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RESEARCH

Exclusives, equatives and prosodic phrases in Samoan

Sasha Calhoun
Victoria University of Wellington, New Zealand
Sasha.Calhoun@vuw.ac.nz

This paper investigates the functions of prosodic phrasing in the Austronesian VSO language Samoan. Two types of sentences are investigated, exclusives (involving the particle *na'o* 'only') and equatives. Two complementary methodologies were used, a production study and an acceptability judgment study, to examine the prosodic realisation and relative naturalness of different word orderings of the two sentence types. The particle *na'o* has an unusual distribution: preceding the initial constituent, be it the verb or a fronted noun phrase; or following the verb, but only modifying the absolutive (object). It was found that post-verbal absolutives modified by *na'o* are usually not preceded by a phrase boundary, unlike unmodified absolutives which are consistently preceded by a high phrase tone (H-) (cf. Yu 2009). Equatives in Samoan involve clauses which are the juxtaposition of two noun phrases, one the rheme (focus) and the other the theme (topic). It was found that rhemes are usually followed by a phrase break, while for themes this is optional. Rheme-theme order was strongly preferred to theme-rheme order. These findings are argued to show a close relationship between information structure, constituent ordering and prosodic phrasing in Samoan. The preferred order of constituents in Samoan is rheme-theme, with a high phrase tone marking the end of the rheme. The absolutive argument is strongly preferred to be at the start of the theme.

Keywords: Samoan; Austronesian languages; prosody; information structure; production experiment; acceptability judgments

1 Introduction

As this special issue shows, there is currently renewed interest in the forms and functions of prosodic phrasing across languages, and a recognition that our knowledge of this area should be informed by studies of prosodic phrasing in diverse languages (e.g. see Szendrői 2003; Elfner 2012; Wagner 2015). This research explores prosodic phrasing in Samoan, a Polynesian VSO language that is part of the Austronesian family. The study was sparked by interest in the function of H- phrase tones in Samoan. These have been found to have an interesting distribution: they are found in reasonably expected positions such as the end of the clause in an initial cleft, but also, intriguingly, before the absolutive following the verb (Orfitelli & Yu 2009; Yu 2009). In the latter case Yu (2009) claims that they are tonal markers of absolutive case. In Calhoun (2015) some issues are raised with this analysis, and it is instead claimed that H- tones mark the ends of phonological phrases. However, that study was not directly concerned with the distribution and function of the H- tones, being rather about the realisation of (rhematic) focus in Samoan. This study looks directly at prosodic phrasing in two types of sentences in Samoan which looked likely to test key aspects of the function of these tones.

The aims of this paper are two-fold. Firstly, to provide further evidence for the claim in Calhoun (2015) that H- tones are simply prosodic boundary markers, e.g. by examining cases where absolutive case can be separated from H- tone marking. The prosodic realisation of two sentence types will be looked at, those involving *na'o* 'only' and equatives. The second aim is to explore a functional explanation for the patterns of prosodic phrasing in Samoan, given the available evidence. The two main functions of prosodic phrasing are generally argued to be marking syntactic structure and information structure (e.g. see Selkirk 2011; Féry 2013). I analyse whether syntactic phrases correspond to phonological phrases in Samoan, and show such a correspondence does not seem to explain the observed data. I will then show that there are a number of reasons, on the basis of the literature on Samoan and other Polynesian languages, to suppose that phonological phrases correspond to information structure units, specifically marking the boundary between the rheme and the theme, in Samoan. However, the existing studies directly investigating prosody in Samoan (Orfitelli & Yu 2009; Calhoun 2015) are of limited use to test this idea, thus motivating the current study.

The approach taken in the study is to look at constructions in Samoan whose semantics should lead to a certain information structure, i.e. exclusives (involving *na'o* 'only') and equatives. This enables us, at least partially, to separate case-marking from information structure, which are the two main functions of H- tones in Samoan being considered. The sentences are first looked at in a production study, in which the prosodic realisation of the sentences was examined, using the prosodic annotation scheme developed in Calhoun (2015; drawing on Orfitelli & Yu 2009). Evidence is also drawn from an acceptability judgment study, in which the same set of sentences was presented to Samoan speakers who were asked to judge how acceptable, or natural, they were as sentences of Samoan. These judgments complement the production study, as they can help corroborate the interpretation of the information structure in the production study. This approach was used, rather than attempting to annotate information structure in free discourse, or manipulate information structure directly. Information structure is particularly difficult to study in an under-documented language like Samoan, without direct access to native speaker intuitions, as it interacts in complex ways with so many other parts of the linguistic system (e.g. see Himmelmann & Ladd 2008; Schultze-Berndt & Simard 2012; Simard this issue). As there is so little research on this aspect of Samoan, it was therefore decided to begin with read sentences where the semantics of the sentence strongly constrains the information structure. It is acknowledged that these data provide only a first step, and much work remains to be done to develop and test the claims being put forward here (this will be discussed further in Section 6).

There has been very little research on either prosody or its functions in Polynesian languages, nor indeed in Austronesian languages more generally; although for Polynesian see Bauer (1991) and de Lacy (2003) on Māori, Vicenik & Kuo (2010) and Ahn (2016) on Tongan, and Clemens (2014) on Niuean. Therefore this is a valuable contribution to our knowledge of this large but under-studied language family.

Below, Section 1.1 gives basic background on Samoan syntax and prosody. Section 2 describes the H- tones, and considers likely motivations for these tones in turn: case marking, correspondence with syntactic structure or with information structure. Section 3 discusses the choice to focus on sentences involving *na'o* and equatives. Section 4 sets out the results of the production study for each set of sentences, and Section 5 the results of the acceptability judgment study. Section 6 summarises the proposals put forward here and discusses the implications of the findings and future research.

1.1 Samoan

Samoan is a Polynesian language, which is part of the Austronesian language family (Mosel & Hovdhaugen 1992: 4). There are around 200,000 speakers in Samoa, and a further 160,000 worldwide (Lewis et al. 2013), including a large population in New Zealand. Like other Polynesian languages, Samoan has relatively simple phonology and phonotactics. There are ten consonant phonemes (/f, ŋ, l, m, n, p, s, t, v, ʔ/, plus /h, r, k/ in loan words), and five vowel phonemes (/a, e, i, o, u/) (Mosel & Hovdhaugen 1992: Ch. 2).[1] Vowel length is phonemic. Only open syllables are allowed, so syllable structure is (C) V(V). Lexical stress usually falls on the penultimate mora (Zuraw et al. 2014).

1.2 Samoan syntax

Basic word order is Verb-Subject-Object (VSO) (Chung 1978: 14; Hunkin 2009: 103):

(1) Sa toso e Sione le maea.
PAST pull ERG Sione DET rope
'Sione pulled the rope.'

(2) Sa savali Sione.
PAST walk Sione
'Sione walked.'

Samoan is morphologically ergative, i.e., in a transitive sentence like (1) the object, or absolutive, *le maea* is unmarked for case, while the subject, or ergative (the agent), *Sione* is preceded by the particle *e* (Chung 1978: 54–55). In an intransitive like (2), on the other hand, the subject, *Sione* is unmarked for case, showing it is also absolutive. Syntactically, the agent sometimes aligns with the grammatical subject (e.g. only ergative NPs and intransitive subjects can be realised as clitic pronouns, Chung 1978: 34–37), while sometimes the object does (e.g. with fronting constructions, see below). As the alignment of the subject (S) with either the Agent (A) or the Object (O) is not clear (see Dixon 1994; Mosel & Hovdhaugen 1992: 773), I shall avoid the term 'subject' in describing semantic roles, and only use the terms verb, agent and object (VAO) (following the convention in Dixon 1994). Mosel & Hovdhaugen (1992: 448–451) state that VAO ordering alternates relatively freely with VOA ordering, and "the argument on which the speaker wants to focus as an essential part of the new formation directly follows the verb" (except for non-clitic pronouns which always follow the verb). However, in my production study of focus marking in Samoan (Calhoun 2015), VOA ordering was rarely used. It remains an open question, therefore, what the functional uses of VOA order are.

1.3 Samoan prosody

The first study of Samoan prosody in the Autosegmental-Metrical framework (Ladd 1996; 2008) was by Orfitelli & Yu (2009) (see also Yu 2009). To my knowledge, the only published research on Samoan prosody preceding this was a short section in the major Samoan grammar (Mosel & Hovdhaugen 1992: 40–42). Their data consisted of read sentences by a 21 year male speaker of Samoan. Orfitelli & Yu (2009) found evidence for three levels of prosodic constituency in Samoan. They found that prosodic words (ω) were usually marked by a rising accent whose peak was associated with the stressed mora of the lexical head (which they label 'LH' and are here labelled 'L+H*'). Intonational phrases (ι) are marked at the right-edge by high (H%) or low (L%) boundary tones. In their data, Into-

[1] In this paper I follow Samoan orthography, where <V̄> = /V:/, <'> = /ʔ/ and <g> = /ŋ/.

national Phrases matched sentences. My study, Calhoun (2015), involving seven native Samoan speakers aged 18–50, found the same basic prosodic patterns, proposing mainly notational differences to Orfitelli & Yu's 2009 description (see further Section 4.4).

2 Motivating the distribution of H- phrase tones

Along with the basic prosodic features outlined above, Orfitelli & Yu (2009) uncovered an intonational feature, i.e. a high phrase tone H-, with a very interesting distribution. This tone patterns as a phrase tone, rather than a pitch accent, as the peak associates with the end of the prosodic word, rather than the stressed mora. This can be seen in Figure 1 (a production of (1)): the pitch peak on *toso* is during the stressed mora, the first [o], whereas the peak on *Sione* is at the end of the final [e], and extends into the following word *le* (see further in Section 4.4). These tones appeared in a number of expected places, i.e. at the end of fronted phrases (see example in (8) below), in lists and coordination. However, these tones were also found at the end of the word before the absolutive, leading Yu (2009) to claim they are functioning as tonal markers of absolutive case in this position, but markers of the right edge of phonological phrases in all other positions.

Below, we will discuss the most likely motivations for the distribution of these H- phrase tones, beginning with Yu's claim they are case markers in some cases. If H- tones mark the edges of phonological phrases some or all of the time, this leaves the question of what kind of constituent these phrases correspond to. Phonological phrases are usually taken to correspond to syntactic or information structural constituents (Szendrői 2003; Elfner 2012; Wagner 2015). We consider each in turn.

2.1 Do H- tones mark absolutive case?

Yu's (2009) main argument for H- tones marking absolutive case is that they seem to appear very stably before the absolutive constituent, no matter the order, number and length of the arguments following the verb. She therefore proposes that these are akin to other lexical cases markers in the language, such as the ergative *e*. They do not appear when the absolutive is fronted, but there are no case markers in fronted phrases, so this is expected.

However, as was discussed in Calhoun (2015), there are a number of issues with this analysis. As Yu (2009) acknowledges, a tonal case marker would be highly unexpected in a

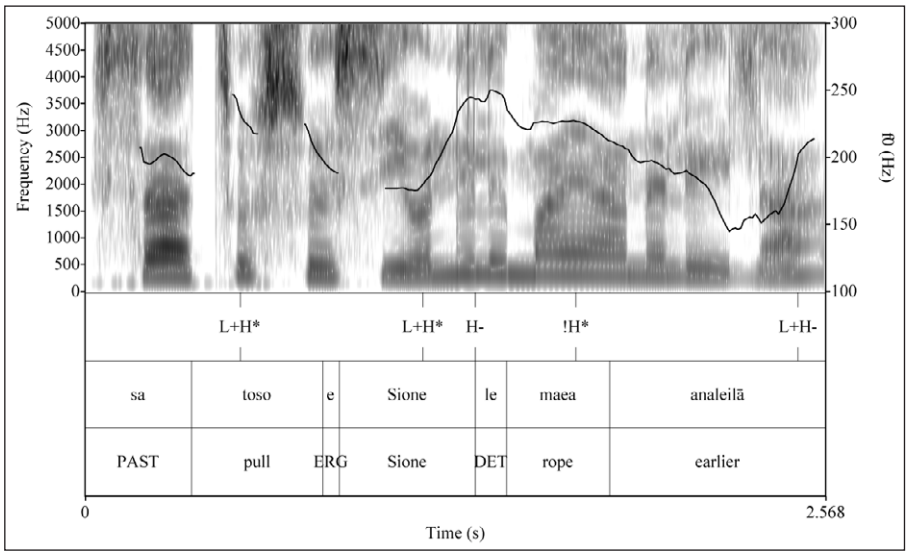


Figure 1: Realisation of a VAO sentence in Samoan, showing the realisation of a H- phrase tone, from Calhoun (2015: 215).

generally non-tonal language family.[2] To my knowledge, high tones before the absolutive have not been observed in other Polynesian languages.

Further, in order to make the analysis work, Yu (2009) argues that the 'absolutive' H- tones are independent of the H- tones that appear in other positions, such as at the ends of fronted phrases (see (8)). In these positions, H- tones mark the right edges of phonological phrases (φ), and phonological phrases correspond to (some) syntactic phrases (cf. Selkirk 2011). However, as Calhoun (2015) shows, the 'absolutive' H- tones appear to have exactly the same phonetic and phonological properties as other H- tones. There are no systematic differences in their realisation, and they both appear to trigger a reduction in pitch scaling in the following phrase (see further in Calhoun 2015). Calhoun (2015) therefore proposes, on the basis of simplicity, that in all cases these tones mark the edges of phonological phrases. In the study reported here, it will be shown that phonological phrases can also be marked by L- tones at the right edge (see Section 4.4), including before some absolutive constituents, further strengthening a unified analysis of these tones as marking phrase boundaries in all cases.

Another possibility is that absolutive case triggers the insertion of a prosodic boundary before the absolutive constituent. This seems unlikely as it implies a much richer interface between syntax and prosody than is usually assumed, as Yu (2009) notes (see also Selkirk 2011). However, this is a possibility unless there are cases where post-verbal absolutive arguments are realised without the preceding H- tone, as indeed will be shown for absolutives modified by *na'o* ('only') in Section 4.5.

2.2 Do H- tones mark XPs?

If H- tones mark the right edges of phonological phrases in all cases, the next possibility is that these phonological phrases correspond to syntactic constituents. In most theories of the syntax-phonology interface, it is claimed that phonological phrasing corresponds to syntactic structure, modulo purely phonetic/phonological effects on phrasing (e.g. Shattuck-Hufnagel & Turk 1996; Truckenbrodt 1999; Selkirk 2011). For example, in Match theory, phonological phrases correspond to syntactic phrases, or XPs (Selkirk 2011). Therefore, we should be able to derive the following observed prosodic phrasing from the syntactic phrasing (φ are phonological phrases and ι intonational phrases):[3]

(3) a. VAO: $((\text{V Erg})_{\varphi} (\text{Abs})_{\varphi})_{\iota}$

b. VOA: $((\text{V})_{\varphi} (\text{Abs Erg})_{\varphi})_{\iota}$

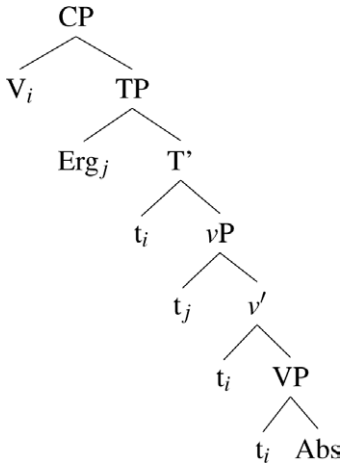
Mosel & Hovdhaugen (1992) are not specific about the internal structure of the verb phrase, and I am not aware of a syntactic analysis of Samoan which would allow us to evaluate this question (though see Koopman 2012). Therefore, in (4), a proposal within the generative framework by Otsuka (2005) for the syntactic structure of VAO and VOA sentences in Tongan is set out (Erg = ergative, i.e. A, Abs = absolutive, i.e. O, Otsuka calls these VSO and VOS). Samoan and Tongan are closely related and the relevant facts are similar: Tongan also has basic word order VAO and is morphologically ergative, although it has both ergative and absolutive lexical case markers.

