“VP” adverbs without a VP: The syntax of adverbs in Tongan

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Abstract

The Polynesian language Tongan appears to lack surface-oriented motivation for a VP constituent. Even so, adverbial elements appear in both a rightwards location and a leftwards location, superficially similar to the S-adverbs and VP-adverbs in well-studied western European languages. This paper explores how the Tongan "VP-adverbs" (as well as others) can be analyzed in HPSG without a VP for those adverbs to attach to. Several kinds of analyses, representing different strands of research on the syntax of adjuncts in HPSG, are explored: a Adjuncts-as-Valents analysis, a VAL-sensitive Adjuncts-as-Selectors analysis, and a WEIGHT-sensitive Adjuncts-as-Selectors analysis. All suggest that an analysis of the adverbs without a VP is possible; a WEIGHT-sensitive Adjuncts-as-Selectors seems to have the fewest issues.

1 Introduction

This paper examines the syntax of (mostly) single-word adverbial elements in the language of Tongan, a language of the island-nation of Tonga in the South Pacific. Tongan is a member of (from smallest to largest) the Polynesian, Oceanic, and Austronesian language families. As one might expect, Tongan shares many syntactic properties with other members of these families, and, in particular, it seems likely that many of the syntactic issues surrounding adverbial elements discussed herein are not just found in Tongan, but are widespread in other Polynesian languages and, at least, in other closely related Oceanic languages. However, the discussion below will focus on Tongan in order to ensure a thorough discussion and analysis for one language.

As in many languages, Tongan allows expressions functioning as modifiers of predicates – adverbial elements – in different places within the clause. In very broad strokes, the locations in Tongan are akin to Jackendoff's (1972) two categories for English: S-adverbs (more linearly leftwards) and VP-adverbs (more linearly rightwards). While it is not presently clear whether these two locations in Tongan have strong semantic motivations (enough to consider them "sentence

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Abbreviations used include: ABS = absolutive case; CAT = category feature; CONT/CNT = content feature; DEF = definitive accent; DEM = demonstrative; DEPS = dependents feature; DET = determiner; DU = dual number; *elist* = empty list; ERG = ergative case; ESS = essive case; EXCL = exclusive; FUT = future tense; HD = head feature; IND = index feature; LOC = local feature; MOD = modifiee feature; *nelist* = non-empty list; PHON = phonology feature; PFT = perfect aspect; PL = plural number; PLUR = pluractional; PN = proper noun/pronoun; POSS.O = O-class (subordinate) possession; Pred/*pred* = predicate word class; $\text{Pred}^{\max}$ = expression headed by a member of the predicate word class, requiring no further valents; *prep* = preposition; PROX = proximal; PST = past tense; S or SG = singular number; SU or SUBJ = subject grammtical relation; SYNSEM/SS = syntax-semantics feature; TAM = tense-aspect-mood word; TR = transitive affix; VAL = valence feature; VP = verb phrase; XARG = external argument feature

operators" and "predicate operators" like Thomason & Stalnaker (1973) propose for English); *prima facie*, there seems to be similarities.

However, as will become clear, the "VP-adverb" location in Tongan is, in fact, quite surprising. This is because the location contravenes the conventional wisdom that adjuncts appear further away from their heads than arguments do, and, given this location and conventional approaches to adverb syntax (see Pollock (1989) and Potsdam (1998) for some older, classic approaches), it would appear that the Tongan VP-adverbs do not have an obvious phrasal constituent (that is, either a X′ or XP category) to attach to. Thus, this class of adverb does not seem to have an obvious or straightforward analysis, in both constraint-based lexicalist frameworks as well as in movement-based syntactic frameworks.[1]

Thus, this paper looks to explore Tongan adverbs further – especially the "VP-adverbs" – and works to develop the best analysis of them within the constraint-based lexicalist framework of Head-driven Phrase Structure Grammar (HPSG) (Pollard & Sag, 1987, 1994; Ginzburg & Sag, 2000; Sag et al., 2003). After providing a discussion of the foundations of Tongan clause structure, the paper will turn to the basics of adverbial syntax in Tongan, noting that there are, in fact, three areas (or zones, as they will be called) that adverbial elements can occupy in Tongan. The paper next considers the analysis of the adverbial elements in the two peripheral zones – Zones 1 and 3 – in the context of the two dominant approaches to adjunct syntax within HPSG: Adjuncts-as-Selectors and Adjuncts-as-Valents. From this discussion, it seems as though the Adjuncts-as-Selectors approach seems to offer a slightly better analysis for the peripheral zones, and so the paper next considers how the Adjuncts-as-Selectors approach might handle the middle zone's adverbial elements. After sketching an analysis sensitive to valence, a problem for that analysis is pointed out. The paper then offers a final sketch analysis of another Adjuncts-as-Selectors approach – this one making use of grammatical weight – that provides a fix to the problems found in the previous analysis, before wrapping up with some concluding remarks.

The sketch formal analyses will employ the version of HPSG from Ginzburg & Sag (2000) – for concreteness – with one minor alteration: the VAL(ence) list will be one single list, rather than split into separate SUBJECT and COMPLEMENTS lists. A few further features not utilized in Ginzburg & Sag (2000) will be used in this paper, too, but they will be discussed as they become relevant. The choice to follow Ginzburg & Sag (2000) does not seem particularly confining and I am confident that the analyses presented herein could be fairly easily be ported into the framework of the Sign-Based Construction Grammar (SBCG) (Sag, 2012).[2]

The analyses contained herein will sidestep the issue of whether these adverbials words are truly a separate class of words – which one might call adverbs – or

[1]Massam (2010) provides a movement-based analysis for the adverbial elements in Tongan's sibling language, Niuean, using "Roll Up Movement" of Cinque (2005). However, as Massam's paper discusses, this analysis is not entirely without problems, even within the confines of Minimalist assumptions. Also see (Massam, 2013) for further analysis of this area of the clause in Niuean

[2]In fact, Ball (2008), on which this paper builds, is entirely couched within the SBCG framework.

have some other categorization. There is some reason to think that the adverbials words in Tongan might be verbs or at least closely aligned with them: the so-called adverbs can appear with verbal derivational morphology and at least some of them can function as main predicates. However, the analyses would only be minutely different if the adverbial words are treated as verbs or as part of a distinct adverb class, so I will default to treating them as adverbs (and will, henceforth, call them just by that term).

