-feng xin,
   I   yesterday write-finish-le one-cl letter,
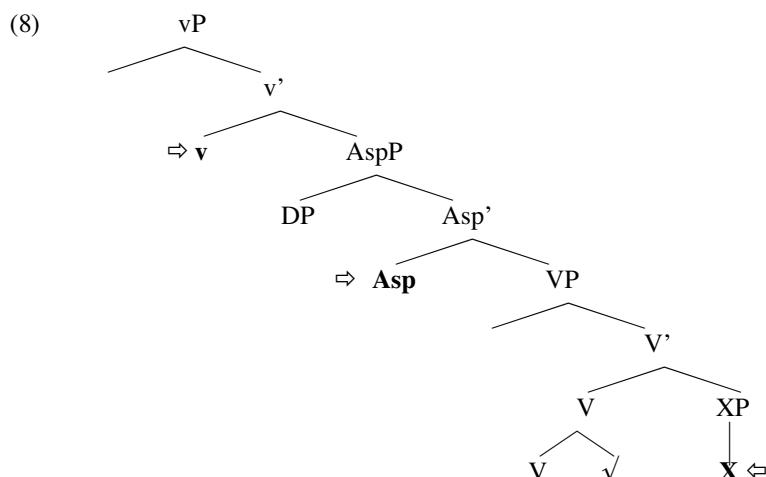
     keshi mei xie-wan
     but   not write-finish
?'I wrote a letter yesterday but I didn't finish it.'

In Malagasy, while (5a) creates the conversational implicature that the teachers were successful in gathering the children, this is defeasible as shown by (5b). In order to ensure that the gathering event was successful and completed, *naha-* must be added as in (6). Chinese works similarly. Without special marking, the verb, even in the perfective, does not entail completion. To ensure a completed reading, a special marker must be added (from Tai 1984, glosses from Soh and Kuo to appear). In Chinese, without the marker of result, there is no entailment of the completion of the event, thereby explaining the difference between (7a) with no result marked and (7b) where the result is marked.

Already, then there is a problem for the acquisition of telicity. One could say (along the lines of Snyder 1995), that English has a special marker for telicity but that it is null. The verb *eat* always contains such a morpheme while the verb *push* never does. In this paper, I will argue that the problem of telicity actually is even more complicated than this. I will argue that even overt telic markers vary from language to language in a way that can be accounted for by positing different syntactic positions for them. This suggests that if telicity is marked with zero morphemes, not only does the learner have to know that the morphemes are there, but where exactly in the tree structure they appear.

3. Different types of telicity

In this section I will claim that telicity (or boundedness) can be marked in different positions in different languages.[3] To be more specific, I will place telic markers in three different places using the articulated vP structure given below. Asp(ect) Phrase occurs embedded within the vP, below the position of the base-generated external argument. It is this position that is important in calculating the aspectual verb characterization of the verb and its internal arguments.[4] I will assume that Themes are generally generated in the Spec position of the VP, but that the element that measures the event will appear in the Spec of the Aspect Phrase.[5] The three possible positions for telicity are v, Asp, and X.

(8)
```
            vP
          /    \
              v'
           /      \
    ⇨ v          AspP
             /        \
          DP          Asp'
                    /      \
            ⇨ Asp          VP
                         /    \
                             V'
                          /      \
                         V        XP
                        / \       |
                       V   √      X ⇦
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Importantly, I take the domain of vP to be the domain of l-syntax as in Hale & Keyser (1993). In other words, this is the domain within which non-compositional semantics may occur (for more discussion see Travis 2000).

   I will present evidence for each of the positions for telicity in turn, and argue that they have different characteristics and different consequences with respect to other elements in the tree.[6] A table providing a brief overview is given below.

Table 1. Three positions of telicity

V	Asp	X
<u>Functor category</u> (Ritter and Rosen 1993) - restricted class - may have idiosyncratic meaning	<u>Functional (binding) category</u>, (Travis 1994) - closed class - productive meaning	<u>Lexical category</u> (AP/PP) - open class - may have idiosyncratic meaning
natural endpoint beginning point arbitrary point	natural endpoint beginning point	natural endpoint
scope above Event Measuring DP (in Spec, Asp)	??	scope below Event Measuring DP (in Spec, Asp)

Going from right to left on the first row of the table we can say, just observationally, that we might expect a different inventory of elements to appear in the three positions. I am assuming that X often is realized as an A ('The children hammered the nail *flat*') or a P ('The children pulled the poster *down*'). As lexical categories[7], we expect to have a wide range of possible elements in this position. Further, as it is a non-functional category within the domain of l-syntax, I would expect some idiosyncratic behavior. For example, the semantic contribution of X to the V+X complex might not be compositional.