[2] Note that the related Polynesian languages Tongan and Pukapukan have the so-called 'definitive accent', which marks an NP as definite. Careful phonetic studies have shown that, despite the name, this does not involve pitch features but rather doubling of the final mora in the last word of the noun phrase (Taumoefolau 2002; Salisbury 2002; Anderson & Otsuka 2006; van Ryn 2013). This is therefore not a tonal morphological feature, but more akin to reduplication. According to Condax (1990), Samoan has a similar feature which is restricted to locative NPs. Condax's study shows the phonetics of the marking seem to also be consistent with doubling of the final mora in the NP.

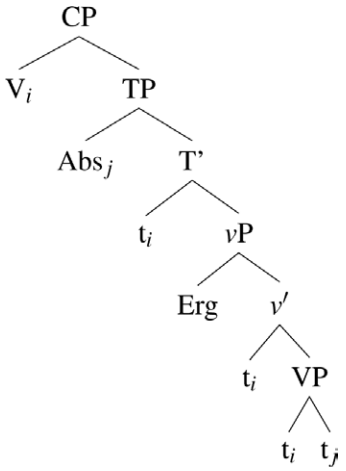
[3] Thank you to the editors for detailed discussion and suggestions on the analysis presented in this section.

(4) (Tongan, from Otsuka 2005)

a. **VAO**



b. **VOA**



If the CP corresponds to an intonational phrase (as per Selkirk 2011), the VP corresponds to a phonological phrase, and the Ergative and Absolutive are each in their own XP, we should get the prosodic phrasing below. Functional projections are not usually said to correspond to prosodic phrases, nor traces to be visible (Truckenbrodt 1999) (the VP in (5b) does not correspond to a *φ* because it contains only traces).

(5) a. VAO: (V (Erg)$_\varphi$ ((Abs)$_\varphi$)$_\varphi$)$_\iota$

b. VOA: (V (Abs)$_\varphi$ (Erg)$_\varphi$)$_\iota$

This is not what is observed in (3). If TP and *v*P are taken to correspond to phonological phrases, we get further layers of phonological phrasing, but still not the observed phrasing, as follows:

(6) a. VAO: (V ((Erg)$_\varphi$ (((Abs)$_\varphi$)$_\varphi$)$_\varphi$)$_\varphi$)$_\iota$

b. VOA: (V ((Abs)$_\varphi$ ((Erg)$_\varphi$)$_\varphi$)$_\varphi$)$_\iota$

It could be argued that some of the phrasings shown above are not well-formed because there are vacuous phonological phrases around the lowest argument in (5a), (6a) and (6b). However, even if we assume there is some constraint to remove these, we do not get the phrasings in (3). Another issue with the phrasings above is the status of the verb, which as a head should correspond to a prosodic word, not its own phonological phrase (per Selkirk 2011). One possibility is that the verb forms its own phonological phrase here to repair a violation of StrongStart (Selkirk 2011): a constraint specifying that the leftmost element in a prosodic constituent is optimally not lower in the prosodic hierarchy than the constituent which follows it. This constraint has been argued by Clemens (2014) to be important in Nuiean in explaining why the initial verb forms its own phonological phrase (see also Elfner 2012 for Irish), where the verb is also assumed to be a head in CP. However, if StrongStart was at play here, we would expect either both VAO and VOA to follow the phrasing in (3b), where the verb forms a phonological phrase by itself; or both to follow the phrasing in (3a), where the verb forms a phonological phrase with the following argument; not a mixture of both.

The basic problem is that since the argument following the verb occupies the same syntactic position whether it is ergative or absolutive, there is no way to explain on syntactic

grounds why there is a prosodic phrase break following the verb in VOA but not VAO order. Other approaches, such as mapping between syntactic and phonological phrases based on left or right alignment, face the same problem. Therefore phonological phrases do not seem to correspond to XPs in Samoan.

2.3 Do H- tones mark information structure

This leaves a correspondence between prosodic phrases and information structural units. Focus is reported to affect phrasing in many languages (Truckenbrodt 1999; Selkirk 2011; Féry 2013). The literature on information structure is wide, with much contradictory use of terminology for similar underlying phenomena (e.g. see Kruijff-Korbayová & Steedman 2003). For the purposes of this article, I will simply present the framework to be adopted here, making links to existing descriptions of information structure in Samoan and other Polynesian languages. This framework recognises that there are two orthogonal dimensions to information structure which are often subsumed under the notion of 'focus': the 'quantificational' distinction between *focus* and *background*, and the 'organisational' distinction between *theme* and *rheme* (see Vallduví & Vilkuna 1998; Steedman 2000; Calhoun 2010; Steedman 2014 and Vallduví *to appear*; who draw on earlier work including Halliday 1967). These dimensions can be seen in the following example:

(7) Q. What are your kids doing at University?
A. [[[Katie]$_F$'s doing]$_\theta$ [[Chemistry]$_F$]$_\rho$],
theme *rheme*
[[and [Paul]$_F$'s doing]$_\theta$ [[Law]$_F$]$_\rho$].
theme *rheme*

In most approaches, *Chemistry* and *Law* would be labelled as foci in this example. However, this subsumes two different reasons why they are emphasised. Firstly, according to Rooth's (1992) alternative-semantics definition of *focus* (F), they are focused in that the speaker introduces a presupposition of alternatives to the focused element, which needs to be resolved in the context, in this case an explicit contrast between *Chemistry* and *Law* (this is also termed Kontrast or Contrast by Steedman and Vallduví). Secondly, they serve to advance the discourse, here answering the first speaker's question. This 'organisational' sense of focus we will here call the *rheme* (ρ, also commonly called the comment), i.e. the part of the utterance which updates the common ground, or is new in relation to the current question-under-discussion (rather than the discourse as a whole). Therefore *Chemistry* and *Law* are rhematic foci. (It remains a controversial question whether all rhemes contain a focus, sometimes framed as whether 'new information' focus is necessarily contrastive in the Roothian sense, see Vallduví to appear; I leave this aside here.)

As this example makes clear, though, *Katie* and *Paul* are also focused in the Roothian sense, in that the speaker is selecting between alternatives in the set of their kids at University (see further Büring 2003; Vallduví to appear). However, they have a different function in terms of the organisation of the discourse. They are *themes* (θ) as they establish a link between the current utterance and the common ground or what the current question-under-discussion is, what Halliday (1967: 213–214) terms "the speaker's point of departure"; in this case breaking the first speaker's question into two information units, and setting up which *kid* each rheme refers to. Therefore *Katie* and *Paul* are thematic foci (also commonly called contrastive topics). There is often no focus in the theme, as the question-under-discussion (or topic) is established, and so alternatives are not evoked. However, there are a number of common functions of focus in the theme: to mark a contrast with another theme in the immediate context, as in (7), or to mark a change in topic (Gundel & Fretheim 2004). (Note

that the changing topic function is often called 'aboutness topic'). Parts of an utterance that are not focused are background (in this example the two instances of *doing*). It is often not practicable to make a distinction between the background of the theme and the rheme when they are contiguous in a sentence.

This discussion could be taken to imply that the information structure of an utterance can always be determined from the relationship between the words in an utterance and the preceding context. While we can infer the most likely information structure of an utterance from this method, and indeed this is the approach often taken in experimental work to elicit particular information structures, this is not necessarily the case. The information structure used is a choice the speaker makes when producing each utterance, and they can always choose to change the question-under-discussion, and hence the theme/rheme and foci, from that established by the context (e.g. see Lambrecht 1994; Steedman 2014). This possibility always needs to be kept in mind during information structure analysis.

There has been very little research directly addressing the marking of information structure in Samoan, so the sketch developed here is necessarily speculative. Given a two dimensional view of information structure, there are good reasons to support the assumption of a basic organisation of information into rheme-theme order in Samoan. In their concluding remarks on "some remarkable characteristics of Samoan syntax", Mosel & Hovdhaugen (1992: 772–4) state that "in Samoan important new information is encoded as a predicate", where the predicate is usually the intial constituent, giving a range of different constructions which achieve this (including fronted *'o*-phrases discussed below). In other Polynesian and Oceanic languages with verb-initial syntax, the initial constituent is often called the predicate phrase, rather than verb phrase, as non-verbal constituents frequently appear in this position which act like predicates (Bauer 1997; Massam 2000; Paul 2001; Otsuka 2005; Simard this issue). There is not a lot of discussion in this literature on the semantics of the notion of 'predicate', and its relation to information structure. However, the predicate seems to be assumed to be the new or focal (rhematic) information. Functionally, it makes sense for the predicate to normally be rhematic, in that a predicate denotes a set which needs to be evaluated, fitting with our notion of rheme as being the open part of the current question-under-discussion (cf. Hohaus & Howell 2014). It has been proposed to be a rule that for verb-initial languages the rheme (or rhematic focus) precedes the theme (or topic) (Herring 1990; Longacre 1995; Simard this issue).

In Yu & Orfitelli's study, H- tones were systematically found at the end of fronted phrases (in addition to before absolutives). These phrases, called the "fronted presentative noun phrase" construction by Mosel & Hovdhaugen (1992: 464–476), involve a noun phrase, preceded by the particle *'o*, before the verb. The fronted phrase can be an argument of the verb, or a temporal or locative adverbial. For example:

(8) 'O Melina na tausamia le meleni.
PRES Melina PAST eat-ES DET melon
'It was Melina who ate the melon.'

(9) 'O le meleni na tausami e Melina.
PRES DET melon PAST eat ERG Melina
'It was the melon that Melina ate.'

As can be seen, when the agent is fronted, there is a suffix *-a* on the verb, but not when the object is fronted (the suffix also does not appear with fronted intransitive subjects, hence in fronted constructions objects align with the subject role). This suffix takes a number of

forms including *-ia*, *-ina* or *-a*; it appears in a range of contexts (not just when the agent is fronted), and its function is disputed (e.g. see Chung 1978: 81–93; Mosel & Hovdhaugen 1992: 747–763; Cook 1996; Otsuka 2011). I follow Mosel & Hovdhaugen (1992) in labelling it an 'ergative suffix'. I translate these as clefts, although it should be kept in mind that their uses do not always match that of clefts in English.

The fronting construction is very common. Mosel & Hovdhaugen (1992: 474–475) list its pragmatic functions as introducing the topic of discourse, referring to contrasting participants, as a means of emphasis, and to denote where and when a state of affairs takes place. In the information structure framework adopted here, fronting would therefore be a means for marking rhematic focus, where this does not fall on the verb, but also focused themes. In Calhoun (2015) fronting was found to be the most consistent means of marking rhematic focus, consistent with this analysis. In related languages Niuean and Tongan, the equivalent phrases (marked with the cognate *ko*) are analysed as predicative clefts, again in line with this analysis (Massam 2000; Otsuka 2005). If this holds, then the H- tones at the end of fronted phrases mark the end of a focused constituent, usually the rheme. More broadly, phonological phrases appear to map onto rheme and theme units.

Focus (in the Roothian sense) may be indicated by the *'o* marker (although this is unlikely to be the only means to mark focus). This has been claimed by Hohaus & Howell (2014), who propose that *'o* denotes a noun phrase for which alternatives need to be calculated (see also Brown & Koch 2016). They argue this links the presence of *'o* in fronted phrases with other occurrences of *'o*, e.g. with (fronted) question words (see (25)–(31)) below), in the particles *na'o* ('only') (see Section 3.1) and *so'o* ('any'), and the future tense marker *'o le 'ā*.

Mosel & Hovdhaugen (1992) do not comment on how initial thematic and rhematic foci are distinguished. Given that the normal ordering in Samoan is argued to be rheme-theme, we would only expect the theme to precede the rheme when it is focal; it is well attested for languages with initial (rhematic) focus to have a theme (topic) position before this (e.g. see Herring 1990; Rizzi 1997; Simard this issue). Mosel & Hovdhaugen (1992) give examples of multiple fronted *'o* phrases in Samoan, e.g.:

(10) Mosel & Hovdhaugen (1992: 472):

'O	le	atunu'u	o	Niu	Kini,
PRES	DET	country	POSS	New	Guinea

'o	tamaitai	e	faia	fa'atoaga.
PRES	lady-PL	GENR	do-ES	plantation

'In New Guinea, it is the women who work on the plantations.'

Here, *New Guinea* is clearly thematic, and *the women* rhematic. In other languages with similar pre-verbal theme and rheme focus positions, the main stress in the sentence falls on the rheme focus, if present, or else in the main clause if there is only a theme focus, e.g. see Szendrői (2003) for Hungarian, Bauer (1991) for Māori *ko*, and Section 3.2 and Simard (this issue) for the Oceanic language Gela.

In order to tie this analysis of the prosodic phrasing of fronted phrases in with the appearance of H- tones before absolutives, it would need to be the case that the absolutive usually forms the beginning of the theme in Samoan. That is, in a standard verbal clause, the verb and any following arguments up to the absolutive form the rheme, and the absolutive by default the theme, hence explaining the presence of a phrase break marking the end of the rheme before the absolutive. This is tenable, given that the absolutive is the unmarked argument, and hence a natural "point of departure" for the speaker. Yu (2009) states that the sentences in her study were elicited under broad focus. It is therefore plausible that, in the absence of a specific context, the speaker in her study took the default

argument, the subject, as the beginning of the theme, no matter the order of the arguments (given that the word order was not chosen by the speaker).

The evidence from the study reported in Calhoun (2015) is somewhat equivocal. That study was designed to investigate the marking of rhematic focus, and did not directly look at the marking of themes. Speakers were asked to describe pictures showing a transitive event in response to questions intended to elicit rhematic focus on the agent or object (as opposed to broad focus). The speakers fell into three groups who used quite different (rhematic) focus marking strategies. Two speakers, both older than 40, almost always fronted the focus preceded by *'o*, a pattern that agrees with what is proposed here. Three speakers, all younger than 26, always used VSO order no matter the focus, though they variably used a full accent on the object in object focus. The last group, consisting of one younger and one older speaker, both usually fronted the agent when it was focused, but not the object. The younger speaker in this group variably used a strong accent on the object in object focus, suggesting her focus-marking system aligns with the other younger speakers. However, the older speaker did not, i.e. under object focus the object was produced with a weak or no accent. All of the speakers who produced objects (absolutives) post-verbally which were focused (according to the experiment design) still produced the H- phrase tone before the absolutive. My analysis is that for the younger speakers the relationship between prosodic phrasing and information structure is changing, most likely because of greater contact with English. For these speakers, theme-rheme order is allowed, rhematic focus can be marked prosodically on post-verbal arguments in situ, and the phrasing of the absolutive is serving some other function. The older speaker who did not front the object when focused is more difficult to account for under my proposal. My best analysis is that the cueing question was not successful in eliciting a response with rhematic focus on the object for this speaker, given her object focus responses did not apparently differ from broad focus. Wh-type questions are usually used in studies like this to elicit different focus structures from speakers, however, speakers are always free not to produce the expected information structure in their response. It may be that there is such a strong dispreference for focusing absolutives in Samoan that she reinterpreted the requested information structure to avoid this.

3 Constructions investigated in this study

As the discussion above showed, there are a number of reasons, on the basis of the literature on Samoan and other Polynesian languages, to suppose that phonological phrases correspond to information structure units, specifically marking the boundary between the rheme and the theme, in Samoan. However, the two existing studies looking directly at prosody in Samoan, Orfitelli & Yu (2009) and Calhoun (2015), are of limited use to test this idea. What is needed is data in which we can be reasonably sure of the information structure, in order to, at least partially, separate this from absolutive case. That is the approach taken here, where we examine two types of construction in Samoan in which the semantics of the sentence should result in a certain information structure. This lets us see if we are on the right track in proposing a correspondence between phonological phrases and information structure in Samoan. This study forms part of a larger project looking at prosodic phrasing in a range of syntactic structures in Samoan.

3.1 The exclusive na'o ('only')

Sentences involving the adverbial particle *na'o* ('only') have a very interesting distribution with respect to absolutive arguments. It was therefore thought they would be a good test of whether H- tones always occur before absolutives. To my knowledge, the prosody of sentences involving *na'o* has not been studied before.