2 Basic Tongan Clause Structure

2.1 Empirical Basics of Clauses

The morphosyntax of Tongan involves little-to-no inflectional morphology and, instead, uses a fair amount of function words. The phrases are strongly head-initial, with the aforementioned function words appearing at the left-edges of the relevant groupings. A basic sentence, which illustrates these properties, is given in (1):

(1) Na‘e tāmate‘i ‘e Tēvita ‘a Kōlaiate.
PST kill.TR ERG David ABS Golaith
‘David killed Golaith.’ (Churchward, 1953, 67)

Within (1), *na‘e* ‘PST’ is from a word class I will call *TAM* (tense-aspect-mood marker), a class of words that seems to function quite similar to auxiliary verbs in other languages. *Tāmate‘i* ‘kill’ is from a word class I will call *predicate*, a class that I assume includes both traditional verbs as well as adjectives. The phrases *‘e Tēvita* ‘ERG David’ and *‘a Kōlaiate* ‘ABS Goliath’ are post-predicate argumental phrases related to this predicate; for concreteness, I will assume these are PPs. As the glosses in (1) indicate, the prepositions which signal predicate-argument relationships in Tongan are ergatively-aligned. Figure 1 gives a schematic view of the clause in Tongan. Within the scheme of Figure 1, the TAM and predicate are

TAM	Predicate	Argumental Phrases

Figure 1: Basic Components of the Tongan Clause

strictly ordered; the argumental phrases, on the other hand, can be flexibly ordered within their region of the clause, with information-structural import.

While many arguments occur in the post-predicate location, not all do. Some arguments are not, in fact, overtly realized at all (these would be instances of “zero anaphora”). An example of this occurs in (2):

(2) Na‘e hola.
PST run.away
‘(He) ran away.’ (Chung, 1978, 39)

A further class of principled exceptions to the generalization that all arguments occur after their predicate comes from certain arguments with pronominal meaning. These are realized before the predicate, but after the TAM. One such element is *ku* '1SG.SUBJ' in (3):

(3) Na'á ku manuatu'i ia.
PST 1SG.SUBJ remember.TR 3SG
'I remembered him.' (Churchward, 1953, 66)

As is evident from the glosses in (3), these elements are *not* ergatively-aligned; rather, they index the traditional subject category. These "preposed pronouns" (the term for them from Churchward (1953) that I will adopt[3]) do seem to play a role in determining the best analysis of the Tongan "VP-adverbs," as I will return to in section 5.

2.2 Analysis of Basic Clauses in Tongan

In (1), as with any VSO ordering, the verb (or predicate) and the object (or patientive argument) are realized discontinuously, and this is regularly possible in Tongan. This raises a question: should a constituent of a verb + object (alternatively, a predicate + its non-subject arguments) – what I will call a VP – be recognized? This question is considered in-depth in Ball (2008, ch. 3), and the finding there is that there is no strong surface-oriented motivation for recognizing a VP for Tongan. To summarize the motivations for Ball's (2008) conclusion: (1) no auxiliary or other verb class obviously subcategorizes for a VP; (2) VP-coordination 'over' a subject is not possible; (3) "VP-fronting" is possible, but seems to involve a nominalized construction, so it could be seen as just a subspecies of NP-fronting; and (4) ellipsis is possible, but "VP-ellipsis" seems like the elided element is better analyzed (again) as a nominalized construction. Furthermore, "VP-ellipsis" does not always clearly pick out just the predicate and its non-subject arguments.

However, does that mean that there is no immediate constituents in Tongan between the clause as a whole and the phrases serving as arguments? This question is considered in-depth in Ball (2008, ch. 4) and the finding there is that a unit consisting of the predicate and *all* of its arguments does appear to be a constituent. I will informally call such a constituent Pred^{max}. To summarize the motivations for Pred^{max} in Ball (2008): (1) both TAMs and other verbs, termed "quasi-auxiliaries," do appear to subcategorize for a Pred^{max} and (2) Pred^{max} coordination is possible.

With these constituency ideas as a backdrop, let me next sketch the analysis presented in Ball (2008) for the Tongan clause, which incorporates these constituents. On this analysis, the Tongan clause is principally put together with the Head-All-Valents Rule, given in (4):[4]

[3] In spite of the connotations of this term, there do seem to be compelling reasons to view the "preposed pronouns" as suffixes on the TAMs; see the discussion in Ball (2008, ch. 4). The discussion that follows does not crucially hinge on how exactly the "preposed pronouns" relate morphophonologically to the TAM word, and so I leave the issue aside here.

[4] Bolded **H** stands for the head, in both rules and tree structures.

(4) Head-All-Valents Rule

$$\left[\text{VAL} \quad \langle\ \rangle\right] \quad \rightarrow \quad \mathbf{H}\left[\text{VAL} \quad \langle\ \boxed{1}, \ldots, \boxed{n}\ \rangle\right] \quad \boxed{1} \ldots \boxed{n}$$

The rule allows a head with some number of valents to combine with all its requisite valents to form a constituent. Every instance of the Head-All-Valents Rule creates a "saturated" constituent, one where no further arguments are required to complete the unit. Although (4) is quite similar to previous HPSG (or SBCG) proposals for verb-initial structures—including Schema 3 from Pollard & Sag (1994, 40), *sai-ph* from Ginzburg & Sag (2000, 36), *aux-initial-cxt* from Sag (2012, 188)—the rule in (4) is slightly different in one key way: its head is left underspecified for *word*/*phrase* distinction, for reasons that will be crucial for the later analysis of adverbs.