   I assume, however, that Aspect is a functional category[8] and as such we expect to find a closed set of elements in this position. In the extreme there might be only two elements — the realization of plus or minus features. Further, as a non-lexical category, I would expect the distribution of Aspect to be more productive and its meaning contribution to be more predictable.

   Finally, while Chomsky (1995) considers "little" v a functional category, I assume that it is a functor category along the lines of Ritter and Rosen (1993). As such it will not be as open a class as X or as closed a class as Asp but rather would have a relatively small number of realizations (see Folli and Harley to appear, for a discussion of 'flavors' of little v, as well as Arad, 1998).

   These are just observations concerning the range of variation in the elements we might expect to appear in these positions, but the other characteristics of the different elements will be much more important in determining position. We will see that these characteristics will follow from the syntactic configuration that the elements find themselves in. The second row of the table refers to the semantic contribution that elements in each position can have. I assume that telicity markers can pick out natural endpoints from all positions, but elements in X can *only* describe the natural endpoints of events. Elements in Asp or v can in addition pick out beginning points of events, but only elements in v, as they have access to the whole event, can in addition designate arbitrary endpoints of events.

   Finally, because of their different positions with respect to the Event Measuring DP, the telicity markers will interact with these DPs differently.[9] The markers in v will have scope above this DP, and

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[6] In this paper I will not be talking about the attachment of the root so I have simply adjoined it to V. However, I believe that the root can vary on where it attaches (see Erteshik-Shir and Rapoport (1997) for this type of claim).

[7] I assume that P is a lexical category though this is not crucial in the context of this paper.

[8] In other work (Travis 1994) I claim that event related 'functional' categories, such as Aspect and Event, have a special status of what I have termed 'binding categories' because they bind event variables.

[9] The idea of using the interpretation of telicity with respect to the Event Measuring DP comes from Slabakova's work (e.g. Slabakova 1996, 1997, 2001).

the markers in X will have scope below this DP. I will leave aside for now the interaction with the telicity marker in Asp for reasons to be discussed below. Now we will look at each of these cases in turn.

3.1 Telicity in X

Arguing that the position X can hold material encoding the endpoint of an event is the least controversial of the claims that I will make.[10] Many of the small clause type analyses of complex verb phrases proposed in the late 80s had an equivalent of an X position to describe the endpoint of an event (see, for example, Hoekstra 1988 and, for a more recent reference, Folli and Harley to appear). We saw examples of this above in (4), where the verb *push* in English isn't itself telic, but when combined with a telic goal PP, the construction becomes telic. Further, we saw that the quality of the event measuring DP can over-ride this telicity, i.e. a bare plural DP will make the event atelic in spite of the presence of the telic PP. Further, we saw in (7) that Chinese seems to have to mark all telicity overtly. In the case we saw above, a verbal compound is formed to mark the endpoint. Following analyses such as Sybesma (1992), I assume that the resultative predicate is generated in a position similar to goal phrases in English.[11] Now we turn to two more controversial possibilities for the marking of telicity cross-linguistically.

3.2 Telicity in v

Slabakova (1997a, 1997b, 2001) has argued that in Bulgarian (and other Slavic languages) the marking of telicity as done by preverbs occurs in a position higher than the marking of telicity in English.[12] In Slabakova (1997a, 1997b), she claims that these preverbs appear in v. She gives two arguments for this: one is that preverbs can also encode a causative meaning as might be expected in v, and the second is that these preverbs have scope over the Event Measuring DP. Relevant examples for each argument are given below. In (9) we see the preverb *raz-*, which adds an agent to the root verb. In (10) we see that the preverb has scope over the DP since it creates a telic event in spite of the apparent [-SQA] quality of the DP.[13]

(9)   *raz-* adds an agent (Slabakova 1997:89)
   a.   Kounòt   *raz*-smja/*raz*-plaka   bebeto
        clown-DET PV-laugh/cry-3sS/AORIST   baby-DET
        'The clown laughed/cried the baby.'

   b.   Kompanijata   na drugi dexo   vinagi   raz-jažda
        company   of   other children always   PV-eat 3pS/PRES

            decata
            children-DET
        The company of other children always gives children an appetite.'

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[10] This position for the marking of telicity is similar to, among others, Snyder (1995).

[11] Soh and Kuo (to appear) in an interesting paper show that the facts of Chinese are a bit more complicated. For example, some creation predicates do entail completion with certain types of event measuring phrases.

[12] Slabakova (1997, 2001) assumes that telicity in English is computed and realized in the inner Aspect position in English. I will reserve overt marking of telicity in this position for a different sort of phenomenon (see section 2.3).

[13] ABBREVIATIONS: AOR - aorist; DET - determiner; NEG - negation; PERF - perfective; PFX - prefix; PL - plural; PRES - present; PST - past; PV - preverb; S - subject; s, SG - singular; SASP - situation aspect; TRANS - transitive.