As in other Polynesian languages, verbal modifiers, including adverbs, in Samoan usually occur at the end of the verb phrase (Chung 1978; Mosel & Hovdhaugen 1992), e.g.:

(11) Mosel & Hovdhaugen (1992: 388, their 7.331):
'Ua mumū **fua** **lava** le mōli.
PERF burn just EMPH DET lamp
'The lamp is burning away to no purpose.'

(12) Mosel & Hovdhaugen (1992: 390, their 7.350):
Na alu atu loa **fo'i** Ioane...
PAST go DIR then also Ioane
'And then Ioane went away...'

(13) Mosel & Hovdhaugen (1992: 391, their 7.365):
... 'ua ou solia **maia** lou maota...
PERF 1-SG trespass-ES EMPH DET-POSS-2-SG house
'... I have trespassed into your chiefly house...'

As can be seen, the adverbs *fua* ('just') and *lava* (an emphatic particle loosely translated as 'just' or 'very') in (11), *fo'i* ('also') in (12), and *maia* (an emphatic particle loosely translated as 'really') in (13) follow the verb. Some of these adverbs can also occur with fronted noun phrases, e.g. *lava* and *fo'i* in the following:

(14) Mosel & Hovdhaugen (1992: 325, their 6.429):
'O le taimi **lava** e te alu ese ai...
PRES DET time EMPH 2-SG GENR go away ANAPH
'The very time you go away...'

(15) Mosel & Hovdhaugen (1992: 325, their 6.428):
'O le ala **fo'i** lea o lo'u sau...
PRES DET reason just that POSS DET-POSS-1-SG come
'That is just the reason of my coming...'

However, the distribution of *na'o* ('only') is quite different, it can appear preceding the verb phrase (16), but also preceding a fronted noun phrase (17), and attached to a post-verbal absolutive argument (18):

(16) Mosel & Hovdhaugen (1992: 272, their 6.132):
Sa **na'o** na ou tepa tasi i tua...
PAST only PAST 1-SG look one LD back
'I only looked back once...'

(17) Mosel & Hovdhaugen (1992: 272, their 6.133):
Na'o le toatolu lava tagata
only DET HUM-three EMPH person
e nonofo i totonu o le potu...
GENR stay LD inside POSS DET room
'Only three people are going to stay inside the room...'

(18) Mosel & Hovdhaugen (1992: 273, their 6.136):
Ia, 'ae nofo lava **na'o** le tama lenai i lo lātou āiga.
well but stay EMPH only DET boy this LD DET-POSS 3.PL family
'Well, then this boy stayed alone in their family.'

In order to modify an agent with *na'o*, the agent must be fronted. It is not clear from the existing literature what motivates the choice between the different possible placements of the *na'o* phrase, and whether they are all equally natural.

Na'o ('only') also has important semantic properties with respect to information structure. Exclusive adverbs like *na'o* ('only') are focus sensitive, i.e. the presence of an exclusive demands an exclusive interpretation of the focus. Beaver & Clark (2008) identify *only* in English as being the prototypical exclusive adverb: "On our account, the focus sensitivity of exclusives arises as a direct consequence of their intrinsic discourse function, which is to comment on the current question. Since we take focus to mark which part of a clause answers the Current Question, a particle which comments on alternative answers to the Current Question is necessarily focus sensitive" (Beaver & Clark 2008: 70). The Current Question in Beaver & Clark's 2008 definition is equivalent to the question-under-discussion in our definitions of theme and rheme above, so within our framework this is saying that the constituent modified by *only* is normally the rhematic focus. Since the semantic essence of an exclusive is the choice of an option between alternatives, it is also possible for an exclusive to modify a focused theme, e.g. "Only Katie's doing chemistry". In the Samoan examples above, the consistent modified by *na'o* seems to be a rhematic focus, with the predicted exclusive semantic property. Hence, modification by *na'o* can be a diagnostic for focus on a noun phrase, most commonly rhematic focus, but also possibly thematic focus.

The focus-sensitivity of *na'o* is also supported by orthography: *na'o* is often written in Samoan as two words *na 'o*. As Hohaus & Howell (2014) claim, this would support the interpretation of *na'o* as a special case of *'o*, which in their account is a morphological focus marker (see above). Further, before a verb *na* is a past tense marker, which could support the interpretation of *'o* (and *na'o*) phrases as predicative (and hence usually corresponding to the rheme). In summary, if the presence of *na'o* affects the occurrence of the H- phrase tone on post-verbal absolutives, then this is a strong indication that the distribution of the tone is related to the information structure of Samoan utterances.

3.2 Equatives

The choice to look at equatives (or equational clauses) was motivated by the account of the intonation of equatives in Māori by Bauer (1991). Bauer showed that there is particularly clear intonational marking of theme-rheme structure (which she called topic-focus) in equatives in Māori, which are similar syntactically to equatives in Samoan. To my knowledge, the prosody of equatives in Samoan has not been studied before.

Samoan, like other Polynesian languages, does not have copulas, so equatives are defined as clauses in which two noun phrases are juxtaposed (Mosel & Hovdhaugen 1992: 501–519):

(19) Mosel & Hovdhaugen (1992: 502, their 11.11):

Sa	i ai	le	ulugāli'i	i	Tutuila,					
PAST	exist	DET	couple	LD	Tutuila					
'o	**Pua**	**le**	**tamaloa**	a	**'o**	**lana**	**ava**	**'o**	**Sigano**.	
PRES	Pua	DET	husband	but	'o	DET-POSS-3.SG	wife	PRES	Sigano	

'There was a couple in Tutuila, the husband was Pua and his wife Sigano.'

In the information structure framework used here, *le tamaloa* ('the husband') and *lana ava* ('his wife') are themes, in that they link the equative clauses back to the *le ulugāli'i* ('the couple') set up in the sentence before. *Pua* and *Sigano* are rhemes, in that they give the new information about the couple, their names. There are two equative clauses in (19), the first is in rheme-theme order, and the second theme-rheme order. As can be seen,

rhemes are always marked with *'o*, showing that they are focal. According to Mosel & Hovdhaugen (1992), themes are only marked with *'o* in theme-rheme order, as in the second clause here where the speaker marks the contrast in the theme from the first clause. Mosel & Hovdhaugen (1992: 502) report that in general rheme-theme (their predicate-subject) order is more basic, while theme-rheme is marked; however, when the rheme is a proper name both orders are commonly found (Mosel & Hovdhaugen 1992: 512).

In Polynesian languages, these structures are treated as predicative, in that one noun phrase, the rheme focus, takes the role of the predicate and the other, the theme, the subject (Mosel & Hovdhaugen 1992; Bauer 1991; Massam 2000).[4] Mosel & Hovdhaugen (1992) do not comment on whether the subject is case marked in these constructions, although they talk of the two noun phrases as being 'juxtaposed', which does not suggest case marking. I have not been able to find any examples of clear overt marking of absolutive case on the subject in equatives in other Polynesian languages, including those such as Niuean and Tongan that have overt markers of absolutive case in some cases (Bauer 1991; Massam 2006; Potsdam & Polinsky 2011; Brown & Koch 2016). In her analysis of equatives in Niuean, Massam (2006) assumes that the subject in sentences equivalent to *'o Pua le tamaloa*, the subject (*le tamaloa*) is absolutive. However, she is not then able to provide a unified analysis of these sentences and 'double *'o*' constructions (or 'double *ko*' in Niuean) like *'o lana ava 'o Sigano*, which appear to have the same semantic identity relationship in both orders. She treats the latter as involving two juxtaposed small clauses, essentially akin to the analysis proposed for both orderings here. I therefore proceed on the assumption that neither noun phrase in these constructions is case marked, and that therefore these constructions allow us to look at information structure independently of case marking. At the end of Section 4.6, I return to the possibility that subjects are marked with absolutive case in rheme-theme order, and the implications for my findings in that case.

Bauer (1991) analyses *ko* (a cognate of *'o*) as having two distinct functions in Māori. 'Equative *ko*' (EQ) functions as the marker of the predicate in equative sentences like (20). She states that this is equivalent to its use as a (rhematic) focus marker in verbal sentences. In sentences like (21), on the other hand, 'topicalizing *ko*' (TOP) is a topic marker (our thematic focus):

(20) *Māori,* Bauer (1991: 4, her (2), original glosses)*:*
Ko Huia ahau.
EQ Huia 1.SG
'I am Huia.'

(21) Bauer (1991: 4, her (4)):
Ko Rewi kei konei.
TOP Rewi at here
'Rewi is here.'

Crucially, there is a clear intonational difference between these two uses of *ko*. In (20), the main pitch movement is on *Huia*, with flat pitch following, whereas in (21) the main stress is on *konei*. Bauer analyses *konei* as the predicate (our rheme) in (21), with *ko Rewi* being an initial topic (our focused theme). A shift in stress to *Rewi* in (21) makes it contrastive (rheme focus); Bauer translates this as 'It is Rewi who is here'. Bauer suggests that the focal case should be analysed as analogous to the equative sentence in (20), i.e. with the structure [Ko Rewi]$_{FOC}$ [kei konei]$_{TOP}$ (rheme-theme in our terms). Bauer also comments that,

[4] This is different to equivalent copula constructions in European languages which are treated as either predicative or equative, cf. Heycock (2012).

while it should be possible to use equative (rheme focus) and topicalising (theme focus) *ko* together, sentences like (22) were rejected by her consultants, being corrected to (23):

(22) *Māori,* Bauer (1991: 10, her (23)):
*Ko tēnei ko te roia.
TOP this EQ the lawyer
'This is the lawyer.'

(23) Bauer (1991: 10, her (25a)):
Ko tēnei te roia.
TOP this the lawyer
'This is the lawyer.'

In (23), the stress is on *roia*, which Bauer says suggests that the equative (rheme focus) *ko* has been deleted. Unlike in Māori, structures equivalent to (22) are well attested in Samoan, even if they are marked, as was discussed above. Therefore, if the intonational distinction between rheme-theme and theme-rheme equative sentences seen in Māori also holds in Samoan, then looking at the use of H- phrase tones in these sentences should shed light on whether phonological phrases are involved in marking the division of utterances into theme and rheme in Samoan.

4 Production study

The production study investigated the prosodic realisation of different sentence types in Samoan, with regard to the distribution of boundary tones, in particular the H- phrase tone. Two types of sentences are reported on in this paper, sentences involving *na'o* ('only') and equative sentences, as discussed above. There were six other sentence types included as well, not reported here, which were part of a larger study into the functions of prosodic phrasing in Samoan. This study, and the acceptability judgment study reported in Section 5 were approved by the Victoria University of Wellington Human Ethics Committee (reference number 20490).

4.1 Participants

Six participants took part. They were all native speakers of Samoan who grew up in Samoa and were now living in New Zealand. Three had moved to New Zealand in the past 3–4 years, while the other three moved over 40 years ago. Three of the participants were male and three female. Participants were aged 44–72 years. In my previous study (Calhoun 2015) it was found that there was significant differences between older and younger speakers, with considerably more variability among the younger speakers. Since variation was not the focus of this study, it was decided to only recruit older speakers. All reported being Samoan dominant, speaking Samoan at least 80% of the time in their daily lives. All speakers reported having learnt English in school from the age of 6 (apart from one who reported learning English from age 19, but who had been in New Zealand over 40 years). Information on the exact origin of the speakers was collected, but it was not found to have any evident effect on the results. Regional variation in Samoan within Samoa is small (Mosel & Hovdhaugen 1992: 8). Participants received supermarket vouchers in recognition of their participation.

4.2 Materials and design

There were a total of 208 sentences, including 20 *na'o* sentences, 8 equative sentences, and 180 sentences of other types which are not reported here. These were split into 13 blocks of 16 sentences. The sentences were evenly distributed across blocks so that no

condition for any type was repeated in any block. Within each block, the sentences were presented in a fixed pseudo-random order, so that there was not a repeat of the same type within three items. There were no dedicated fillers.

Each sentence was presented with a context designed to create a discourse context appropriate for that sentence. The contexts were intended to help the participants to produce the sentences naturally. The sentences and contexts all involved the daily activities of the fictional Malaga family. In the family were Kalolo and Felila, the mother and father, their children Manino (adult male), Melina (adult female), Amani (teenage male) and Alana (teenage female), as well as Penina, Manino's wife, and Asovale, Melina's husband.

The sentences were constructed so that, as far as possible, the key words for analysis had particular phonological properties. The verbs and nouns were all at least three morae long, so that any *f*0 movement could be clearly associated with a word. The last two morae (including the stressed mora) in each key word contained only sonorant sounds, to facilitate the *f*0 (fundamental frequency) analysis.

The sentences and contexts were presented in a printed list, with the contexts in light blue and the sentences for the participants to read in black in a larger font. There was also a separate sheet which introduced the Malaga family, and gave instructions on the experiment task. All material was in Samoan.

4.2.1 Na'o sentences

Sentences were constructed involving *na'o* modifying a noun phrase in all of the syntactic positions in which it is known to be grammatical in Samoan (see Section 3.1). The contexts are shown below. Labels in bold will be used to refer to each *na'o* condition:

(24) Context for (25–27):
'O le taeao sā tele ai fuālā'au'aina mai le fa'ato'aga 'i luga o le laulau. 'Aiseā na toe fia 'ai ai Melina i le aoauli?
'In the morning, there was a lot of fruit from the garden on the table. Why was Melina hungry again by lunchtime?'

(25) **V*na'o*OA:**

Na	tausami	na'o	le	meleni	e	Melina	analeilā.
PAST	eat	only	DET	melon	ERG	Melina	earlier

'Melina only ate the melon earlier.'

(26) **VA*na'o*O:**

Na	tausami	e	Melina	na'o	le	meleni	analeilā.
PAST	eat	ERG	Melina	only	DET	melon	earlier

'Melina only ate the melon earlier.'

(27) ***na'o*OVA:**

Na'o	le	meleni	na	tausami	e	Melina	analeilā.
only	DET	melon	PAST	eat	ERG	Melina	earlier

'It was only the melon that Melina ate earlier.'

(28) Context for (29):
'O le taeao sā tele ai fuālā'au'aina mai le fa'ato'aga 'i luga o le laulau. 'O ai na tausamia na'o le meleni?
'In the morning, there was a lot of fruit from the garden on the table. Who only ate the melon?'

(29) **AV*na'o*O:**

'O	Melina	na	tausamia	na'o	le	meleni	analeilā.
PRES	Melina	PAST	eat-ES	only	DET	melon	earlier

'It was Melina who only ate the melon earlier.'

(30) Context for (31):
'O le taeao sā tele ai fuālā'au'aina mai le fa'ato'aga 'i luga o le laulau. 'Āfai na tofu fuālā'au'aina 'uma, 'aiseā 'ua lē fiafia ai Kalolo?
'In the morning, there was a lot of fruit from the garden on the table. If everyone had some fruit, why was Kalolo annoyed?'

(31) ***na'o*AVO**:

Na'o	Melina	na	tausamia	le	meleni	analeilā.
only	Melina	PAST	eat-ES	DET	melon	earlier

'It was only Melina who ate the melon earlier.'

As explained in Section 3.1, the noun phrase modified by *na'o* should be focal, because of the semantics of exclusives. Exclusives normally modify rhemes, though they can modify themes. For all the sentences except (29), the *na'o* modified constituent would be most naturally interpreted as rhematic, as that constituent advances the question-under-discussion set up by the context (broadly "what Melina ate" for (25–27) and "who ate the melon" for (31)). For (29) the rheme would most naturally be *Melina*, as this answers the question, so *na'o le meleni* should be a thematic focus.

Four sets of five sentences, like the above, were constructed; see Appendix for the other three sets. Each sentence ended with a time adverbial, either *analeilā* ('earlier') or *ananafi* ('yesterday') repeated from the context (see further in Section 4.4).

4.2.2 Equative sentences

There are two possible orderings of equative sentences in Samoan, which I label 'rheme-theme' (ρ-θ) and 'theme-rheme' (θ-ρ) (see Section 3.2). As with the *na'o* sentences, four sets of equative sentences were constructed. Participants read these after hearing the context set out below. All sentences ended in an adverbial phrase repeated from the context (see further in Section 4.4).