To build a canonical Tongan clause, such as the one from (1), two instances of (4) are all that is needed. Looking at the structure bottom-up (though nothing intrinsically requires this), the predicate head *tāmate'i* 'killed' is combined with its two arguments, *'e Tēvita* 'ERG David' and *'a Kōlaiate* 'ABS Goliath' via (4) to form a $\text{Pred}^{\max}$. Then, to make the sentence (the TAM phrase), the TAM head *na'e* 'PST' combines with the aforementioned $\text{Pred}^{\max}$ via (4). The resulting structure is as in Figure 2.

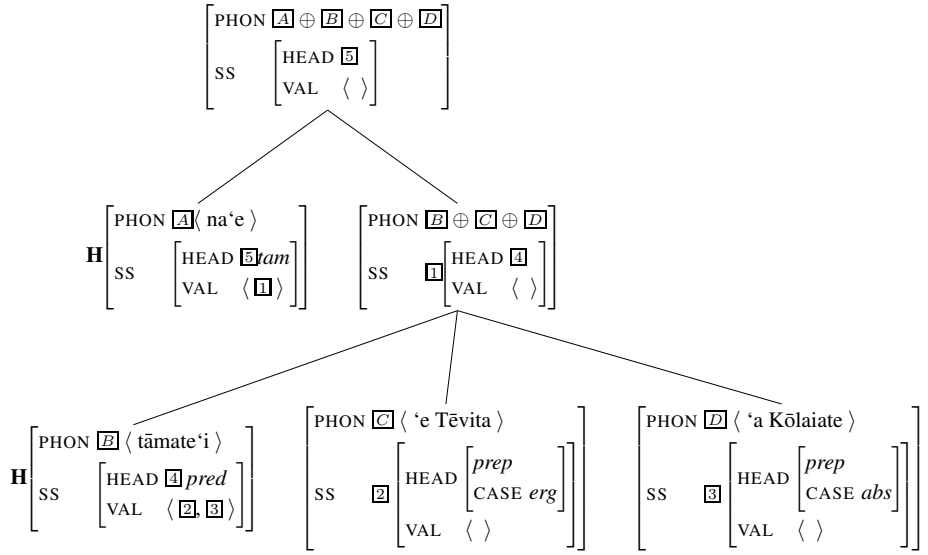

Figure 2: Tree Structure for Example (1)

3 Basics of Adverbial Syntax in Tongan

With the Tongan clause basics established, I turn to the basics of the syntax of adverbs in Tongan. Following in the footsteps of the clear discussion of French adverbs in Bonami et al. (2004), it seems useful to talk about adverb locations in

terms of pre-analytical zones. In his seminal grammar of Tongan, Churchward (1953) suggests that there are just two adverb zones: "preposed" (before the predicate) and "postposed" (after the predicate). This division would seem to exactly line up with the S-adverb–VP-adverb distinction mentioned in the introduction. However, careful examination of adverb location suggests that there are actually at least 3 zones in which adverbs can appear in Tongan. Their positioning with respect to the landmarks of the Tongan clause noted in Figure 1 are given in Figure 3. On the scheme in Figure 3, Churchward's (1953) "postposed" adverbs are split

Zone 1		Zone 2		Zone 3
TAM	↓	Predicate	↓ Argumental Phrases	↓

Figure 3: The Locations of the Adverb Zones

between Zone 2 and Zone 3. While the difference between Zone 2 and Zone 3 can be slight (and, thus, Churchward's distinctions were not without merit), there do seem to be some differences between the two, which will be highlighted further below.

The ability of the same adverb to appear in different zones across sentences (a property of some English adverbs, as noted by Jackendoff (1972), and some French adverbs, as note by Bonami et al. (2004)) in Tongan is presently not well-understood. Preliminarily, potential positioning of a single adverb in multiple zones in Tongan seems like it is rare, if not impossible. However, further research is needed to clarify this empirical area.

I turn now to considering the adverbs of each zone in slightly more depth. As Figure 3 indicated, the Zone 1 adverbs are located between the TAM and predicate. Examples of Zone 1 adverbs include the italicized words in (5)–(7):

(5) Na'e *toutou* fakama'a 'e Tēvita e faliki.
PST repeatedly clean ERG (name) ABS.DET floor
'Tēvita cleaned some (particular) floor repeatedly.' (Ball, 2008, 65)

(6) Na'e *kei* kata 'a e ongo ki'i ta'ahine faka'ofa'ofá.
PST still laugh ABS DET DU small girl beautiful.DEF
'The two beautiful girls were still laughing.' (Broschart, 2000, 353)

(7) Ko e tangata tonu pē ia na'á ne *fa'a* fakakaungāme'a
ESS DET man exact very that PST 3S.SU habitually associate
mo iá.
with 3SG.DEF
'That was the very man with whom he habitually associated.' (Churchward, 1953, 128)

It seems plausible that some adverbs in Zone 1 (such as the adverbs in (6) and (7)) have "high" scopal properties (maybe equivalent to semantically applying to the whole eventuality denoted by the $\text{Pred}^{\max}$ or otherwise have some semantic affinity

with the TAM), but how widespread this is remains to be empirically verified. It, however, is clear that multiple adverbs are possible in this zone at one time, as with *fu'u* 'excessively' and *kei* 'still' in (8):[5]

(8) 'Oku *fu'u* *kei* si'i.
PROG excessively still small
'It is still too small.' (Churchward, 1959, 260)

Zone 2 adverbs, as Figure 3 indicated, appear between the predicate and any and all of the argumental phrases. Examples include the italicized words in (9)–(13), many of which seem to come from semantically coherent subclasses of adverbs. Examples (9) and (10) illustrate that manner adverbs appear in Zone 2:

(9) Na'e fakama'a *fakalelei* 'e Pita e faliki.
PST clean well ERG (name) ABS.DET floor
'Pita cleaned some (particular) floor well.' (Ball, 2008, 49)

(10) Na'e tali *totoka* 'a Mele ki he pasi.
PST wait calmly ABS (name) to DET bus
'Mele waited calmly for some (particular) bus.' (own data)