(10)   Scope above the DP (Slabakova 2001:89)[14]
        Toj na-pis-a   pisma *3 časa/za 3 časa
        he PV-write-3SG/AOR   letters *for 3 hours/in 3 hours
        'He wrote the letters in 3 hours.'

If these markers are in v, we expect to find a restricted set of them. This set, I assume, will be larger than something represented in a true functional category where there may be only one or two realizations. On the other hand, it will be smaller than something represented by a true lexical category, which could be an open set. Further, as a non-functional category within l-syntax, I would expect it to be able to encode non-compositional meaning. Both of these expectations are met (see Slabakova 1997 for details). I would like to claim further that, from the position of v, telicity marking can target a variety of points in an event. It can specify not only the natural endpoint as can an element in X, but it can also target the initial point and an arbitrary endpoint. Examples below show all of these possibilities. In (11) we see again the case of Bulgarian preverb *na-* added to the imperfective root to give a telic predicate. When the same preverb is added to the stative predicate *mraz* 'hate' in Bulgarian as in (12), a beginning point is created. (13) gives an example from Bulgarian (Slabakova, p.c.) where a pre-verb added to an activity picks out the beginning point of the activity. Finally, Kozlowska-Macgregor (2002, to appear) shows that the preverb *po-* in Polish, shown here in one of its uses in (14), creates an arbitrary endpoint.

(11)   na-piš-a   (natural endpoint)   Bulgarian
       PV-write-1SG
       'to write up'

(12)   na-mraz-ja   (beginning point)   Bulgarian
       PV-hate-1SG
       'to start hating someone'

(13)   Toj za-tancuva   vals   mnogo dobre   (beginning point)   Bulgarian
       he PV-danced-AOR   waltz very   well
       'He began waltzing well OR He learned to waltz well'

(14)   Maria po-czyta-la   ksiazke   (arbitrary endpoint)   Polish
       Maria **po**-read-PAST book
       'Maria read a book for a while'

3.3 Telicity in X, v, and Asp

We have already seen, then, that telicity can be marked in two different places. We have used English and Chinese to look at marking in X and Bulgarian (and Polish) to look at marking in v. A given language may employ more than one of these positions, however, and to see this we turn to the Athabaskan languages of Navajo and Slave which, I will argue, use all three of the positions for telicity given on the tree in (8).[15]

Navajo is well-known for its complicated and recalcitrant verbal morphology. The easiest way to present this morphology is through a templatic description such as the one from Speas (1990), given below.

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[14] Slabakova (1997) places Bulgarian preverbs in v and it is this analysis that I am following. In Slabakova (2001), she changes the analysis and places the preverbs in a Perf head between v and Asp. I am also assuming that the forced definite interpretation of the DP in (10), rather than weakening Slabakova's argument, supports her claim that the pre-verb is generated in a syntactic position higher than the DP. See Travis (to appear) for more discussion on this.

[15] An account of Navajo which is similar to the one presented here was first given in Travis (1992).

(15)   Navajo Verbal Morpheme Order (from Speas (1990:205))

adv iter dist-pl d-obj deic-sbj **adv** mode sbj **voice/trns stem**
1 2 3 4 5 **6** 7 8 **9**
1 = ADVERBIAL: manner, direction ... also indirect object pronoun
2 = ITERATIVE: aspectual/adverbial prefix
3 = DISTRIBUTIVE PLURAL: plural and distributive, 'each one separately'
4 = DIRECT OBJECT: number and person of direct object
5 = DEICTIC SUBJECT: indefinite (someone) or fourth person (people in general)
6 = ADVERBIAL: adverbial/aspectual notions
7 = MODE: core of tense system
8 = SUBJECT: person and number of subject
9 = VOICE/TRANS

The positions that we will be most interested in are the ones in bold — positions 1, 6, and 9. As Speas points out, some lexical items appear to be 'a sort of discontinuous morpheme'. The examples she gives of this are reproduced below with information as to which slot in the template the morphemes appear. To take the most complicated one, we can see that what might be the lexical entry for the verb 'to pray' (16c) is in fact a combination of discontinuous morphemes spread over positions 1, 6 and 9.

(16)   a. yá ... ti'   'to talk'   1 ...   stem (9)
        b. di ... łid   'to burn something'   6 ...   stem (9)
        c. so ... di ... zin 'to pray'   1 ...6 ...   stem (9)

I would like to suggest that these three positions represent the three non-functional heads that appear in the articulated vP structure sketched in (8) — v, V (√) and X. Because of a slight complication of morphology, the mapping of morpheme to structure is not completely transparent, so I take a few paragraphs to untangle this.