The equative sentences were intended to be of only one type, with four items of that type (as for the *na'o* sentences where there were four items for each type). However, the choice of sentences for these items turned out to be somewhat problematic. All four behaved differently with respect to prosody and ratings (see Sections 4.6 and 5.3.2), so it would not have been appropriate to pool the results over the four items. Therefore, it was decided to treat each item as a different type. These are labelled (in bold below): 'single', meaning a single rheme and theme; 'predicative', a single rheme-theme sentence which would be considered predicative and not equative in the European tradition (see Section 3.2); 'conjoint', a conjoint rheme and single theme; and 'double', a double rheme-theme structure.

(32) Context:
Ta'u mai po'o ai tagata 'i totonu 'o le 'āiga.
'Tell me who's in the family.

(33) *ρ-θ,* **Single**:

'O	Amani	'o	le	ui'i	'o	le	'āiga.
PRES	Amani	PRES	DET	youngest	PRES	DET	family

'Amani is the youngest in the family.'

(34) *θ-ρ*, **Single**:
’O le ui’i ’o Amani ’o le ’āiga.
PRES DET youngest PRES Amani PRES DET family
‘The youngest in the family is Amani.’

(35) *ρ-θ*, **Predicative**:
’O Alana ’o le faia’oga mai le ’āiga.
PRES Alana PRES DET teacher from DET family
‘Alana is the teacher in the family.’

(36) *θ-ρ*, **Predicative**:
’O le faia’oga ’o Alana mai le ’āiga.
PRES DET teacher PRES Alana in DET family
‘The teacher in the family is Alana.’

(37) *ρ-θ*, **Conjoint**:
’O Kalolo ma Felila ’o mātua ’o le ’āiga.
PRES Kalolo and Felila PRES parents PRES DET family
‘Kalolo and Felila are the parents in the family.’

(38) *θ-ρ*, **Conjoint**:
’O mātua ’o Kalolo ma Felila ’o le ’āiga.
PRES parents PRES Kalolo and Felila PRES DET family
‘The parents are Kalolo and Felila in the family.’

(39) *ρ-θ*, **Double:**
’O Kalolo le tamā a ’o Felila le tinā i le ’āiga.
PRES Kalolo DET father but PRES Felila DET mother LD DET family
‘Kalolo is the father but Felila is the mother in the family.’

(40) *θ-ρ*, **Double:**
’O le tamā ’o Kalolo a ’o le tinā ’o Felila i le ’āiga.
PRES DET father PRES Kalolo but PRES DET mother PRES Felila LD DET family
‘The father is Kalolo but the mother is Felila in the family.’

The Samoan consultants assisting with constructing the materials advised that it sounded more natural for them to have both arguments introduced with *’o* in both orderings for all but the ‘double’ sentences, i.e. only the double sentences showed the asymmetry discussed in Section 3.2, where both arguments are marked with *’o* in theme-rheme order, but only the rheme is in rheme-theme order. In addition, they felt that it was more natural to mark the adverbial with *’o* in most of the sentences. The uses of *’o* are rather complex (see Section 2.3), so it was decided to stick with the reportedly more idiomatic forms; though, in retrospect, this made the intended rheme-theme structure non-transparent from the wording. However, the intended structure is clear from the semantics of the sentences. Families can be expected to have parents and ‘youngest ones’ (*ui’i*), so this is naturally the theme, whereas the identity (name) of each member is the new information being advanced about the family. This does not hold with the ‘predicative’ sentences, which showed the most variability in realisation and rated poorly (see Section 5.3.2). *’O le ’āiga* (‘in the family’) was repeated from the question, so it should be interpreted as background. In Section 5.3.2,

it will be shown that participants systematically rated the different orderings differently, showing they did assign the intended structure to the sentences.

4.3 Procedure

A few days before the experiment session, each participant was given the list of contexts and sentences and asked to read through it to familiarise themselves with the sentences. The experimental sessions were conducted almost entirely in Samoan, both in the printed material and in interactions with a Samoan-speaking research assistant. Participants first read the instruction sheet and were given the chance to ask questions. They were then seated with the research assistant. Each had the printed list of contexts and sentences. Participants were asked to imagine that the sentences related to the daily activities of the Malaga family, but to treat each context and sentence pair as unrelated to the ones before and after it. They were told that, in some cases, the sentence may feel like only the first part of a longer answer to the question, which was not given. The research assistant read the contexts, and the participants were asked to reply with the sentence in as natural a way as possible. Participants were recorded using head-mounted microphones directly to hard-drive at a sampling rate of 44 kHz. The whole session took around 45 minutes.

4.4 Prosodic analysis

The sentences were automatically segmented at the word and phone level using the *Prosodylab-Aligner* tools (Gorman et al. 2011). The automatic segmentations were then hand-corrected. The prosodic realisations of the sentences were analysed by the author using the annotation scheme for Samoan developed in Calhoun (2015) (which drew on the analysis in Orfitelli & Yu 2009) within the Autosegmental-Metrical framework (Ladd 1996; 2008). Analyses were carried out using *Praat* (Boersma & Weenink 2014).

The following inventory of tonal events were found in these data. This matches the inventory in Calhoun (2015), with the addition of L- phrase tones, and largely agrees with Orfitelli & Yu's (2009) system, with some minor notational differences (see further in Calhoun 2015). These events will be described and exemplified below.

- **Pitch accents:** L+H*, L+!H*, H*, !H* (associated with the stressed mora in a word)
- **Phrase tones:** H-, L-, L+H-, L+!H- (associated with the end of a phonological phrase)
- **Boundary tones:** L% (associated with the end of an intonational phrase)

Each prosodic word in Samoan is usually associated with a rising pitch accent, L+H*, i.e. an L (low) pitch target rising to a peak associated with the stressed mora, H*, as can be seen on *tausamia* and *meleni* in Figure 2 (Orfitelli & Yu 2009 label these 'LH' accents). (The sound files for all the Samoan examples in this section are included with the supplementary data for this paper.) Prosodic words consist of a lexical head, plus any surrounding particles (usually to the left). The stressed mora is usually penultimate (Zuraw et al. 2014), i.e. when the final vowel in the word is short, the peak is associated with the penultimate vowel (e.g. with /le/ in *meleni* in Figure 2), whereas when the final vowel is long, the peak is associated with that vowel (e.g. with /la:/ in *analeilā* in Figure 3). Some accents are produced without a clear initial L target, these were labelled H* (or !H*), e.g. *meleni* in Figure 3 (following Orfitelli & Yu 2009).[5] In these cases, more weight was placed

[5] Note that a small dip in *f*0 can be seen during the [l] segment in *meleni*. This appears to be a microprosodic effect, in that there was very consistently an *f*0 dip during [l] sounds in the data, as can be seen in all the examples given in the paper. This is somewhat surprising, in that sonorants are not usually thought to create microprosodic effects (Ladd 2008: online appendix). However, the laterals in Samoan are very strongly articulated, so that phonetically they may be closer to [ɮ], and hence are not fully sonorant (thank you to an anonymous reviewer for this suggestion).

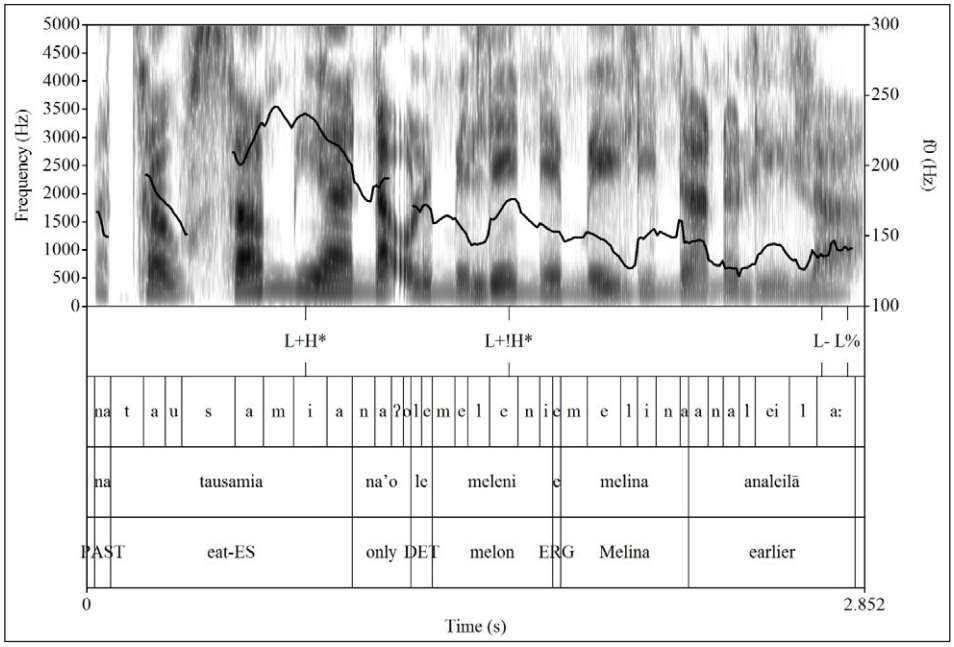


Figure 2: Prosodic realisation of a typical V*na'o*OA sentence.

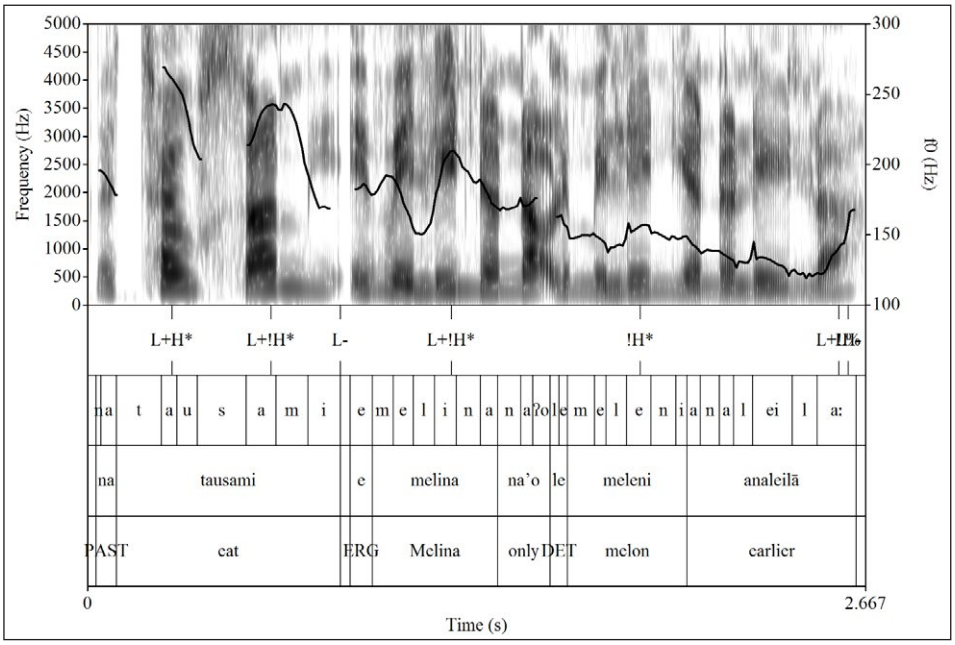


Figure 3: Prosodic realisation of a typical VA*na'o*O sentence.

on non-pitch cues to prominence, such as duration and amplitude,in deciding accent status. In a few cases, secondary lexical stress is also marked with a pitch accent, so there are two pitch accents in the prosodic word, e.g. on *tausami* in Figure 3. Secondary stress is usually marked with a (!)H* accent, but occasionally L+(!)H* (as was also found by Orfitelli & Yu 2009). Finally, in the system used here, accents produced with a perceptibly lower peak than the preceding high tonal event in the intonation phrase were marked downstepped (!), e.g. the L+!H* accent on *meleni* in Figure 2 (Orfitelli & Yu 2009 found downstep in their data, but did not mark it as a separate accent type).

Some pitch movements were associated with prosodic constituent boundaries, rather than stressed morae. These were labelled as phrase tones (H-, !H-, L-). Rising phrase tones (H-, !H-) were previously identified by Orfitelli & Yu (2009) (see also Yu 2009; Calhoun 2015). These can be seen in Figure 4. The pitch rises on *Melina* and *tausamia* extend from

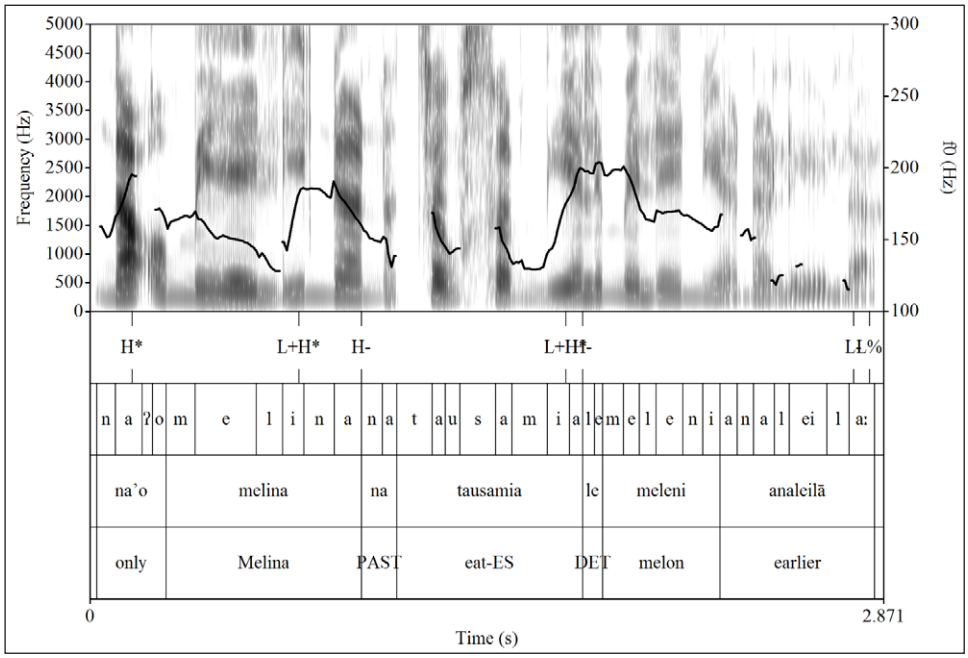


Figure 4: Prosodic realisation of a typical *na'o*AVO sentence.

the stressed mora (/li/ and /mi/ respectively) until the end of the prosodic word, in the case of *tausamia* continuing over /leme/ at the beginning of the following prosodic word.[6] As noted in the earlier work, there is usually no evident pre-boundary lengthening with these tones. The tones could be downstepped relative to the preceding H-, but not preceding accents in the phrase. Note that a phrase tone was labelled as downstepped if the peak was lower than the immediately preceding tonal event in the intonation phrase, be it pitch accent or phrase tone. In addition, in these data low phrase tones (L-) were found. These involved a fall in pitch at the end of a prosodic word, usually followed by a short pause, and always with a definite perception of juncture, e.g. at the right edge of *tausami* in Figure 3. Low phrase tones in mid-sentence position were not noted in the previous studies.

In Calhoun (2015), it was found that the final prosodic word in each intonation phrase was usually produced with a rising pitch movement, no matter its information status or semantic role. It was claimed that this pitch movement is not a pitch accent,but a non-prominence lending phrase accent associated with the stressed mora (in Orfitelli & Yu 2009 this is identified without argument as the nuclear accent). The phrase accent analysis will be assumed here. Therefore, rises on the final prosodic word were labelled L+H- (or L+!H-), e.g. on *analeilā* in Figure 3. The final word was always a time expression repeated from the context, in order to separate any pitch accents on the final argument in the sentence from these phrase accents. In some cases there was no clear rise on the final word, although there was some perception of stress. These were labelled as L- phrase accents associated with the stressed mora, e.g. on *analeilā* in Figure 2. Sentences were usually produced as a single intonation phrase. These usually ended in a low boundary tone (L%) (see Figure 2) (this was also found by Orfitelli & Yu 2009). However, in cases where the final vowel was long and the word carried a rising phrase accent (L+(!)H-), this final fall was not apparent in the pitch trace (although it often sounded as if it was there), as in Figure 3. Following the analysis in Calhoun (2015), it is assumed that there is an underlying low boundary tone, L%, in these cases, but it is truncated.