A subclass of adverb widely found in the Polynesian languages is what Polynesian grammarians refer to as directionals. Directionals function to place events in time or space, sometimes in quite abstract or idiomatic ways. Example (11) shows that directionals – *atu* 'forth' is one – likewise appear in Zone 2 in Tongan:

(11) Na'e fakatau *atu* 'e Sione hono 'ū sū.
PST transact forth ERG (name) 3SG.POSS.O PL shoe
'Sione sold his shoes.' (Ball, 2008, 87)

Yet another subclass of adverbs is what Churchward (1953) dubbed the adverbs of uncertainty. *Nai* 'maybe', a member of this subclass, appears in (12), exemplifying that the adverbs of uncertainty appear in Zone 2, too:

(12) Na'e kai *nai* 'e Sione e mata'i ika lahi?
PST eat maybe ERG (name) ABS.DET piece fish big
'Sione ate some big piece of fish?' (Ball, 2008, 87)

Finally, the above subclasses are not an exhaustive list of the kinds of adverbs that are potentially able to appear in Zone 2. Still other adverbs can appear in Zone 2, as (13) shows:

(13) Na'e tō *'anefē* 'e Sione 'a e manioke?
PST plant when.PST ERG (name) ABS DET cassava
'When did Sione plant some cassava?' (own data)

[5] On the assumption that the Zone 1 adverb further to the left should apply to the larger semantic domain, the translation provided by Churchward for (8) is a bit surprising. It remains for future work to determine how anomalous, if at all, (8) might actually be.

Impressionistically, of the three zones, it appears that Zone 2 has more diverse collection of members, as the above discussion suggests.

Certainly, the presence of manner adverbs in the Zone 2 seems unsurprising, as manner adverbs seem intuitively to have a strong semantic affinity for the main predication itself (suggesting the semantically-based approach to adverb syntax of Ernst (2002) may also be applicable to Tongan). However, as with the Zone 1 adverbs, an exhaustive study of the unity of the semantic subclasses awaits future research.

It is clear, however, that multiple adverbs are possible in this zone at the same time, as exemplified in (14):

(14) Na‘e fakama‘a *fakalelei ma‘u pē* ‘e Sione ‘a e faliki.
PST clean well always ERG (name) ABS DET floor
‘Sione always cleaned some (particular) floor properly.’ (own data)

Furthermore, from example (14), it seems reasonable to conclude that, at least within this zone, the more rightwards an adverb is, the larger semantic domain it applies to.

Lastly, we come to the adverbs of Zone 3, which, as Figure 3 indicated, appear clause-finally, after any argumental phrases. Adverbs appearing in Zone 3 include the italicized words in (15) and (16):

(15) Na‘á ne fai eni *‘aneafi*.
PST 3SG.SUBJ do PROX.DEM yesterday
‘He did this yesterday.’ (Churchward, 1953, 66)

(16) ‘E ha‘u ia kiate kimautolu *‘apongipongi*.
FUT come 3SG to.PN 1PL.EXCL tomorrow
‘He is coming to us tomorrow.’ (Chung, 1978, 148)

As examples (15) and (16) clearly indicate, Zone 3 seems to be the spot for deictic temporal adverbs. Whether other kinds of adverbs are found here remains to be empirically discovered.

If there are no overt argumental phrases of a given predicate, Zone 2 and Zone 3 adverbs look like they appear in the same location. An example of this is in (17), where the adverb again is italicized:

(17) ‘E fai *‘apongipongi*.
FUT do tomorrow
‘It will be done tomorrow.’ (Churchward, 1953, 197)

Other examples (like (16)) clarify that *‘apongipongi* ‘tomorrow’ does seem to pattern as a Zone 3 adverb; but from just (17), that conclusion is not so clear. So, in the very least, the distinction between Zone 2 and Zone 3 adverbs can be tricky to tease apart; at worse, the difference is a false dichotomy. Even if the difference is not a false dichotomy, it does seem that these two kinds of adverbs share some affinities; any good analysis should group the adverbs of these zones together in a principled fashion.

4 Approaching An Analysis

4.1 Approaching Adjuncts in HPSG

A vast majority of HPSG analyses of structure-building crucially rely on dependencies between the elements combining to license the said structure. This is true for the syntax of adjuncts (adjectives, adverbs, and others) as much other kinds of syntactic relationships. However, there have been two styles of approaches to the syntax of adjuncts in HPSG and I will outline them here.

On the classic HPSG approach to the syntax of adjuncts – as presented in Pollard & Sag (1994, 55–57) – the adjunct is viewed as imposing requirements on the head that it goes with (in line with some observations about the nature of semantic restrictions on the head-adjunct relationship; for example, see Muehleisen (1997) for the discussion of these kinds of relationships with the domain of adjectives in English). I will refer to this style of analysis as the Adjuncts-as-Selectors approach. These adjunct-mandated requirements, in HPSG analyses, are mediated via the MODIFIED (MOD) feature: the value of MOD is a description of the syntactic (and semantic) expression that the adjunct goes with. Thus, adjunct combination in HPSG can generally be seen as involving the following rule:[6]

(18) Head-Adjunct Rule (underspecified version)

$$\left[\text{VAL}\quad \boxed{C}\right] \rightarrow \mathbf{H}\boxed{1}\left[\text{VAL}\quad \boxed{C}\right], \left[\text{MOD}\quad \boxed{1}\right]$$

The comma between the two daughters (on the right-side of the rule) indicates that, at this level of abstraction, the daughters could be in either order, subject to further constraints that a given language, combination, or syntactic item might impose. Despite what differences in notation might lead one to believe, the rule in (18) actually is very close to the usual phrase structure grammar approach to adjuncts (used by a wide variety of frameworks): it allow a head element and an adjunct to together form a phrase. However, unlike in the standard X-bar approach, the rule in (18) does not stipulate that the head must be of category X'; instead, the adjunct is free to make its own requirements. This flexibility will be of great help in the analyses in section 5.