There are two ways that the mapping of morpheme order to structure is not straightforward. The first surprise is the one we have just discussed where the idiosyncratic material that looks like a lexical entry is interspersed with more productive material that looks more inflectional. I propose that this oddity of Navajo can be accounted for by assuming that position 1 is X, position 6 is v, and position 9 is V (plus √). The inflectional type material in positions 2 through 5 will be realized on the Inner Aspect position, and the material in positions 7 and 8 will be realized on functional categories above the vP which I label "I" as a shorthand for possibly multiple inflectional projections. The template is reduced then to the following mapping to syntax.

(17)   Template
        affix positions: 1   2-5   6   7-8   9
        phrase structure positions: X   Asp   v   "I"   V

The second problem is that the morpheme order in Navajo seems to be the opposite of what one might expect given the Mirror Principle of Baker (1985). While positions 1 through 8 look predictable with the syntactic level going up a phrase structure from left to right ending with subject agreement, it is surprising to have the verb stem at the end (position 9) rather than at the beginning. While there have been a variety of accounts for this morpheme order (see e.g. Speas 1990, 1991), I assume in Travis (1992) that there is a sort of morphological tucking in.[16] In other words, each morpheme, as it is added,

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[16] Jonathan Bobaljik has pointed out to me that Stump (2001) has a mechanism of head marking on headed roots whereby inflectional morphemes attach within derivational and compounding formatives to a head. It could be that Navajo is making rampant use of this mechanism but it would take me too far afield within the context of this paper to investigate this possibility further. See Richards (2001) for a discussion of 'tucking in ' where it applies to XP movement.

is attached to some notion of a verbal stem rather than to an edge.[17] This has the effect of pushing already attached morphemes further to the left in the structure. This is shown schematically below.

(18)   a.   [verbal stem]
         b.   af1 +   [verbal stem]
         c.   af1 +   af2 +   [verbal stem]

A sketch of the relevant tree structure is given in (19). While a discussion of some of the details of this analysis would take me beyond the line of argumentation of this paper, the important point to notice is that position 9 is the V plus √, position 1 is X, and position 6 is v.

(19)

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                          TP
                 ┌─────────┴─────────┐
            Dsubject                 T'
                          ┌───────────┴───────────┐
                         vP                        T
                 ┌────────┴────────┐       ┌───────┴───────┐
            Lsubject               v       T             AgrS1
                          ┌────────┴────┐  #7              #8
                        AspP    ⇨   v
                 ┌────────┴──┐      #6
            indefsubj      AspP
                    ┌────────┴──────┐
                Dobject           Asp'
                          ┌─────────┴──────────┐
                         VP                    Asp
                 ┌────────┴────┐      ┌─────┬────┴────┬──────┐
            Lobject           V   Iterative Dist/Pl AgrO1  AgrS
                     ┌────────┴──┐    #2      #3     #4     #5
                 ⇨   V          XP
                    #9+√         │
                          ⇨      X
                                #1
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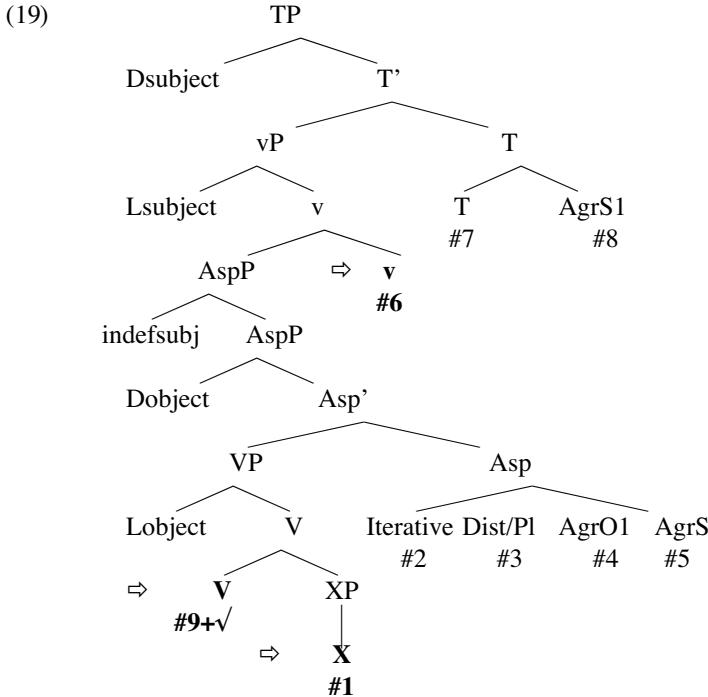
This analysis of the morpheme order of Navajo, in fact, correlates quite closely with a recent analysis by Rice (2000) of similar morphemes in the related language, Slave. Rice's goal is to show that the morpheme order in Slave correlates with their syntactic scope. As a part of her discussion, she investigates three sets of morphemes that are relevant for the discussion here. These are what she calls situation aspect markers, subsituation aspect markers, and preverbs. Though much more work on this language is required before any claim is made with certainty, I would like to suggest that the preverbs are in X and therefore appear in position 1, that the subsituation markers are in Asp (around position 2) and situation markers are in v (position 6).