[6] The boundary marking on *Melina* is rather subtle, as it does not extend all the way to the end of /na/, but rather starts to fall during the /a/; however, if thiswere a pitch accent, the fall would typically begin during the stressed /i/.

4.5 Na'o sentences: Results and discussion

This section presents the prosodic patterns found in the productions of the *na'o* sentences. First the patterns found over all the sentences are set out. These results are then discussed in terms of whether they follow the predictions of the claimed case-marking and information-structure functions of H- tones discussed in Section 2. In Section 4.5.3, the proposed information structure/phonological phrasing correspondence developed in Section 2.3 is expanded to account for L- phrase tones, found for the first time in these data.

4.5.1 Overall patterns

Six of the *na'o* sentences were excluded because they were disfluent, leaving a total of 114. The most common intonational pattern for each *na'o* condition is shown below (see Figures 2–5 for examples). For each prosodic word, the most common accent or phrase tone type is given, with the percentage of the total accounted for by that tone type below. The phonological (φ) and intonational phrases (ι) suggested by the phrase and boundary tones are shown. The phrase tones and phonological phrases are bolded as they are of primary interest in this study.

As noted in Section 4.4, prosodic words consist of the lexical head, plus any particles to the left, with any accent falling on the lexical head and any phrase tone at the right boundary of the prosodic word. In some cases a prosodic word carried two accents (e.g. marking secondary lexical stress), in these cases the accent type was taken to be the stronger of the two, according to the ranking L+H* > L+!H* > H* > !H*. For the *na'o* constituents, there was sometimes an accent on *na'o* as well as (and rarely instead of) on the argument; these were treated like the other cases of prosodic words with two accents, as there was no evident pattern as to when these occurred.

Where the most common tone type did not account for at least 70% of the data, the next most common tone type is shown in a second row below the argument, along with percentage. Where one of the most common realisations was the presence of an accent or phrase tone, and the other was the absence of one, this is indicated by a dot. Downstepped accents and phrase tones are grouped with non-downstepped equivalents where relevant. In all cases, the two most common tone types for a given argument accounted for at least 70% of the data; infrequent tone choices are not shown. The total number of each condition is also given.

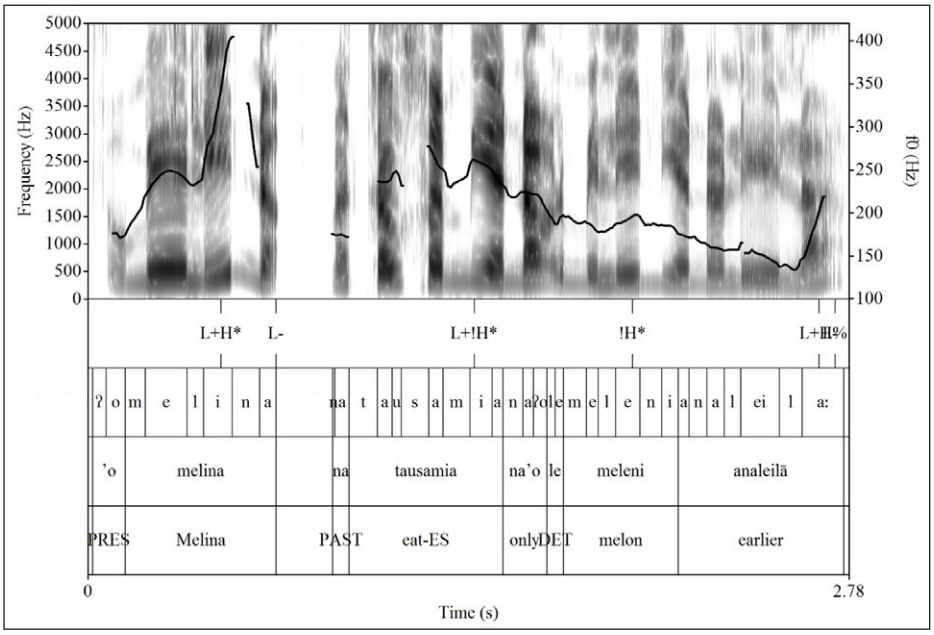


Figure 5: Prosodic realisation of a typical AV*na'o*O sentence.

(41)	((	**V**		***na'o* O**		**A**	**T**	$)_{\varphi}$	$)_{\iota}$)	
		L+H*	.	L+(!)H*	.	L+(!)H*	L+(!)H-		L%	
		96%	*67%*	*63%*	*67%*	*50%*	*83%*		*100%*	
			H-	!H*	**L-**	.				
			25%	*33%*	*29%*	*25%*				(*N*=*24*)

(42)	((	**V**	**A**	$)_{\varphi}$ (	***na'o* O**	**T**	$)_{\varphi}$	$)_{\iota}$	
		L+H*	L+(!)H*	**L-**	L+(!)H*	L+(!)H-		L%	
		78%	*83%*	*43%*	*48%*	*96%*		*100%*	
				.	!H*				
				39%	*39%*				(*N*=*23*)

(43)	((	***na'o* O**	$)_{\varphi}$ (	**V**	**A**	**T**	$)_{\varphi}$	$)_{\iota}$	
		L+H*	**H-**	(!)H*	(!)H*	L+(!)H-		L%	
		91%	*50%*	*50%*	*41%*	82%		*100%*	
			L-	L+(!)H*	L+(!)H*				
			27%	*36%*	*36%*				(*N*=*22*)

(44)	((	**A**	$)_{\varphi}$ (	**V**		***na'o* O**	**T**	$)_{\varphi}$	$)_{\iota}$	
		L+H*	**H-**	L+!H*	.	.	L+(!)H-		L%	
		100%	*55%*	*59%*	*73%*	*45%*	*87%*		*100%*	
			L-	!H*		L+(!)H*				
			45%	*32%*		*41%*				(*N*=*22*)

(45)	((	***na'o* A**	$)_{\varphi}$ (	**V**	$)_{\varphi}$ (	**O**	**T**	$)_{\varphi}$	$)_{\iota}$	
		L+H*	**H-**	L+(!)H*	**(!)H-**	(!)H*	L+(!)H-		L%	
		87%	*50%*	*100%*	*100%*	*43%*	*78%*		*100%*	
			L-			.				
			36%			*35%*				(*N*=*23*)

4.5.2 Case-marking hypothesis

According to the case-marking hypothesis, post-verbal absolutives should always be preceded by an H- tone (see Section 2.1). It is clear this is not the case for post-verbal absolutives modified by *na'o*, i.e. the absolutive (O) is not commonly preceded by an H- tone at all for VA*na'o*O (42) and AV*na'o*O (44) sentences, and only 25% of the time for V*na'o*OA (41) sentences. Most commonly post-verbal *na'o*-modified absolutives do not have a phrase boundary preceding them, although in VA*na'o*O sentences (42) *na'o* is preceded by a low boundary tone (L-) around half the time. However, in the *na'o*AVO sentences (45), the post-verbal absolutives were very consistently preceded by the H- tone when not modified by *na'o*, as was found by Orfitelli & Yu (2009) and Calhoun (2015).

The difference between an absolutive preceded and not preceded by an H- tone can be seen very clearly in Figure 6, which shows the realisation of part of the sentence *na filifilia na'o le lavalava e Alana ananafi* ('Alana only choose a sarong yesterday', see (61) in the Appendix) by two different speakers. On the left is the most common realisation with no phrase break following the verb (cf. (41)): as can be seen the pitch begins to fall in the stressed mora (the second /li/) and continues to fall through the start of *na'o* (note the speaker includes the 'ergative' suffix here, cf. Section 2.3). On the right is one of the small number of realisations with a H- phrase tone following the verb: here it can be seen that the pitch continues to rise through the stressed mora (the second /fi/) to the end of the verb, and there is a short pause after the rise consistent with a phrase break.

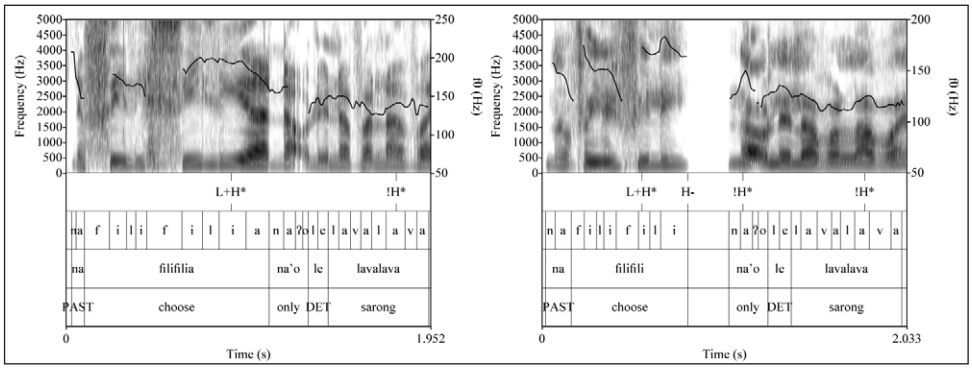


Figure 6: Realisation of a V*na'o*OA sentence without and with H- before *na'o*.

These data, therefore, present a major challenge to the claim that H- phrase tones mark absolutive case in Samoan, in that they do not usually appear before post-verbal absolutives preceded by *na'o*.

4.5.3 Information-structure hypothesis: Phrasing

According to the information structure hypothesis (see Section 2.3), phonological phrases should normally correspond to theme or rheme units. The preferred order of these units is rheme-theme, so the initial phrase should be the rheme, containing the rhematic focus. H- phrase tones normally mark the end of a rheme if there is a following theme. As established in Section 4.2.1, the *na'o*-marked constituent should be focal in each of these sentences, and given the context would be most naturally be rhematic in all but the AV*na'o*O sentences (with the caveat that speakers can always interpret information structure differently to what was intended). The information-structure hypothesis therefore predicts the *na'o* constituent to be in the initial phrase, the usual position for the rheme, in all but the AV*na'o* sentences. For the V*na'o*OA sentences ((41) and Figure 2), this is indeed what we find, the most common realisation of this sentence is as a single phonological phrase. The information structure of (41) would therefore be (repeating the example from (25)), where [ ] marks the edges of information units, and ( ) prosodic phrases:

(46) **VA*na'o*O**
'O le taeao sā tele ai fuālā'au'aina mai le fa'ato'aga 'i luga o le laulau.
'Aiseā na toe fia 'ai ai Melina i le aoauli?
'In the morning, there was a lot of fruit from the garden on the table.
Why was Melina hungry again by lunchtime?'

[(	Na	tausami	na'o	[le	meleni]$_F$	e	Melina	analeilā.)$_{L\varphi}$]$_\rho$
	PAST	eat	only	DET	melon	ERG	Melina	earlier

'Melina only ate the melon earlier.'

In (42), around half the time the *na'o*-marked absolutive also forms part of the initial phrase, the predicted pattern under the information structure hypothesis. However, the other half of the time, there is a phrase break before the absolutive which is low (labelled L-, see Figure 3). These low phrase tones were not observed mid-clause in the previous studies, so their function needs to be deduced from their behaviour in these data. Across languages, high phrase tones are commonly found to indicate incompleteness, and low tones completeness, e.g. Pierrehumbert & Hirschberg (1990: 302) propose that an H- phrase tone in English "indicates that the current phrase is to be taken as forming part of a larger composite interpretive unit with the following phrase. A L phrasal tone emphasizes the separation of the current phrase from a subsequent phrase". Incorporating this pattern within the framework being developed here, we can modify the function of

H- tones somewhat, to mark an information unit as incomplete, often a rheme that needs to completed by a following theme. L- tones then have the opposite function, marking an information unit as complete.

Applying this formulation to the information structure of the two-phrase realisation of (42), we get (context given above):

(47) **VA*na'o*O:**

[(Na tausami e Melina)$_{L\varphi}$]$_{\rho 1}$
PAST eat ERG Melina

[(na'o [le meleni]$_F$ analeilā.)$_{L\varphi}$]$_{\rho 2}$
only DET melon earlier

'Melina only ate the melon earlier.'

That is, these speakers are dividing their reply into two rhemes (labelled ρ1 and ρ2), or two information units. Looking at the context, this interpretation makes sense. The speakers were interpreting the response as offering two separate pieces of information to the question 'Why was Melina hungry?': first, that she had eaten in the past, second that it was only a melon. Other speakers chose to interpret this as a single information unit, and hence did not have a boundary between *Melina* and *na'o*.

In Section 2.3, fronted *'o* constituents were claimed to be rhematic foci (and sometimes thematic foci). According to the framework developed there, we therefore predict them to form their own phonological phrase, normally with a final H- phrase tone marking a rheme with a following theme, as was indeed found in previous studies (Orfitelli & Yu 2009; Calhoun 2015). As predicted, in these data fronted constituents always formed their own phrase, whether or not the *na'o* constituent was initial ((43–45), see Figures 4 and 5). However, unlike in these two previous studies, at the right-edge of these phrases H- tones alternate with L- tones. The H- tone usage is as predicted, and implies that the initial phrase is the rheme, followed by a theme. For example, for (43) this would be (same context as above):

(48) ***na'o*OVA**:

[(Na'o [le meleni]$_F$)$_{H\varphi}$]$_\rho$
only DET melon

[(na tausami e Melina analeilā.)$_{L\varphi}$]$_\theta$
PAST eat ERG Melina earlier.

'Melina only ate the melon earlier.'

For the cases where the fronted phrase ended with an L- tone, as with (47) above, I propose this shows the speaker is dividing their reply into two information units, or two rhemes. This realisation was most common with the (44) sentences (see Figure 5). That is, this variation can be explained if speakers had two competing interpretations of the information structure of that sentence type, as follows (note the context is different to the examples above, cf. (29)):

(49) **AV*na'o*O**

'O ai na tausamia na'o le meleni?
Who only ate the melon?'

a. [('O [Melina]$_F$)$_{H\varphi}$]$_\rho$
PRES Melina

[(na tausamia na'o [le meleni]$_F$ analeilā.)$_{L\varphi}$]$_\theta$
PAST eat-ES only DET melon earlier

b. [(’O [Melina]$_{F}$)$_{L\varphi}$]$_{\rho 1}$
PRES Melina

[(na tausamia na’o [le meleni]$_{F}$ analeilā.)$_{L\varphi}$]$_{\rho 2}$
PAST eat-ES only DET melon earlier

‘It was Melina who only ate the melon earlier.’

Under this analysis, most speakers produced a sentence with the intended information structure, i.e. ‘only ate the melon earlier’ as the theme, repeated from the question (49a). However, this entailed having a focus in a non-initial theme, which is an unusual and probably dispreferred structure (cf. Section 5.3.2). This is equivalent to the attested, but unusual, ‘second occurrence focus’ cases in English and German (Beaver et al. 2007; Baumann 2014). Therefore, other speakers interpreted ‘only ate the melon earlier’ as a second information unit, a second rheme (49b). This would serve as a clarification or re-confirmation of what Melina was doing.

Finally, in (45) we again see variation between H- and L- tones at the end of the first phrase, again consistent with competing interpretations of the information structure, as follows (context from (31)):

(50) ***na’o*AVO**
’Āfai na tofu fuālā’au’aina ’uma, ’aiseā ’ua lē fiafia ai Kalolo?
If everyone had some fruit, why was Kalolo annoyed?’

a. [(Na’o [Melina]$_{F}$)$_{H\varphi}$]$_{\rho 1}$
only Melina

[[(na tausamia)$_{H\varphi}$]$_{\rho 2}$ [(le meleni analeilā.)$_{L\varphi}$]$_{\theta 2}$]$_{\theta 1}$
PAST eat-ES DET melon earlier

b. [(Na’o [Melina]$_{F}$)$_{L\varphi}$]$_{\rho 1}$
only Melina

[(na tausamia)$_{H\varphi}$]$_{\rho 2}$ [(le meleni analeilā.)$_{L\varphi}$]$_{\theta}$
PAST eat-ES DET melon earlier

‘It was only Melina who ate the melon earlier.’