The alternative style of analysis (pursued by Pollard & Sag (1987); Bouma et al. (2001); Levine & Hukari (2006); Bonami & Godard (2007); Sato & Tam (2008), among others), flips the selection relationship (though not the headedness relationship). On this style of analysis, the head selects for the adjunct, just as head selects for arguments. Thus, syntactic analyses involved this style (which I will dub Adjuncts-as-Valents approach) manipulate adjuncts in a head-driven fashion. In many versions of this style of analysis, the adjuncts are added to the VAL list of the head by an argument-extending lexical rule, such as the (generic) one in (19):

[6]This rule is highly comparable to Schema 5 of Pollard & Sag (1994, 58), the *head-adjunct-phrase* of Ginzburg & Sag (2000), and the Head-Modifier Rule of Sag et al. (2003, 146).

(19) $$\left[\text{CAT}\ \left[\begin{array}{ll}\text{HD} & \boxed{1}\textit{pred}\\ \text{VAL} & \boxed{A}\end{array}\right]\right] \mapsto_{LR} \left[\text{CAT}\ \left[\begin{array}{ll}\text{HD} & \boxed{1}\\ \text{VAL} & \boxed{A} \oplus \left\langle \left[\text{MOD} \mid \text{HD}\ \ \boxed{1}\right] \right\rangle\end{array}\right]\right]$$

Once adjuncts are added to a VAL list, they could be combined with their heads by rules such as the Head-All Valents Rule (given earlier in (4)).

With these two possibilities available, I next consider how plausible each might be for the adverbs of the two peripheral zones, Zones 1 and 3.

4.2 Approaching an Analysis of Zone 1 and 3 Adverbs

Zone 1 and Zone 3 adverbs appear to be easier to analyze than Zone 2 adverbs because, due to their locations, they can straightforwardly be seen as attaching to the local $\text{Pred}^{\max}$ constituent. An analysis where this attachment metaphor is actualized is considerably easier to implement under the Adjuncts-As-Selectors approach.[7] In fact, on this approach, Zone 1 and Zone 3 adverbs would have the same value for the MOD attribute: namely, that in (20):

(20) $$\left[\text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{HEAD}\ \ \left[\text{MOD}\ \left[\begin{array}{ll}\text{HEAD} & \textit{pred}\\ \text{VAL} & \langle\ \rangle\end{array}\right]\right]\right]$$

The two kinds of adverbs can be distinguished by boolean valued attribute: POST-HEAD (taken from Sag et al. (2003, 161)). A specification of − for POST-HEAD will require the adverb to appear in Zone 1; a specification of + for POST-HEAD will required the adverb to appear in Zone 3, as long as (18) is further specified as the two rules in (21):[8]

(21) a. Post-Head Head-Adjunct Rule

$$[\textit{phrase}] \rightarrow \mathbf{H}\boxed{1}[\textit{sign}]\ \left[\begin{array}{ll}\text{POST-HEAD} & +\\ \text{MOD} & \boxed{1}\end{array}\right]$$

b. Pre-Head Head-Adjunct Rule

$$[\textit{phrase}] \rightarrow \left[\begin{array}{ll}\text{POST-HEAD} & -\\ \text{MOD} & \boxed{1}\end{array}\right]\ \mathbf{H}\boxed{1}[\textit{sign}]$$

Thus, the Adjuncts-as-Selectors analysis for Zone 1 and Zone 3 adverbs is straightforward and quite uniform.

[7] However, such an attachment metaphor also is compatible with the idea that Zone 1 adverbs are actually higher predicates with $\text{Pred}^{\max}$ complements; i.e., Zone 1 adverbs are actually main predicates, involved in a multi-clausal construction. This appears to be characteristic of adverbs in some languages; however, due to my ultimate focus on Zone 2 adverbs, I will leave this analytical avenue unexplored here.

[8] The VAL specifications from (18) should be understood as applying in (21a) and (21b) as well.

An Adjuncts-as-Valents analysis of Zone 1 and Zone 3 adverbs is technically feasible, but it is not as straightforward, uniform, or, in some cases, empirically validated as the Adjuncts-as-Selectors analysis is for them. Given their locations in the clause and the general head directionality in Tongan, for a uniform analysis, the Zone 1 adverbs would have to be taken as valents of the TAM, while Zone 3 adverbs would be valents of the predicate itself. This immediately brings up an issue because this analysis predicts that Zone 1 adverbs should always co-occur with a TAM marker. However, they do not, as the example in (22) shows:

(22) Talu ia mo e *toutou* hoko kiate au 'a e ngaahi
since that COM DET repeatedly be.next to.PN 1SG ABS DET PLURAL
faingata'a.
difficulty
'Since that I have been in difficulty again and again.' (Churchward, 1953, 122)

As revealed in example (5), *toutou* 'repeatedly' clearly is a Zone 1 adverb. In (22), it appears with a predicate *hoko* ' be next to'; however, this predicate is not preceded by a TAM marker, and, in fact, seems to be in some sort of nominalization construction, where a TAM marker would be highly unlikely, if not downright impossible. Because Zone 1 adverbs actually do not obligatorily co-occur with a TAM marker, the Zone 1 adverbs do not plausibly seem to be treated as TAM valents. Thus, already the Adjuncts-as-Valents Analysis is pushed into a non-uniform analysis of Zone 1 and Zone 3 adverbs, an undesirable result.

Evidence that Zone 3 adverbs should not be treated as valents of the predicates is not so easy to come by. Still, it seems that the two principal motivations (per Sato & Tam (2008)) for the Adjuncts-as-Valents approach either are not found or may not be found with Zone 1 and Zone 3 adverbs. The first of these motivations is definitely absent: case assignment. While Adjuncts-as-Valents might be motivated for some languages because there is interaction between the case of some adverbial element and its head (perhaps interacting further with the case of some argument), this is irrelevant for Tongan adverbs. The adverbs under consideration here (which, recall, do not include prepositional phrases) do not seem to be very nominal in nature and most certainly do not seem to have any morphological requirements imposed by the predicate (let alone case requirements). The second motivating factor, the ability to "extract," may not be found. Preliminarily, it seems unlikely that Zone 1 adverbs can be "extracted;" Zone 3 adverbs may or may not.[9]

[9]Interestingly, Zone 2 adverbs can "extract," as the example in (23) shows (compare (23) with (13)):

(23) Ko 'anefē na'e tō ai 'e Sione 'a e manioke?
ESS when PST plant there ERG (name) ABS DET cassava
'When did Sione plant some cassava?'