Let us start with preverbs and situation markers as these interact in interesting ways. Some examples of the preverbs are given below (Rice 2000: 263).

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[17] At this point, it is not clear to me how to characterize this verbal stem as it is morphologically complex containing both a root and a voice marker.

(20)   a.   ní-n-i̧-zha
            PV-achievementSASP-PERFviewpt-stem
            'S/he arrived at a point.'

    b.   ní-né-n-i̧-yo̧   ní – né – n – i̧ - yo̧
            PV-qualifier-achievementSASP-PERFviewpt-stem   1   6   9
            'S/he stopped (completed) growing.'   X   v   V

It is clear in the examples I have given that the preverbs are picking out the endpoint of an event. These will co-occur with morphology in v (position 6) that indicates achievement situation aspect. Rice gives examples, however, that describe an endpoint but are vague as to whether the endpoint has been reached. It is the situation marker in v which makes this precise.[18] The situation marker *s* will indicate that the endpoint is reached, and the situation marker *gh* indicates that it has not necessarily been reached (Rice 2000:267-268).[19]

(21)

s situation aspect (accomplishment)	*gh* situation aspect (activity)	
ná-zhe-eh-chú	*ná-zha-a-chú*	*ná* 'down' 'take sg. down, bring down, put down…'
ká-zhe-né-h-sho̧	*ká-zhe-ni-i-h-sho̧*	*ká* 'out' 'cause to grow out'

     The morphemes that Rice labels subsituation markers add 'purely aspectual material'. The examples given are inceptive, egressive, and conative. These appear to be more productive than the preverbs that we have seen above, as would be expected if they appear in Asp. Some examples are given below (Rice 2000:261 with some diacritics missing). In these cases I assume that the preverb position is null.

(22)   Inceptive *d*
        a.   d-éh-ji
             inceptive-accomplishmentSASP-voice/stem
             'S/he started to sing.'

        b.   d-é-ya
             inceptive-accomplishmentSASP/PERFviewpt-stem
             'S/he started to go.'

(23)   Egressive *n*
        a.   n-é-ti
             egressive-accomplishmentSASP/PERFviewpt-stem
             'S/he fell asleep.'

        b.   n-éh-tlah
             egressive-accomplishmentSASP-stem
             'It landed.'

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[18] In this case the preverb would be like the preposition 'toward' in English.
[19] The forms of the situation markers are changed by morpho-phonological processes. In the end, only the quality of the vowel indicates their presence.

My claim, then, is that Slave uses all three positions for telicity — the preverbs and the subsituation markers appear in X and Asp respectively in Slave and the situation markers appear in v.[20] This correlates with the use of these morphemes — those in position 1 (which is X) can only see part of the situation, the endpoint,[21] those in Asp can see the end and the beginning, while those in position 6 (which is v) see the whole situation. What is interesting and requires further exploration is the fact that the morphemes in v act a bit differently from their counterparts in Bulgarian. In Bulgarian, telicity is added in v. In Slave, if the telicity value has been determined lower in the structure, the v simply reflects this telicity value. If, however, as in example (21), telicity has not been determined, the material in v can fix the value. Slave and Navajo, then, are cases where elements in a variety of heads can be used to create the construction of an event.

The question can then arise as to the role played by DPs in such a language. Smith (1991) and Rice (2000) pick up this question in Navajo and Slave respectively, both coming to the same conclusion, which is that DPs do not enter into the computation of aktionsart in these two languages. This is, in fact, not surprising if these two languages are polysynthetic in the sense of Baker (1996). As polysynthetic languages, they would not have their DPs in argument positions but rather in adjunct positions. Rice (2000: page 271), however, points out the following intriguing fact. When pronominal elements are incorporated into the verbal morphological system, then they can have an effect on the argument structure.

(24)   a.   be-w-i-h-xi
             'I killed it/him/her/it'   (*s* accomplishment situation aspect)

         b.   ku-**y**-i-gho
             'I killed them'   (*gh* activity situation aspect)

What is interesting in the data above is that the plural pronominal material acts as if it is [-SQA], unlike what occurs in the English translation. A better translation would use a bare plural (*I killed things*). Again, the element in v, the situation marker, reflects the telicity value that has been determined by the elements lower in the vP.