In (50a) the H- tone distribution seems to indicate a nested information structure: like in (49a), the fronted phrase is the rheme, and the whole of the verb phrase its theme. However, within this theme, there is a nested rheme-theme structure, with the absolutive forming the beginning of the theme (following the pattern for absolutives not modified by *na’o* in the earlier studies). As noted in Section 2.3, the default in Samoan is to make the absolutive the theme, consistent with this realisation. This is plausible in the context, as the melon is the source of Kalolo’s annoyance. However, this information structure is rather complex, so it seems plausible that a significant portion of the time speakers chose to break the reply into two information units (50b), a single rheme, and then a rheme-theme.

4.5.4 Information-structure hypothesis: Accenting

The information structure analysis developed here also seems to be supported by the accenting patterns. Cross-linguistically, (unfocused) themes tend to be prosodically weak, while (rhematic) foci are strong (e.g. see Gundel & Fretheim 2004). In these data the *na’o* + absolutive constituent was usually fully accented (L+(!)H*); whereas when not modified by *na’o*, the absolutive tended to be prosodically weak (!H* accent or no accent) (cf. Figure 2 and 4, this pattern was also found by Calhoun 2015). The exception to this was the AV*na’o*O sentences, where the *na’o* + absolutive constituent was not accented around half the time ((44) and Figure 5). As discussed above, these sentences have an unusual information structure, akin to ‘second occurrence focus’, which likewise shows lowered

prominence on the second focus (Beaver et al. 2007). Therefore, focused constituents are generally produced with strong accents.Note this is a different conclusion to that reached in Calhoun (2015), where it was suggested that H- tones trigger 'accent suppression' in the following phrase, i.e. arguments in the phrase following the H- were either realised with no accent, or a weak !H* accent. However, this was not the case in these data, so it appears that accent realisation is independent of the H- tones, and may be related to information structure. The exception was the final prosodic word, realised with a strong L+H- phrase accent (one argument for the phrase accent interpretation of these rises). The strong final phrase accents were consistently found on the final time adverbial (T) in these data, despite always being background.

The non-occurrence of H- tones before absolutives modified by *na'o* strongly suggests that the distribution of H- tones, and hence phonological phrases in Samoan, is linked to information structure. Above was sketched a unified account of the division of fronted phrases and verbal clauses into phonological phrases, based on a correspondence with information structure. In addition, this account offers an explanation for the distribution of phrases ending in L- tones, noted for the first time in these data. That is, H- tones mark an information unit as incomplete, L- as complete.

4.6 Equative sentences: Results and discussion

The structure of this section follows that for the section above, first the overall prosodic patterns of the equative sentences are laid out, then these are discussed in terms of the extent to which they support the proposed information structure marking function for phonological phrases, and case marking for H- tones.

4.6.1 Overall patterns

Two of the equative sentences were excluded because they were disfluent, leaving a total of 46. The most common intonational pattern for each condition is shown below in (51) (see Figures 7–10 for examples). The phonological (φ) and intonational phrases (ι) suggested by the phrase and boundary tones are shown. Again the phonological phrasing and phrase tones are bolded. I use the labels 'θ' (theme) and 'ρ' (rheme) for each constituent (prosodic word)

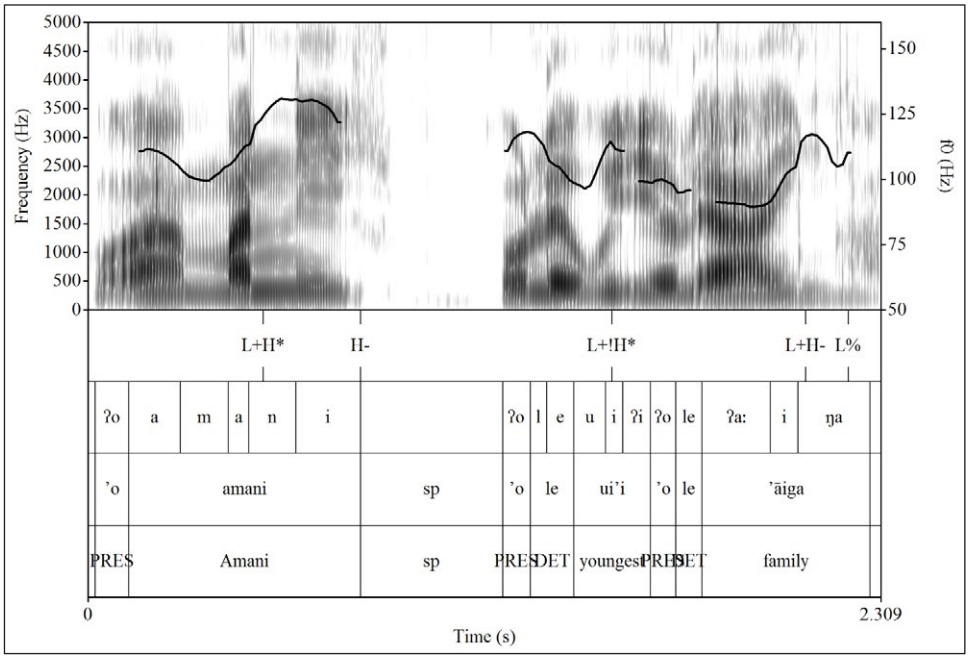


Figure 7: Prosodic realisation of a typical single equative sentence in rheme-theme order.

according to the intended information structure (see Section 4.2.2), although note that this does not necessarily match the information structure intended by the speaker (see Section 2.3).

As noted in Section 4.4, prosodic words consist of the lexical head, plus any particles to the left, with any accent falling on the lexical head and any phrase tone at the right boundary of the prosodic word. In some cases a prosodic word carried two accents (e.g. marking secondary lexical stress), in these cases the accent type was taken to be the stronger of the two, according to the ranking L+H* > L+!H* > H* > !H*. Where the most common tone type did not account for at least 70% of the data, the next most common tone type is shown in a second row below the argument, along with percentage. Where one of the most common realisations was the presence of an accent or phrase tone, and the other was the absence, this is indicated by a dot.Downstepped accents and phrase tones are grouped with non-downstepped equivalents where relevant. In all cases, the two most common tone types for a given constituent accounted for at least 70% of the data; infrequent tone choices are not shown. The total number of each condition is also given.

(51) a.

((	ρ	)φ (	θ	**Adv**	)φ	)ι
	L+H*	**H-**	L+(!)H*	L+(!)H-		L%
	90%	*100%*	*100%*	*100%*		*100%*
				(**Single**)		(*N*=*5*)

b.

((	θ	)φ (	ρ	)φ (	**Adv**	)φ	)ι
	L+H*	**(!)H-**	L+(!)H*	**(!)H-**	L+(!)H-		L%
	100%	*67%*	*100%*	*83%*	*100%*		*100%*
		.					
		33%			(**Single**)		(*N*=*6*)

c.

((	ρ	)φ (	θ	**Adv**	)φ	)ι
	L+H*	**H-**	L+(!)H*	L+(!)H-		L%
	80%	*60%*	*80%*	*100%*		*100%*
		L-				
		40%		(**Predicative**)		(*N*=*5*)

d.

(	(	θ	)φ (	ρ	)φ (	**Adv**	)φ	)ι
	H-	L+H*	**L-**	L+(!)H*	**L-**	L+(!)H-		L%
	60%	*50%*	*50%*	*67%*	*50%*	*100%*		*100%*
	.	(!)H*	**H-**	!H*	.			
	40%	*50%*	*40%*	*33%*	*40%*	(**Predicative**)		(*N*=*6*)

e.

((	ρ	)φ (	ρ	)φ (	θ	**Adv**	)φ	)ι
	L+H*	**H-**	L+(!)H*	**(!)H-**	L+(!)H*	L+(!)H-		L%
	100%	*83%*	*67%*	*67%*	*67%*	*100%*		*100%*
			!H*	**L-**	!H*			
			33%	*33%*	*33%*	(**Conjoint**)		(*N*=*6*)

f.

((	θ	)φ (	ρ	)φ (	ρ	)φ (	**Adv**	)φ	)ι
	L+H*	**H-**	L+(!)H*	**(!)H-**	L+(!)H*	**(!)H-**	L+(!)H-		L%
	67%	*67%*	*67%*	*67%*	*67%*	*50%*	*83%*		*100%*
	H*	.	!H*	**L-**	!H*	**L-**			
	33%	*33%*	*33%*	*33%*	*33%*	*50%*	(**Conjoint**)		(*N*=*6*)

g.	((	*ρ*	)$_{\varphi}$ (	*θ*	)$_{\varphi}$ (	*ρ*	)$_{\varphi}$ (	*θ*		**Adv**	)$_{\varphi}$)$_{\iota}$			
		L+H*	**H-**	!H*	**L-**	L+H*	**H-**	!H*	.	L+(!)H-	L%			
		100%	*83%*	*67%*	*67%*	*100%*	*100%*	*83%*	*50%*	*100%*	*100%*			
				L+!H*	**!H-**				**L-**					
				33%	*33%*				*33%*	(**Double**)	(*N*=6)			
h.	((	*θ*	)$_{\varphi}$ (	*ρ*	)$_{\varphi}$ (	*θ*	)$_{\varphi}$ (	*ρ*	)$_{\varphi}$ (	**Adv**	)$_{\varphi}$)$_{\iota}$			
		L+H*	**H-**	L+H*	**H-**	L+!H*	**!H-**	L+(!)H*	**L-**	L+(!)H-	L%			
		67%	*67%*	*83%*	*67%*	*67%*	*67%*	*83%*	*50%*	*100%*	*100%*			
		H*	.		**L-**	!H*	.		.					
		33%	*33%*		*33%*	*33%*	*33%*		*33%*	(**Double**)	(*N*=6)			

4.6.2 Information-structure marking hypothesis: Phrasing

The main prediction of the information-structure marking hypothesis in relation to the production of the equative sentences is that there should be a clear prosodic distinction between the two juxtaposed sentences when produced in rheme-theme and theme-rheme order. Rheme-theme order should be preferred. The rheme and theme should each be in a separate phonological phrase, with a H- phrase tone at the end of the rheme, and lower prominence on the theme (as in other rheme-theme utterances discussed above). In theme-rheme order, if the same pattern is found as was described for Māori by Bauer (1991), the prosodic realisation should be consistent with the main prominence being in the rheme. A phrase boundary between the theme and rheme is less likely,as across languages themes are often grouped with following rhemes (Gundel & Fretheim 2004; Steedman 2014). In terms of its information value, it makes sense for the boundary following the rheme to be compulsory, and following the theme optional. The rheme is the most important part of the sentence, so it needs to be clearly identifiable (as in the data above). The accent on the rheme should also be stronger.

Because of the differences between the productions of each of the four types of equative sentences: single, double, conjoint and predicative (see (51)), these are considered separately (cf. Section 4.2.2), looking firstly at phrasing and then accenting.

In the single equative sentences ((51a) & (51b), Figures 7 and 8), we see intonational differences between the realisation of the first and second noun phrase in rheme-theme and theme-rheme order, as predicted. Initially, the rheme is always followed by an H- tone, while a third of the time there is no break between an initial theme and its rheme. Following the proposal set out in Section 4.5.3, in both orderings, the information unit is incomplete after the first constituent, so if there is a phrase boundary, we would expect it to be H-, as it is; however, the boundary is compulsory after a rheme.

There are also clear intonational differences between the orderings in the double sentences ((51g) & (51h), see Figures 9 and 10), consistent with what was predicted. As with the single sentences, in rheme-theme order, there is almost always a H- tone after the rheme, indicating a theme to come. This break is more variable in theme-rheme order, as the theme does not need to be systematically separated from its following rheme.

The two information units (each theme-rheme pair) in both orderings of the double sentences are separated by a phrase boundary, however this varies between H- and L- in each ordering. Following the proposal set out in Section 4.5.3, this variation could stem from competing functional choices for the speakers. That is, those who used L- were marking that these were two complete information units, each giving new information. Those using H- were marking that the two information units were coordinated, and formed part of a larger complex information unit, about the Malaga family. In Orfitelli & Yu (2009), it was found that H- tones are also used in lists and coordination, this looks like an extension

of this usage. Similarly, speakers sometimes had a L- phrase tone before the adverbial, and sometimes no break; this could be related to whether they interpreted the adverbial as part of the same information unit. A similar explanation can be advanced about the variation between H- and L- tones at the end of each of the rheme constituents in the conjoint sentences ((51e) & (51f)): this could be related to whether the speaker conceptualised these as forming one information unit or two. Otherwise, the phrasing patterns between themes and rheme in the conjoint sentences generally follows that in the single and double sentences.

The predicative sentences ((51c) & (51d)) did not pattern obviously like the other sentence types, and were considerably more variable. These predicative sentences, in both

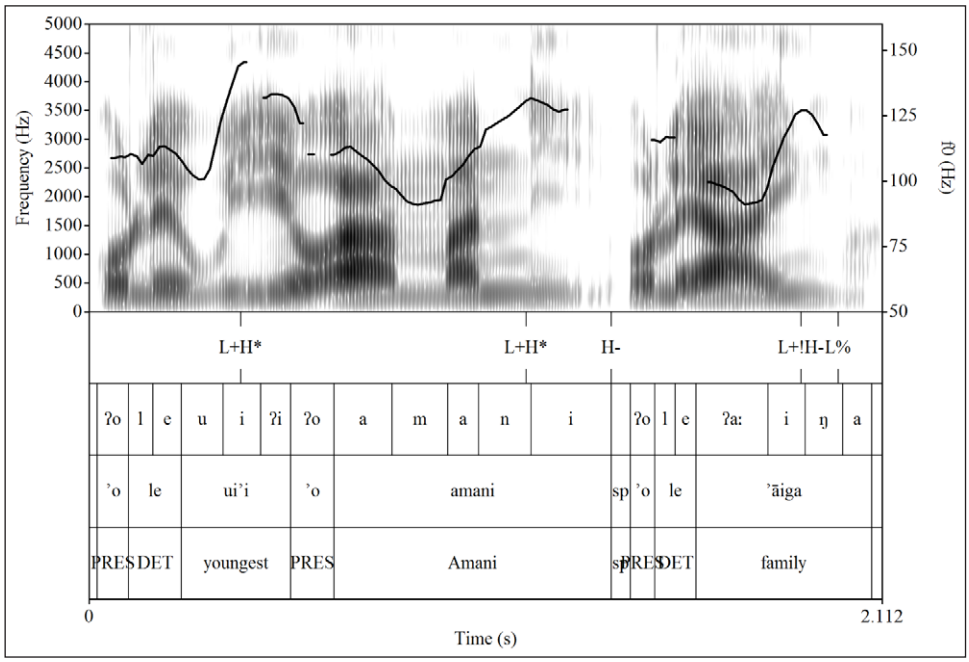


Figure 8: Prosodic realisation of a typical single equative sentence in theme-rheme order.

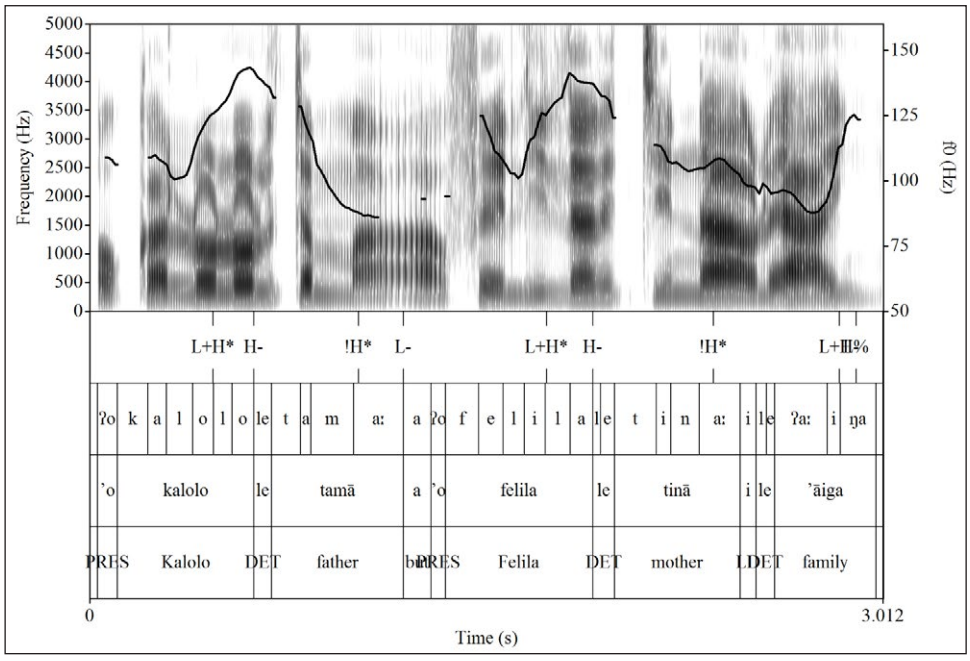


Figure 9: Prosodic realisation of a typical double equative sentence in rheme-theme order.