This may, in fact, be an argument for treating Zone 2 adverbs as adjuncts that are valents. However, there are also accounts, like Chaves (2009), that allow for adverbs to be extracted without treating them as valents. If the Chaves' proposal is adopted, the extraction data's motivation for the Adjuncts-

While the above discussion, especially regarding zone 3 adverbs, does not render the Adjuncts-as-Valents analysis fatally eliminated, it does seem that Adjuncts-as-Valents analysis is not especially well-motivated for Tongan adverbs. With this diminished motivation and the fact that the Adjuncts-as-Selectors analysis seems quite simple and uniform, it seems worthwhile to see if Zone 2 adverbs can be analyzed within the Adjuncts-as-Selectors approach (all the while, allowing for Zone 2's specific properties). The next section turns to this very question.

5 Analyzing Zone 2 Adverbs

As noted earlier, Zone 2 adverbs seem trickier to analyze because their position is not obviously adjacent to a phrasal constituent. However, due to the HPSG approach to combinatorics, it is possible to license adverbs right next to predicates, without positing any additional structure (such as a covert phrasal category just for adverb attachment purposes). Furthermore, such an approach differs only minimally from the treatment of the adverbs of the other two zones, so this would offer a fairly unified analysis of all kinds of adverbs in Tongan. This section offers some sketches of this sort of analysis: first considering a VAL-sensitive approach, then, after noting some issues that such an approach raises, a WEIGHT-sensitive analysis.

5.1 A VAL-Sensitive Adjuncts-As-Selectors Analysis

Combinatoric rules in HPSG generally depend on "level of saturation," that is, the amount or presence of valents in the relevant sister constituents within the phrase. This property renders HPSG structures "bare" in the sense of Chomsky (1995): there are no unary branching tree structures (or, at least, no unary branching tree structures without semantic effect) and the grammar does not explicitly refer to the word/phrase distinction. This property turns out to have great utility in dealing with the problem of the Tongan Zone 2 adverbs. As every syntactic expression is specified with some VAL value and individual classes of words can control which syntactic features they require, the stage is set to allow Zone 2 adverbs to require the exact specification that would allow them to appear where they do.

The specification that the Zone 2 adverbs seem to empirically require is one where they modify any non-saturated predicate-headed expression, either a single word or a phrase. In formal terms, these adverbs would be specified as in (24):

(24)
$$\begin{bmatrix} \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{HEAD} & \begin{bmatrix} \text{POST-HEAD} & + \\ \text{MOD} & \begin{bmatrix} \text{HEAD} & \textit{pred} \\ \text{VAL} & \textit{nelist} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Note that the specification in (24) actually is not that different from the specification of a VP-adverb in English: in a similar framework to the one I have adopted

as-Valents approach is rendered moot.

here, the average English VP-adverb would have the specification [MOD|VAL *singleton-list*], rather than [MOD|VAL *nelist*].

The specification in (24) would interact with the requirements of both the Head-All Valents Rule (from (4)) and the Post-Head Head-Adjunct Rule (from (21a)). These three elements will force the adverb to be "low" (i.e. predicate-adjacent) in the structure. The resulting tree structure for the relevant part of the example from (10) is given in Figure 4. Let us consider how the structure in Figure 4 is licensed.

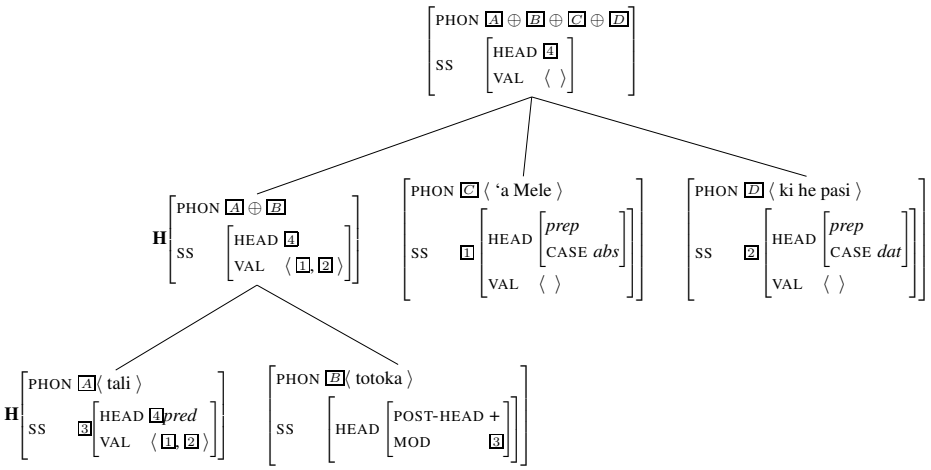

Figure 4: Tree Structure for Lower Part of Example (10)

Per (24), adverbs "look for" an *pred*-headed expression that has a non-empty VAL list (such as 3) and combine with it via the Post-Head Head-Adjunct Rule to create the higher head. This licenses the lower local subtree in Figure 4. The Head-All-Valents Rule can take a head with a non-empty VAL list and "empty" it, as it does in the highest local subtree of Figure 4. Thus, the Post-Head Head-Adjunct Rule must apply at a "low" level of structure, if it is to apply at all. If the Head-All-Valents Rule applies "first," the result ([VAL ⟨ ⟩]) will be a feature structure incompatible with the Zone 2 adverb's MOD value. Furthermore, the Post-Head Head-Adjunct Rule's maintenance of the head's valence, plus the underspecification of the head as being either a word or phrase, will allow this rule to iterate. Such iteration will license examples like (14), with multiple adverbs after the predicate.