3.4 Telicity in Asp

Now I will concentrate solely on the telicity marker that appears in the Aspect Phrase within the vP. I will look at Malagasy in particular but later we will see, I believe, that English also can have telicity marked in this position, albeit covertly. At the beginning of this section, we raised the question of whether a telicity marker in this position would have scope over the Event Measuring DP or not. Given the structure presented in (8) we could imagine the account going either way. In a strict notion of c-command, Spec, Asp asymmetrically c-commands the head Asp. However, considering other notions such as m-command, Spec, Head relations, and/or minimal domains, we could say that Asp could have scope over the Event Measuring DP. Unfortunately, the cases where endpoints are realized in Asp that we will be looking at here have other effects on the syntax and the semantics of the arguments involved. Therefore, at this point, I leave the role of object DPs to further study. There does, however, seem to be a distinguishable set of telic morphemes that appear in the inner Aspect position. They are arguably non-lexical categories, and they can indicate the beginning or endpoint of an event.

Recall from section 2 that Malagasy is what might be called an atelic language. I take this to mean that, in the most frequently used verb forms, there is no commitment made to the completion of the described event even though the conversational implicature is that the event has been completed, as in Chinese. So, upon hearing the sentence in (25a) the hearer will assume that the teachers have, in

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[20] K. Rice (p.c.) says that preverbs and subsituation markers can co-occur with the subsituation marker appearing closer to the verb stem than the preverb. Due to their productivity relative to the preverbs and their position relative to the preverbs, I claim that these are part of the inner aspectual system of Slave.

[21] In Travis (to appear), I show that there is a type of inception that can occur in X but it has the effect of reducing a whole event to a point and does not indicate the beginning of a process.

fact, gathered the children. The implicature can be cancelled, however, as shown in (25b). The relevant examples are repeated below where the verbal prefix is *an-*.

(25)   a.   namory   ny ankizy   ny mpampianatra   (n+an+√vory)
            PST.an.meet   the children   the teachers
            The teachers gathered the children'

       b.   ... nefa   tsy   nanana   fotoana   izy
            … but   NEG   PST.have   time   they
            '... but they didn't have time.'

In order to ensure completion, the verbal prefix *naha-* must be used as shown in (26) below.

(26)   a.   nahavory   ny ankizy   ny mpampianatra   (n+a+ha+√vory)
            PST.a.ha.meet   the children   the teachers
            The teachers gathered the children.'

       b.   *.... nefa tsy nanana fotoana izy
            ' .... but they didn't have time.'

Following Phillips (1996, 2000), I assume that the verbal morphology that ensures telicity is complex, consisting of a stative morpheme occurring in v,[22] and a telicity morpheme occurring in the inner aspect position of Asp. As expected, there are not a large number of different elements that can appear in this position. In fact, most likely *ha-* is the only telic morpheme in Malagasy.[23] It is important to note a consequence of telicity in Malagasy. Once the completion of the event is encoded, the external argument is no longer a voluntary agent but rather a cause.[24] Again I follow Phillips in assuming that the external cause argument in these constructions appears in the Spec, Asp position.[25]

(27)
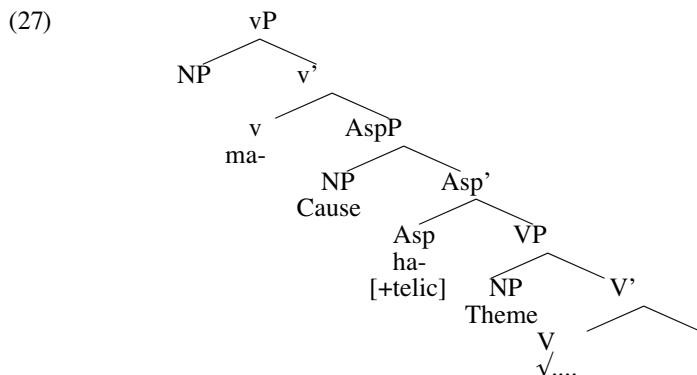
It is clear that *maha-*, when added to events which describe a natural endpoint, insists that it is the natural endpoint of the event that has been reached. When added to activities, however, the telicity marker must refer to the beginning point, as shown in the example below.

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[22] While here I represent the stative morpheme as *ma-*, it is in fact simply *a-* and the *m-* is a separate morpheme that appears outside of the vP.

[23] There are arguably two other telic morphemes, *voa-* and *tafa-*, but these are in complementary distribution with *maha-*. Which morpheme is used depends on whether the verb is unaccusative (*tafa-*), passive (*voa-*) or active (*maha-*).

[24] See Dell (1983) for similar observations about the cognate morpheme *maka-* in Tagalog.

[25] Chen (1995) argues that a similar effect occurs in Chinese, and I have given support from morpheme deletion in Tagalog (Travis 2000, in press) that the non-agentive external argument has to appear in a position lower than Spec, vP.