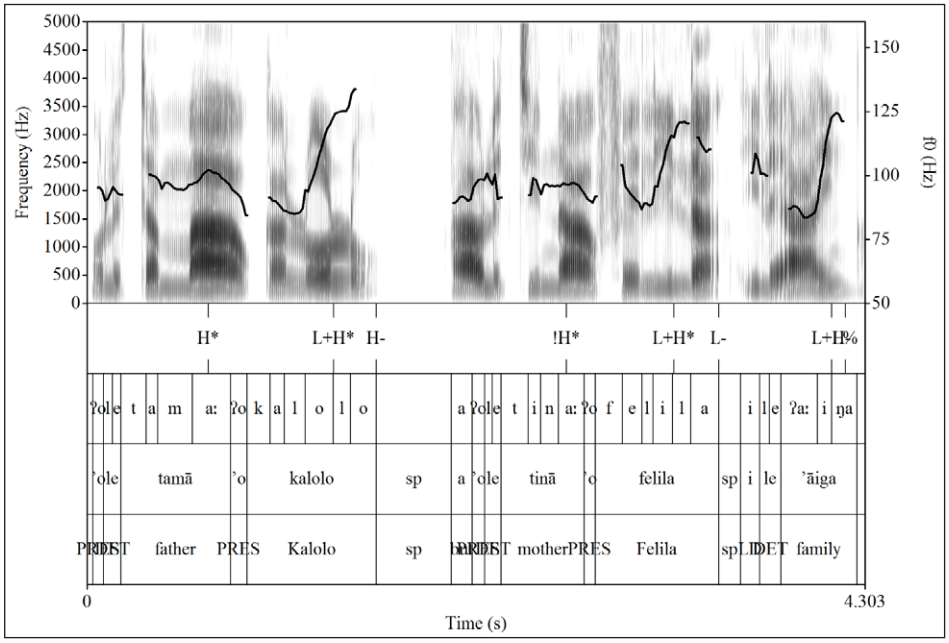


Figure 10: Prosodic realisation of a typical double equative sentence in theme-rheme order.

orderings, were rated poorly in the acceptability judgment task (see Section 5.3.2). It is therefore plausible that speakers found these sentences unnatural, and hence had trouble assigning an information structure to them. In both orderings, there was variation between H- and L- tones after the first argument, which could be because speakers varied in whether they interpreted the intended theme and rheme as belonging to one information unit or two. That is, some speakers interpreted these sentences as giving two new rhemes, "Alana is in the family" and "there is a teacher in the family". In the intended theme-rheme order there was also frequently an H- tone before the initial theme, which to my knowledge is not previously attested in that position; the function of this is unclear.

4.6.3 Information-structure marking hypothesis: Accenting

As with the *na'o* sentences discussed in Section 4.5, the predicted relationship between accent strength and theme/rheme status was found. That is, themes tend to be realised with either no accent or a weak (!)H* accent, while rheme sare usually realised with full accents ((L+!)H*). This can be seen in the double sentences, particularly in rheme-theme order ((51g) & (51h), Figures 9 and 10). However, there is no such difference evident in the single and conjoint sentences. I suspect this is because both the theme and the rheme were marked with *'o* in both orderings in the single and conjoint sentences, but the theme was not marked with *'o* in rheme-theme order in the double sentences. Marking with *'o* caused these to be realised as focused themes (cf. Section 2.3).

4.6.4 Case-marking hypothesis

In Section 3.2, it was noted that it was a possibility that the theme in rheme-theme order could be marked with absolutive case, as has been argued to be the case in equivalent structures in Niuean (Massam 2006). It is therefore possible that H- tones before the theme in rheme-theme order could be motivated by case marking (as would be predicted by Yu 2009). In these data, the theme in rheme-theme order was usually preceded by a H- phrase tone, although not as reliably as in Yu's and Calhoun's previously reported data: this occurs only 60% of the time in the predicative rheme-theme sentences (51c), 67% in the conjoint rheme-theme sentences (51e) and 83% in the first part of the double rheme-theme sentences (51g). Such variability would be expected if phrasing corresponds with information

structure, for the reasons outlined in Section 2.3, however, it is much less expected with case marking. Furthermore, if H- tones are marking absolutive case in this position, we need to find an independent motivation for the variable appearance of phrase boundaries between the two noun phrases in theme-rheme order, which would not be predicted by a syntactic account where each XP corresponds to a phonological phrase. We would also need a separate motivation for the alternation between H- tones and L- tones in this position, and before the absolutive in many of the rheme-theme sentences. The information structure account gives a unified account for all these observed patterns, as argued above, and should therefore be preferred on the basis of simplicity to the case-marking account.

5 Acceptability judgment study

The acceptability judgment study investigated the relative acceptability for Samoan speakers of the different orderings of sentences in the production study. Acceptability judgments for all 208 sentences included in the production study were collected, however, only those for the 20 *na'o* sentences and 8 equative sentences are reported in this paper. Judgments were collected using a web survey.

Acceptability judgments have long been a widely accepted methodology within syntax research. However, there has been much debate about how to interpret acceptability judgments. I follow the framework set out in Sorace & Keller (2005), who make a distinction between 'hard' and 'soft' constraints on grammaticality. Sentences which violate 'hard' constraints are expected to receive extreme acceptability judgments, whereas violations of 'soft' constraints lead to more gradient judgments. "Hard constraint violations are equally unacceptable in all contexts, while soft constraint violations are context dependent, i.e., the degree of unacceptability triggered by soft constraint violations can change from context to context" (Sorace & Keller 2005: 1510). In this study, all sentences presented are reported to be grammatical in Samoan, therefore, judgments should be related to violations of soft constraints. This implies that sentences which get low ratings are only acceptable in a narrow range of contexts, e.g. because they have an unusual or dispreferred information structure. These results therefore complement the production study, by showing which sentence types were less acceptable and therefore have a dispreferred information structure. This supports the information structure analyses of the sentences presented in Section 4.5. For example, it was argued above that if a particular sentence type has a dispreferred information structure (on the basis of the word ordering in relation to the semantics of the sentence), this can result in a high degree of prosodic variability in the realisation of the sentence: some participants will interpret the information structure to be the intended, but dispreferred, one; while others will impose an unintended, but more common, information structure through their prosodic realisation.

It is also now recognised that to be reliable acceptability judgments must be drawn from a good number of naive speakers of the language, who are asked to judge a number of examples (items) of each sentence type (Bard et al. 1996; Sorace & Keller 2005; Weskott & Fanselow 2011); as is the case in our study.

5.1 Participants

14 participants took part. They all reported that they were native speakers of Samoan who were born and grew up in Samoa. 10 participants were female and 4 male. Participants were aged between 42–74 (cf. Section 4.1). Three participants were living in Samoa and the rest in New Zealand, most having immigrated to New Zealand more than 20 years previously. All but one speaker reported having learnt English since school, most since primary school. Information on the exact origin of the speakers was collected, but it was not found to have any evident effect on the results. Participants did not receive any compensation for their participation.

5.2 Materials, design and procedure

The survey was conducted using the software Qualtrics (Qualtrics, Provo, UT). The text in the survey and the email inviting participation were entirely in Samoan. Participants were first asked to complete a questionnaire asking for details relevant to their language background (reported in previous section). They were then told that they would see sentences about the daily activities of the Malaga family, and that they would be asked to rate the acceptability of each sentence. They were then presented with the sentences from the production study, in the same 13 blocks of 16 sentences. Within each block, sentences were presented in random order by participant. Unlike in the production study, the sentences were presented without context. It was decided that including the context would make the results more difficult to interpret, as it would be hard to know if the judgments were based on the acceptability of the sentences themselves, or the appropriateness of the context-sentence match.

For each sentence, participants were asked to judge *'O le ā le tūlaga e iai lea fuai'upu i le gagana Sāmoa, e tusa ai ma lau fa'afofoga?* ('How acceptable is this as a sentence of Samoan?'). They were asked to respond using a scale from 1–9, with 1 being *lē mafai ona e fa'aleoina fa'apea* ('very unnacceptable/would not say that') and 9 being *matuā fetaui lelei i lau fa'alogo* ('perfectly acceptable/natural'). They were asked to make their judgments based on what they thought of how the sentence was constructed, or how likely Samoan speakers would be to say the sentence like that; rather than what they thought of the meaning of the sentence, or how natural the event described was. They were also told to treat each sentence as unrelated to the ones before and after. Participants took around one hour and twenty minutes to complete the survey, although this is approximate as the survey software only recorded the time the survey was open, and participants did not have to complete in one session.

5.3 Results and discussion

5.3.1 Na'o sentences

There were 280 ratings, from 1–9, collected for the *na'o* sentences, one for each of the 20 sentences from the 14 participants. Figure 11 shows boxplots of the ratings for each of the *na'o* conditions. As can be seen, overall the sentences were rated reasonably highly, as might be expected as they were all intended to be grammatical sentences in Samoan. The AV*na'o*O sentences were rated substantially worse than the other conditions, with more variability, while the other sentence conditions were all rated similarly.

An ordinal mixed effects logistic regression model was built to test whether the *na'o* condition had a significant effect on the acceptability rating using the *clmm* function in the *ordinal* package in R (Christensen 2015; R Core Team 2014). As the distribution of the ratings data was not normal, it was decided that it would be better to treat the 1–9 ratings as ordinal. The na'o condition was the fixed effect, participant was the random effect and rating was the dependent. The ratings for the AV*na'o*O sentences were significantly lower than the intercept (V*na'o*OA) ($\beta = -1.84$, $p < 0.0001$), but none of the other conditions were significantly different from the intercept. This model was derived after first building a larger model including the sex of the participant and the years since they had lived in Samoa as fixed effects, the item (sentence set) as a random effect and the random slope of condition by participant. However, ANOVAs were used to determine that none of these factors significantly improved the model, so the simpler model reported above was preferred.

In summary, only the AV*na'o*O sentences were rated significantly lower than the other sentence types. As discussed above, since these sentences were not rejected outright (their average rating was around 4/9), this suggests that these sentences are acceptable in a

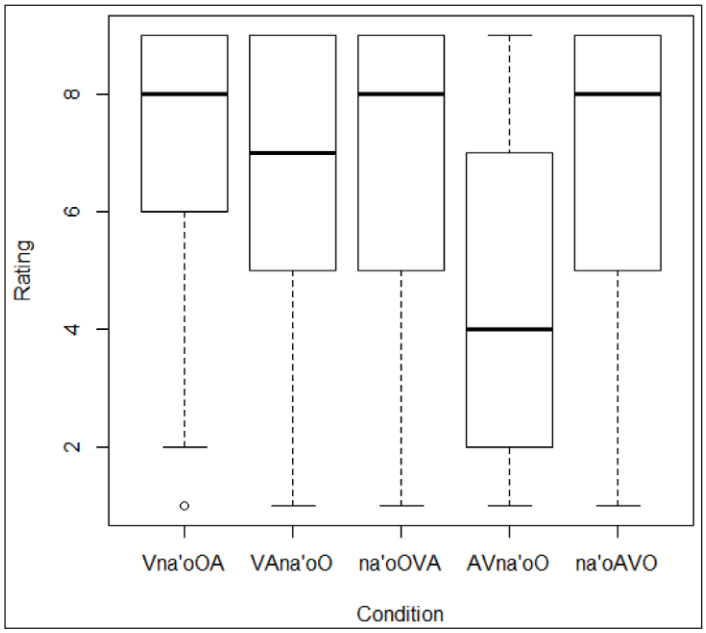


Figure 11: Boxplots of acceptability ratings for *na'o* sentences by condition.

narrower range of contexts than the other *na'o* sentences. This result fits with the discussion of (49) in Section 4.5 above. There it was argued that the ordering of this sentence forces the absolutive to be interpreted as a focused theme, akin to 'second occurrence focus' in other languages. In Samoan it is highly dispreferred to have a focused theme following the rheme. In the production study, it was shown that around half the speakers produced prosodic phrasing consistent with this dispreferred information structure; while the other half produced phrasing consistent with their having broken the sentence into two information units to avoid the dispreferred focused theme following the rheme. The results from the production study and acceptability rating study therefore corroborate one another.

5.3.2 Equative sentences

There were 112 ratings, from 1–9, collected for the equative sentences, one for each of the 8 sentences from the 14 participants. Figure 12 shows boxplots of the ratings for each of the equative sentence orderings by type. As can be seen, the sentences in which the rheme preceded the theme were rated dramatically higher than those in which the theme preceded the rheme, although the difference between the orderings differed depending on the type of equative sentence. In the simple sentences, the difference in acceptability between rheme-theme and theme-rheme order was near categorical. For the conjoint sentences it was a similar picture although there was more variation. However, both the predicative type sentences were rated poorly, albeit slightly higher in (intended) rheme-theme order; whereas both the double sentences were rated reasonably highly, although rheme-theme order was higher.

An ordinal mixed effect logistic regression model was built to test whether the ordering and type of the equative sentences had a significant effect on the acceptability rating using the *clmm* function in the *ordinal* package in R. Again, the distribution of the ratings was not normal, so the 1–9 ratings were treated as ordinal. The ordering (rheme-theme or theme-rheme), type (single, predicative, conjoint or double), and the interaction of ordering and type were the fixed effects, participant was a random effect, as was the random slope of ordering by participant, and rating was the dependent. The ratings for theme-rheme sentences were significantly lower than the intercept (order = rheme-theme,

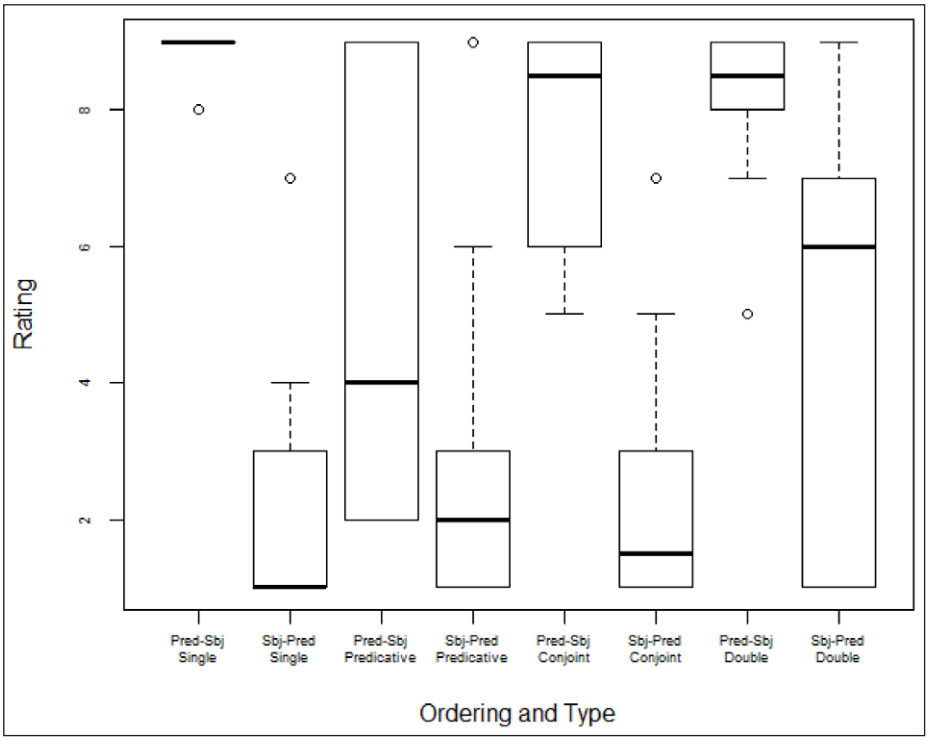


Figure 12: Boxplots of acceptability ratings for the equative sentences by ordering and type.

type = single) (β = –9.02, $p < 0.0001$). Predicative (β = –5.09, $p < 0.0001$), conjoint (β = –2.73, $p = 0.009$) and double (β = –2.23, $p = 0.031$) sentences were all significantly lower than the intercept. However, predicative (β = 6.08, $p < 0.0001$), conjoint (β = 2.97, p = 0.025) and double (β = 4.87, p = 0.0003) sentences in theme-rheme order were significantly better than single sentences in that order. This model was derived after first building a larger model including the sex of the participant and the years since they had lived in Samoa as fixed effects. ANOVAs were used to determine that neither of these factors significantly improved the model, so the simpler model reported above was preferred.