5.2 The Problem With the VAL-Sensitive Adjuncts-As-Selectors Analysis

The VAL-sensitive Adjuncts-as-Selectors Analysis makes the clear prediction that Zone 2 adverbs should always co-occur with a post-predicate valent of the predicate. However, examples like (25), where there appears to be no post-predicate argumental phrases, raise questions about whether this prediction holds:

(25) Na‘a nau ō *leva*.
PST 3PL.SUBJ go.PLUR at.once
‘They went at once.’ (Churchward, 1953, 196)

One possibility for understanding (25) might be that *leva* ‘at once’ is actually a Zone 3 adverb (like the example in (17)) and, thus, the example in (25) is a non-issue for the VAL-Sensitive Adjuncts-as-Selectors Analysis. However, examples like (26) and (27) indicate that *leva* does appear to be in Zone 2:

(26) Na‘e tofi *leva* ‘e Siale ‘a e mā.
PST cut finally ERG (name) ABS DET bread
‘Siale finally cut some bread.’ (Ball, 2008, 87)

(27) Na‘e ha‘u *leva* ‘a e ki‘i tamasi‘i.
PST come finally ABS DET little boy
‘Finally a little boy came.’ (Broschart, 2000, 360)

Thus, *leva* does seem to be as problematic as originally thought.

Another possibility for understanding (25) is that “preposed pronouns” (like *nau* ‘3PL.SUBJ’ in (25)) are completely structure-shared with the lower predicate’s subject “argument slot”: a “raising” analysis. (Such a line of analysis was pursued in Dukes (2001).) On this analysis, *ō* ‘go’, the predicate in (25), would be specified as [VAL <[*sign*]>] and it would be compatible with the Zone 2 adverb’s MOD value, licensing (25). Yet, if “raising” is the correct analysis for “preposed pronouns,” precisely how the Head-All-Valents-Rule behaves would need to be slightly revised.

However, there is some reason to be skeptical of a “raising” analysis for (25). As (28) reveals, a “preposed pronoun” (like *ne* ‘3SG.SUBJ’ in (28)) can co-occur with a post-predicate argumental phrase of the same meaning (*‘e ia* ‘ERG 3SG’ in (28)) in a “doubling” construction:[10]

(28) Kuó *ne* lau *‘e ia* ‘a e tohí ni.
PFT 3SG.SUBJ read ERG 3SG ABS DET book this
‘He had read this book.’ (Dukes, 2001, 72)/(Ball, 2008, 131)

If “preposed pronouns” are connected to the lower argument position by “raising,” two syntactic elements would necessarily be related to the same thematic slot on a single ARG-ST list, complicating the analysis. (Dukes (2001), again, suggests one possible solution that preserves the “raising” analysis.) To avoid these complications, Ball (2008, ch. 5) pursued an analysis along the lines of “copy raising.” Under the “copy raising" approach, the preposed pronoun and post-predicate argument just share their semantic value, rather than the entire feature structure – and this relationship is not entirely encoded just on the respective VAL lists. Within this “copy raising” approach, Ball (2008) assumed that when there is no post-predicate

[10]Note that “doubling” is only possible in Tongan with pronominal meaning argumental phrases. It is impossible to for a “preposed pronoun" to “double” a content-filled argumental phrase.

pronominal argumental phrase, the relevant "argument slot" of the main predicate is "filled" by a *non-canonical* element. By the Argument Realization Principle (one formulation is given in Ginzburg & Sag (2000, 171)), *non-canonical* elements are not allowed on VAL lists; thus, an intransitive predicate with a "preposed pronoun," like *ō* in (25), is specified [VAL ⟨ ⟩], not [VAL *nelist*], and is not compatible with MOD value of the adverb.

A possible solution that would preserve the VAL-sensitive Adjuncts-as-Selectors Analysis would be to treat instances where "preposed pronoun" appears without a corresponding post-predicate pronominal argumental phrase as having, in actuality, a *pro-ss* item acting as the subject on the head predicates's VAL list (similar to the treatment of infinitival clauses with "Pro_{arb}" subjects in English, discussed in Ginzburg & Sag (2000, 51–57)). This would require a slightly different Argument Realization Principle than the one mentioned above, but this could be accomplished easily as long as *pro-ss* belong to a type that was permitted on an ARG-ST list, even while still being a covert element. Thus, *ō* 'go' in (25) could be specified [VAL ⟨ *pro-ss* ⟩] – and would not be [VAL ⟨ ⟩] – allowing it to meet the specification in (24). This analytical move does raise the question of whether this is just positing elements to preserve what might otherwise be a problematic analysis, but this remains a possible fix to the VAL-sensitive Adjuncts-as-Selectors Analysis.

5.3 A WEIGHT-Sensitive Adjuncts-As-Selectors Analysis

The problem created by the "preposed pronouns" for the valence part of the VAL-sensitive Adjuncts-As-Selectors Analysis raise the possibility that maybe valence is not a good foundation for an analysis of the Zone 2 adverbs and may, in fact, by irrelevant for them. Instead, one might consider approaching the problem using weight, following the proposals of Abeillé & Godard (2004).[11] Introduced in Abeillé & Godard (2000), the feature WEIGHT encodes a notion of syntactic complexity. Following Abeillé & Godard (2004), I will assume that the two (relevant) possible values of WEIGHT are *lite* (≈ syntactic complexity is low) and *non-lite*. Furthermore, I will assume that all individual words are constrained to be *lite* (in keeping with the aforementioned Abeillé & Godard works). On the weight-sensitive view of Tongan Zone 2 adverbs, the relevant adverbs are not specified as in (24), but as in (29):

(29)
$$\begin{bmatrix} \text{SS} \mid \text{LOC} \mid \text{CAT} \mid \text{HEAD} & \begin{bmatrix} \text{POST-HEAD} & + \\ \text{MOD} & \begin{bmatrix} \text{HEAD} & \textit{pred} \\ \text{WEIGHT} & \textit{lite} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

As is evident in (29), the VAL value of the modified element is not explicitly constrained, so it can, in principle, be anything; this renders VAL irrelevant.