(28) nahadihy   ny ankizy
      PST-aha-dance   the children
      'The children were able (to **begin**) to dance'

This morpheme, then, can in some sense 'see' the natural endpoint of the event if it has one, and otherwise it refers to the beginning point of an event.[26]

Determining the predictions of the effect of this morpheme is less straightforward than the other two positions and I leave some of this work for future research. Part of the problem is that the languages that arguably make use of this position, such as Malagasy and Chinese, also have DPs where the value of SQA is difficult to determine.[27] A further problem is that the use of this position seems to have other effects on the structure which interfere with the usual tests for event measurement. First, the Malagasy structure co-occurs with a stative marker and secondly, the element in the Spec, Asp appears to be the external argument rather than the internal argument. Investigating these issues is the next step in this research.

4. Acquisition of null telic morphemes

Now let us return to the question of the acquisition of zero morphemes and lexical knowledge. Before going into my views, I look briefly at the research on the acquisition of lexical knowledge done by Juffs (2000). Noting facts of Chinese similar to those we have seen in (7), Juffs proposes that English allows a lexical conceptual structure (LCS) to be realized in a root as in (29), producing the examples given in (30). Chinese does not allow such a lexical conceptual structure to be represented by a root and Juffs claims that this is due to the CAUSE/STATE conflation parameter, the Chinese value of which is given in (31).

(29)   √[ACT (+effect) [GO [STATE]]]

(30)   a.   The book disappointed Mary.
        b.   The sun melted the ice.
        c.   John covered the bed with a blanket.

(31)   Chinese: *[ACT (+effect) [GO [STATE]]]

It is the impossibility of a root to have such a lexical conceptual structure which explains the lack of constructions such as those given in (32) below.

(32) a.   *   Nei ben shu   shiwang   le   Zhang San
                that CL   book   disappoint ASP Zhang San

     b.   ??   Taiyang rong(hua) le   xue
               sun   melt   ASP snow

     c.   ??   Zhang-san   yong tanzi   gai   le   chuang
               Zhang San   use   blanket cover ASP bed
               'Zhang San covered the bed with a blanket.'

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[26] The obvious question is whether this construction can be formed with states (as in Bulgarian). The answer is more difficult. In a way, every Malagasy verb is derived from a stative root. For example, the verb *mamaky* 'to break' is formed by adding *man-* to the adjectival root *vaky* 'broken'. When *maha-* is added instead of *man-*, we get the effect seen above. When *maha-* is added to an adjective that does not have a deverbal form such as *kamo* 'lazy', then a causative is formed. See Phillips (1996, 2000) for more details on this and an account.

[27] Though see Soh and Kuo (to appear) for interesting work on this issue.

d. Zhang-san   yong tanzi   gai**zhu**   le   chuang
    Zhang San   use   blanket cover-complete   Asp   bed
    'Zhang San covered the bed with a blanket.'

In order to represent the type of LCS given in (29), Chinese must mark the resulting state overtly as shown in (32d). In the following sections, I will recast this observation by attaching the LCS structure to a syntactic structure. Further, I will argue that there is evidence that zero telic morphemes show the same range of behaviors that we have seen for the overt telic morphemes just discussed.

4.1 Zero morphemes in X

Unlike Chinese, English allows the complex LCS shown in (29). What does this mean in terms of knowledge of lexical information? I propose that English gives the appearance of having roots that encode such an LCS only because it has a zero morpheme in the syntactic head that encodes the final state in a change of state. This morpheme, however, must be overt in the Chinese system. In other words, while English allows for overt realization of telicity in X (as in (33b) below), it also allows for a zero morpheme in this position (as in (34)).

(33) a.   The children hammered the nail   (*in three minutes/√for three minutes).
      b.   The children hammered the nail **flat**   (√in three minutes/*for three minutes).

(34) a. * The teachers gathered the children but they didn't have time. (cf. (5) in Malagasy)
      b.   I built one house (√in four months/*for four months)

In Malagasy, roots can either have the zero morpheme or not. This explains why an accomplishment type verb can mean completion, but doesn't necessarily mean completion. However, an overt marker in the Asp position will ensure the telic reading as shown in (35b).

(35) a.   Nanorona   trano anakiray   (√tao anatiny efabolana aho/√nandritrin'ny efabolana)   aho
            PST-v-√build house one   (√in four months/√for four months)   I
            lit: 'I built one house (√in four months/√for four months).'

      b.   Nahaorona   trano anakiray (√tao anatiny efabolana aho/*nandritrin'ny efabolana)   aho
            PST-aha-√build house one   (√in four months/*for four months)   I
            lit: 'I built one house (√in four months/*for four months).'