The difference in ratings between equative sentences in the two orderings shown in Figure 12 shows that equative sentences in theme-rheme order are dispreferred in Samoan, across all the equative sentence types. This fits with my analysis that the preferred information structure in Samoan is rheme-theme.

Within this, however, the theme-rheme ordering for the simple and conjoint sentences was rated below 2, suggesting these were basically ungrammatical for the Samoan speakers, whereas for the double sentences, theme-rheme order was dispreferred, but still broadly acceptable. Mosel & Hovdhaugen (1992) state that while rheme-theme ordering is generally preferred, both are found when the rheme is a proper noun (see Section 3.2). However, interestingly, all the examples they give involving proper nouns also have multiple rheme-theme clauses (Mosel & Hovdhaugen 1992: 512). The other context in which they mention that theme-rheme ordering is found is when the theme is being introduced as the topic of discourse (Mosel & Hovdhaugen 1992: 513). In our terms that would be a focused theme. One interpretation of these results, then, is that the Samoan judges found the themes *le ui'i* ('the youngest') and *mātua* ('parents') unacceptable to be focused in the context of sentences stated to be about the Malaga family, and ending in *le 'āiga* ('the family) (see (34 & 38)), because 'parents' and 'the youngest' should be given in the context of a family. This was licensed for the double sentences, however, because of the contrast within the sentence between *le tamā* ('the father') and *le tinā* ('the mother') (see (40)). For these sentences, there was not noticeably more prosodic variability in theme-rheme order

than in rheme-theme order (see (51)), as was noted above for the AV*na'o*O sentences with low acceptability ratings. This may be because there was no readily available alternative information structure for these sentences, which would lead to a different prosodic realisation.

Finally, the predicative type sentences (35 & 36) seem to be marginal for speakers in both orderings. As there is only one item, it is hard to know if this is a peculiarity of that sentence, or a more general restriction. Although the identification of *Alana* as *le faia'oga* ('the teacher') in the family seemed natural to the Samoan consultant who helped construct the sentences, *le faia'oga* may have seemed unnatural to the participants as an expected part of a family (compared to 'mother', 'father', etc.). Alternatively, it could be that these sentences were less acceptable because they are predicative, rather than equative (in the European tradition, cf. Heycock 2012). That is while the other sentences equate unique members of a family with particular names, (35 & 36) equate a name with a general set. Mosel & Hovdhaugen (1992) give examples of both types as 'equational', but it may be that they are in fact of different types. As was discussed in Section 4.6, there was also considerable prosodic variability with these sentences, which would be consistent with their dispreferred intended information structure leading to competing information structure interpretations by the speakers.

6 Discussion and conclusion

The aim of this study was to examine the functions of phonological phrasing in Samoan, in particular H- phrase tones. It has been previously claimed that these can function as absolutive case markers (Yu 2009). Here it was argued that these mark an information unit which is incomplete, and in general phonological phrasing corresponds to information structure. The study looked at phonological phrasing in two types of sentences, exclusives (involving *na'o* 'only') and equatives, in which the semantics should lead to a particular information structure. Two complementary methodologies were used: a production study looking at the prosodic realisation of the sentences and an acceptability judgment study. *Na'o* shows an interesting distribution in Samoan: while most adverbs follow the verb, *na'o* is found attached to fronted phrases, before the verb, and post-verbally attached to the absolutive (object). Further, being an exclusive, modification by *na'o* indicates that a noun phrase is focused. Therefore, these sentences allowed the information status of post-verbal absolutives to be varied while examining their prosody. Equative sentences in Samoan involve a clause which is the juxtaposition of two noun phrases. They were interesting to examine, as in a study of the related language Māori, Bauer (1991) showed that the noun phrases could be ordered rheme-theme or theme-rheme, and that these orderings were prosodically distinct.

For the production study of the *na'o* sentences, it was found that post-verbal *na'o* modified absolutives are usually not preceded by a phrase boundary. This was in contrast to other post-verbal absolutives, which are consistently preceded by an H- phrase tone (Yu 2009; Calhoun 2015). This finding is problematic for Yu's claim that H- tones are tonal markers of absolutive case. It was claimed, rather, that post-verbal absolutives are only preceded by H- tones when they form the start of the theme, with the H- phrase boundary marking the end of the initial rheme. This was supported by the accenting patterns: *na'o* modified noun phrases are usually marked with full L+(!)H* accents, consistent with these being focal. Post-verbal absolutives, on the other hand, are usually prosodically weak (!H* or no accent), consistent with these being themes. In the acceptability judgment study, it was found that sentences involving *na'o* were generally rated as natural in these orderings: V*na'o*OA, VA*na'o*O, *na'o*OVA, *na'o*AVO. However, the AV*na'o*O sentences were rated significantly lower. It was argued these ratings resulted from the

highly unusual information structure forced by the word ordering: with a focused theme post-verbally, akin to the attested, but unusual, 'second occurrence focus' cases in English and German.

The analysis of the equative sentences was somewhat more complex, because the different sentences chosen, which were intended to be items of the same type, in fact all patterned somewhat differently in terms of both prosody and acceptability ratings. However, there was general support for the analysis developed here that information structure drives prosodic phrasing in Samoan. In particular, it was found that rhematic constituents were usually followed by a phrase break, as the rheme is more salient in discourse so its end needs to be easily identifiable. Following thematic constituents, the phrase break appeared to be optional. Across languages the boundary between theme and rheme is often not marked prosodically (Gundel & Fretheim 2004; Steedman 2014). Further, for some of the sentence types at least, rhemes were usually realised with full L+(!)H* accents, whereas themes were usually realised with !H* or no accent, fitting with the interpretation of the accenting in the *na'o* data above. In the acceptability judgment study, it was found that equatives in rheme-theme order were rated dramatically higher than those in theme-rheme order. Sentences in theme-rheme order were only rated as fairly acceptable when they were part of a double clause (theme-rheme-theme-rheme) structure. This fits with my contention that rheme-theme order is preferred to theme-rheme order in Samoan. In particular, it seems that theme-rheme order is only acceptable when the theme is focused. The double clause sentences fitted this, because the themes contrasted with each other, and hence were acceptable; whereas the sentences with a single, predictable, theme, did not.

The finding that H- tones are usually not found before post-verbal absolutives modified by *na'o* is challenging for Yu's claim that H- tones mark absolutive case in this position. Case marking is not usually sensitive to the presence or absence of a preceding adverb. On the other hand, the data presented here support and develop my suggestion in Calhoun (2015) of a unified analysis of H- tones in Samoan. That is, in all cases they are simply tonal markers of phonological phrase boundaries. In these data, H- tones fairly frequently alternated with L- tones in positions where a phonological phrase boundary was expected, e.g. at the end of the fronted constituent in the *na'o* sentences, and following the rheme in the conjoint and double equative sentences. The fact of this alternation suggests there is nothing inherently special about H- tones, but rather L- and H- mark phonological phrase boundaries, which have different functions in Samoan.

The question, then, is what does determine prosodic phrasing in Samoan. As outlined in Section 2.2, in many languages there is argued to be a strong correspondence between syntactic phrasing and prosodic phrasing, e.g. Selkirk's (2011) Match Theory. There it was discussed why this does not seem to explain prosodic phrasing patterns in Samoan, in particular the H- phrase tones before absolutives. Although the data presented here do not directly address syntactic consistency, they are consistent with this argument, in that we find systematic differences in the phrasing of sentences involving a post-verbal absolutive, depending on whether the absolutive is modified by *na'o*. This would be unexpected if phrase breaks before absolutives were induced by syntactic phrasing. Within theories of syntactic-prosodic correspondence such as Match Theory, it is recognised that focus (or focus phrases) can also affect prosodic phrasing (Selkirk 2011); although focus is usually taken to insert a prosodic boundary (before or after the focus), so the *lack* of a prosodic boundary before the focused *na'o*-modified absolutives is still surprising within this approach. Moreover, such theories usually only take a uni-dimensional view of information structure in terms of focus-marking (sometimes with variable focus scope). The

results presented here suggest a two-dimensional model of information structure is necessary. More generally, these results suggest it is important to consider information structure in tandem with syntactic influences on phrasing, so information structural effects are not mistaken for syntactic ones (cf. Schultze-Berndt & Simard 2012).

The data presented here rather support the view that word ordering and prosodic structure in Samoan are strongly influenced by information structure. In particular:

i. The default ordering of information in Samoan is rheme-theme. In this order, the rheme is normally phrased separately to the theme.
ii. If the theme contains a focus, it should normally precede the rheme, a focused theme following the rheme is dispreferred. In theme-rheme order, a prosodic boundary between the constituents is optional.
iii. H- phrase tones mark an information unit as incomplete. Typically, this marks the end of a rheme with a following theme. However, H- tones can also mark coordinated information units.
iv. L- phrase tones mark a completed information unit.
v. A weak ((!)H*) or no accent on a constituent marks it as backgrounded.

The acceptability ratings for equatives in rheme-theme order were dramatically higher than for theme-rheme order, following the expected rheme-theme ordering; in support of (i). In verbal sentences, in the usual case, the absolutive comes at the start of the theme, and hence there is an H- tone before it, as per (i). When the absolutive was marked with *na'o*, however, it was interpreted as focal and hence usually phrased with the rheme, supporting (ii). The AV*na'o*O sentences, where a *na'o* modified phrase followed an initial fronted *'o* phrase, were rated substantially lower than the other *na'o* sentences, as predicted by (ii), because in this case a focused theme followed the rheme. On the other hand, unfocused themes (not contrastive) were unacceptable in initial position in the equative sentences, as per (ii). In the production study for equatives, phrase breaks were variable between the units in theme-rheme order, but not rheme-theme order, as per (ii). In this study, and in Yu (2009) and Calhoun (2015), it was found that both fronted *'o* marked noun phrases, and the verb phrase before the absolutive, were consistently followed by a H- phrase tone. Within this framework, this H- tone marks these both as incomplete information units, to be completed by a following theme, as per (iii). In this study, these tones were found to alternate with L- tones. In these cases, it was shown that the sentence could be analysed as comprising more than one complete information unit, with the L- tones marking this division, as per (iv). Finally, in this study and in my previous study, it was found that post-verbal absolutives are not usually accented (or are weakly accented); here, though, it was found that when they are marked with *na'o*, they are strongly accented, in support of (v). Likewise, in rheme-theme order in equatives, the theme was not usually accented (except if marked with *'o*). In both cases, lack of a (strong) accent seems to show the constituent is backgrounded, as per (v).

As noted in Section 2.3, it has been proposed that rheme-theme order is the norm in verb-initial languages, so therefore the strong preference for this order in Samoan is expected. Within (rhematic) focus-initial languages, it is also very common for focused themes (or new/contrastive topics) to be placed before the rhematic focus (Herring 1990; Bauer 1991; Szendrői 2003; Simard this issue). Likewise, as noted in Section 4.5, the function of high phrase tones as marking incomplete information units and falling complete units is well attested across languages. It is also very common for backgrounded parts of information units to have lower prosodic prominence. Therefore, all of these aspects of the proposal above follow well established patterns of information structure across languages.

What is less clear is why there is such a consistent preference for the absolutive to mark the beginning of the theme in verb phrases (when not modified by *na'o*). That is, as was shown in the *na'o*AVO sentences in this study, as well as in Yu (2009) and Calhoun (2015), the first prosodic phrase in a verbal sentence normally consists of the verb plus any arguments before the absolutive, with a H- phrase tone before the absolutive. In my earlier study, there was at most one argument before the absolutive, the ergative, i.e. Verb-Erg-Abs. However, in Yu's 2009 study there were up to two, i.e. Verb-Erg-Obl-Abs and Verb-Obl-Erg-Abs (where Obl is an oblique argument). According to Halliday (1967: 213) the theme is "the point of departure" for the clause. It therefore follows that the absolutive, being the unmarked argument, is normally the point of departure in Samoan, i.e. the logical or psychological subject (see Gundel & Fretheim 2004). That is, in Samoan, the default point of departure for describing an event is with the thing affected, not the agent. This fits with the comment by Mosel & Hovdhaugen (1992: 773) that in reporting transitive actions, the expression of the ergative agent is "optional", and the agent is more similar to other peripheral arguments such as locatives. Framed in this way, i.e. that the subject normally falls at the beginning of the theme, this pattern also follows common cross-linguistic patterns.

What is ideally needed in order to consolidate and expand the proposal put forward here is data in which the information structure of different sentences in Samoan can be more directly compared. As discussed in Section 2.3, this is inherently difficult, in that information structure is a speaker choice, known only to the speaker, that can at best be inferred by the researcher from the preceding and following discourse context. This is even more the case for an under-documented language like Samoan, and a researcher with only limited access to native speaker intuitions. Two approaches that have been commonly used are question-answer pairs or short dialogues which attempt to directly manipulate the information structure in participants' responses, and the annotation of information structure in corpora of more naturalistic data, such as narratives. The first of these is the approach in Calhoun (2015), and this could certainly be expanded, e.g. by using a variety of contexts before the *na'o* sentences (cf. (25–31)), so that the *na'o* constituent was most naturally interpreted as thematic in some cases, and rhematic in others, and seeing how this affected the phrasing. Even with appropriate pre-testing, though, the researcher cannot be sure that the participants will produce the intended information structure. For example, as discussed above, one explanation for the variation in the object (rhematic) focus sentences in Calhoun (2015) was that some of the speakers did not, in fact, interpret the question as asking for object focus. In corpus studies the data can be argued to be more trustworthy, in that the speakers are choosing the most natural way of expressing information, and structuring the discourse, for themselves. In such data, we would expect to see many more cases where absolutive arguments were not preceded by H- phrase tones when they were not thematic. However, the difficulties for the researcher in inferring the information structure in such data are compounded, so this approach may be more fruitful once a basic picture of information structure in the language has been developed using more controlled data. That is the approach taken here, including the other sentence types collected as part of this study, to be presented in future work. It is acknowledged that the analysis is preliminary, and must be tested and developed with other data, subject to the caveats above. Ideally, the best way to develop an analysis of correspondence between information structure and prosodic structure would be to establish convergences between as many different types of data as possible. This, of course, takes time.

This study investigated the functions of prosodic phrasing in Samoan. The approach taken was to look at two sentence types, exclusives and equatives, with relevant information structure properties. Data came from a production study of the prosodic realisation

of different word orderings of the two sentence types and acceptability judgments of the sentences. The findings, together with the other available evidence, seem to show a close relationship between phrasing and information structure following common patterns found in other languages. It is hoped that the findings presented here will contribute to our understanding of how prosodic and information structure relate cross-linguistically, particularly in Austronesian languages, which are comparatively under-studied.

Abbreviations

Abbreviations in the morpheme glosses are, largely following Mosel & Hovdhaugen (1992: xix): ANAPH = anaphoric pronoun, DET = determiner, DIR = directional particle, EMPH = emphatic particle, ERG = ergative, ES = ergative suffix, GENR = generic tense-aspect-mood particle, HUM = human, LD = locative-directional, PAST = past tense, PERF = perfect, PL = plural, POSS = possessive, PRES = presentative, SG = singular.

Additional Files

The additional files for this article can be found as follows:

- **Appendix.** *Na'o* sentences. DOI: https://doi.org/10.5334/gjgl.196.s1
- **Audio files.** DOI: https://doi.org/10.5334/gjgl.196.s2

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Competing Interests

The author has no competing interests to declare.

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