[11] My thanks to Emily Bender for suggesting this approach; apparently, it has been used for a wide variety of languages by students in her Knowledge Engineering for NLP course.

The interaction of the specification in (29), the Post-Head Head-Adjunct Rule, and the Head-All Valents Rule will create a tree structure for most relevant sentences with the same configuration as in Figure 4. As the VAL value of the modified predicate does not matter, this approach is equally adept at licensing the sentence in (25). The relevant tree structure (with some details left open about the syntax of the "preposed pronoun") is shown in Figure 5. As included in Figure 5, I

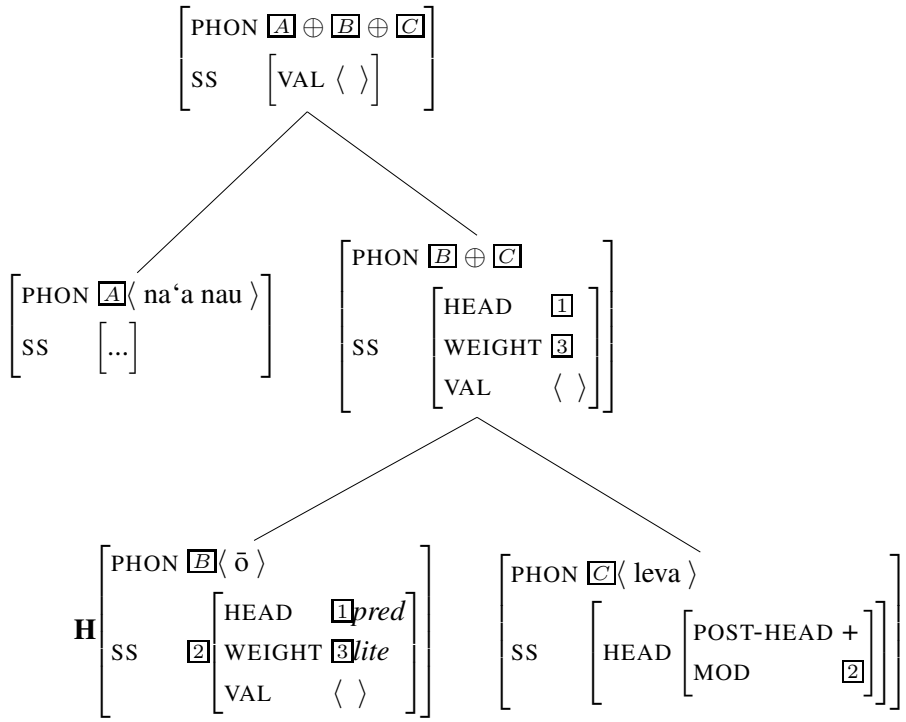

Figure 5: Tree Structure for Example (25)

assume that, minimally, the Post-Head Head-Adjunct Rule is constrained to maintain the WEIGHT value between head-daughter and mother. Thus, in Figure 5, the constituent containing just *ō* 'go' and the constituent *ō leva* 'go at once' are both [WEIGHT *lite*] (3). The purpose of this constraint is to allow the rule to iterate, in order to license multiple adverbs, such as was shown in the example in (14). Consequently, while all words are specified as [WEIGHT *lite*], all [WEIGHT *lite*] items are not words – a few select phrases are also *lite*.

The discussion above indicates that a WEIGHT-sensitive approach can solve the issues for the VAL-sensitive approach. Given its success in this regard, a further question worth considering is whether the Zone 1 and Zone 3 adverbs are amenable to an improved analysis utilizing the WEIGHT feature. Perhaps the specification [VAL ⟨ ⟩] might be replaced with the specification [WEIGHT *non-lite*]. Presently, the kind of data that could adjudicate between these proposals is not obvious, so I leave the exploration of this question for future research.

The net effect of the WEIGHT-sensitive approach is that, in essence, brings

back the rough equivalent of the feature [BAR 0], found, especially, in the Generalized Phrase Structure Grammar framework (GPSG) (Gazdar et al., 1985), HPSG's predecessor. The WEIGHT-sensitive approach, furthermore, could be viewed as a proposal for "head adjunction" (to borrow a term from movement-based syntactic frameworks) within HPSG: that is, a way to allow syntactic constituents to combine directly with lexical heads. As with other proposals for "head adjunction" in constraint-based grammatical frameworks (see, for instance, the proposal within the framework of Lexical-Functional Grammar by Toivonen (2003)) – and in contrast to movement-based approaches – this proposal does not involve any interleaving of word-building and phrase-building. Still, it does raise a question, with bearing beyond just HPSG: is a combinatoric system that is "bare" (and just sensitive to "level of saturation") enough to adequately characterize the syntax of natural languages?

6 Concluding Remarks

Out of the discussion in section 5, it seems that, while the WEIGHT-sensitive approach does have features that might lead one to preliminarily prefer it, the overall best analysis for Tongan adverbs still remains, to a degree, open. Partly, this has to do with further empirical areas that need to be verified or otherwise explored to give an even clearer picture of the syntax of adverbs in Tongan. Nevertheless, I hope that the above discussion has clarified some empirical points surrounding Tongan adverbs and narrowed down some of their analytical space. Of particular empirical note, this paper has advanced the claim that Tongan adverbs appear in not just two locations (as Churchward (1953) suggested), but, in fact, in three zones: one before the predicate and two after it. Furthermore, while adverbs in linearly second zone are plentiful and a bit analytically challenging, the apparent problem of Zone 2 adverbs not having an obvious constituent to attach to is an illusion: there are no fewer than three analytical possibilities for Zone 2 adverbs (and, really, all adverbs) in Tongan. All require slightly more flexible views on either the nature of head-adjunct dependencies or the nature of what adjuncts can select for, but have a natural fit within the confines of the HPSG framework. They furthermore open interesting doors on how the syntax of adverbs might be analyzed, not only in Tongan, but in other Polynesian, Oceanic, and Austronesian language, and potentially other languages around the globe.

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