If zero telic morphemes can be posited for the X position, we can ask about the two other positions that I have claimed house telic morphemes. I will look at each of these in turn.

4.3 Zero morphemes in v

In trying to find zero telic morphemes in the v position, we have to ask what sort of effects we might expect of such a morpheme. We have seen that in Bulgarian, the morphemes in v can target the beginning point of an event, and it is this characteristic that I will focus on here. It has been pointed out (e.g. Moens 1987, de Swart 1998) that English is able to shift an event type to fit a certain semantic environment. For example, the sentence in (36a) is clearly an activity taking a *for*-adverbial. However, as (36b) shows, the same string can take an *in*-adverbial implying that there is some designated point that occurs after three minutes. The same can be shown for stative verbs like *hate* and *know* in (36c) and (36d).

(36) a. The children sang for three minutes.
 b. The children sang in three minutes.
 c. The children hated the play in three minutes.
 d. The children knew the answer in three minutes.

The question is what allows activities and states to appear in a construction that normally requires a telic event? Moens (1987:45) proposes that there is some process which allows transitions between aspectual categories by adding 'an extra "layer" of meaning'. de Swart (1998) introduces aspectual operators which map eventualities onto other eventualities. Sometimes these transitions and operators are marked overtly (the progressive in English maps an event into a state), but sometimes they are not marked overtly as in (36b). These latter cases are considered to be cases of coercion. Going back to the examples above, for (36b), the point that occurs at the end of the time designated by *in three minutes* can either be the endpoint of the singing or the beginning point. With the two stative examples, the point is the beginning point of the hating or the knowing. I would like to suggest that there is a zero morpheme that facilitates the coercion discussed by Moens and de Swart. In the inceptive reading of (36b) and in (36c) and (36d), the zero morpheme would be similar to the overt *na-* morpheme which we saw in the Bulgarian example (12) and would appear in the v position.

4.3 Zero morphemes in Asp

Finally, let us look at the possibility that there are zero telic morphemes in Asp. For this I turn to a structure discussed by Haïk (1989). She investigates a construction in English which behaves, in many ways, similarly to the *maha-* construction in Malagasy. She presents a use of the verb *tell* which has (at least) two characteristics in common with *maha-* constructions — the external argument is a non-agentive cause, and the construction involves a change of state in the object. (37a) below is an example of the relevant construction. (37b) shows that the canonical use of the verb *tell* does not necessarily involve a change of (mental) state in the object while (37c) shows that a change of (mental) state is required.

(37) a. All this snow tells me that winter is here.
 b. Bob told me that winter is here, but I don't believe it.
 c. * All this snow tells me that winter is here, but I don't believe it.

One can think of the meaning of *tell* as having two possibilities. One (as in (38a)) does not involve having a sentient object and describes an activity of talking to (at) someone (something). The other (as in (38b)) involves having a sentient object and describes an attempt by the teller to affect the mental state of the object.

(38) a. Bob told the statue that it was winter.
 b. Bob told Mary that it was winter.

I would like to suggest that the second meaning is similar to the Malagasy atelic predicates since all that is necessarily encoded is an attempt to do something, but not the success of doing this. As in Malagasy, this form can enter into a different construction (in Malagasy, this would be the *maha-* construction) which entails the success of the action. Further, the external argument is now cause rather than agent. If this is the case, the similarities between the alternation in Malagasy and the alternation in English are indicative of a zero representation in English of morphology parallel to the Malagasy *maha-*.[28]

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[28] Unfortunately, this phenomenon in English seems to only occur with verbs with natural endpoints, which may detract from subsequent use of this construction to test other characteristics.

5. Conclusions

To summarize, we have seen that morphology that is needed in the computation of the situation aspect of an event can appear in three different positions within an articulated vP. Each of these positions has its own characteristics. The X position describing the endpoint of an event often shows the range typical to lexical categories, and can be idiosyncratic in terms of distribution and semantic contribution. The Asp position, as a non-lexical category, is a closed class of perhaps only two and simply encodes whether a designated point in the event has been achieved. Further, it is more predictable in its distribution and semantic contribution. For events with natural endpoints (what would be translated as an accomplishment in English), it is this endpoint that is specified. For events without natural endpoints (activities), the designated point will be the initial point. Telicity markers in v as functor verbs will have a restricted set of elements and will be able to target endpoints and beginning points of events as well as creating an arbitrary bound. I argue that all of these elements occur within the vP as they are part of l-syntax and lexical learning. In addition, I have suggested that each of these positions can be represented by a zero morpheme that will show the same syntactic effects as the overt morpheme. Clearly a proliferation of zero morphemes which varies cross-linguistically complicates language learning considerably and the hope is that data from language acquisition can help shed light on the viability of the hypothesis.

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