The Temporal Interpretation of Subordinate Constructions
The View from Samoan

Summary. We offer a comprehensive overview over the temporal interpretation of subordinate constructions in Samoan, based on data from original fieldwork. We show that embedded structures are always interpreted as temporally dependent on the matrix sentence. We speculate that the reason for this behavior lies in the morphological make-up of temporal-aspectual markers in Samoan, which blocks the syntactic and semantic operations which are required to derive readings temporally dependent on the utterance time.

Background. The temporal interpretation of subordinate constructions across languages is a very active area of research in semantics (see e.g. Kusumoto 1999, Hatav 2012, Ogihara & Sharvit 2012 for overviews and further references) and is generally considered a touchstone for the adequacy of any theory of tense and aspect (von Stechow 2009). So far, however, the majority of the research on the topic has focused on languages which morphologically encode temporal distinctions, like English, or lack them altogether, like Hausa (Mucha 2013, 2015). Temporal-aspectual markers in Samoan predominantly encode aspectual relations, though. Apart from generic *e* and future *'o le'ā*, the inventory of morphological markers comprises three aspectual markes, the inchoative *'ua*, the imperfective *'o lo'o* in (1) and the past perfective *na/ sā* in (2) (see also Mosel & Hovdhaugen 1992, Hohaus, to appear). At Logical Form, these pre-verbal aspectual particles combine with a free temporal variable in T, which receives its interpretation from the utterance context, (3). In the case of *na/ sā*, this temporal variable has to additionally meet the presupposition that this be a past time.

(1) a. ***'O lo'o*** *siva   le   teine.*
         ipfv.   dance the girl
         'The girl is/ was/ will be dancing.'[1]
     b. $[\![$ *'o lo'o* $]\!] = \lambda p_{\langle v,t \rangle}. \lambda t_{\langle i \rangle}. \exists e\, [p(e)\ \&\ t \subset \tau(e)]$

(2) a. ***Sā***   *siva   le   teine.*
         past.pfv. dance the girl.
         'The girl danced.'
     b. $[\![$ *sā* (simplified) $]\!] = \lambda p_{\langle v,t \rangle}. \lambda t_{\langle i \rangle} : t$ is a past time interval. $\exists e\, [p(e)\ \&\ \tau(e) \subseteq t]$

(3) $[_{\text{TP}\langle t \rangle}\ [_{\text{T}\langle i \rangle}\ t_{7,\langle i \rangle}]\ [_{\text{AspP}\langle i,t \rangle}\ [_{\langle vt,\langle i,t \rangle \rangle}\ \text{Asp}]\ [_{\text{VP}\langle v,t \rangle}\ \ldots\ ]]]$ with $g(7, \langle i \rangle)$ from context

When embedded, the context dependency observed in the interpretation of these aspectual particles is replaced by a dependency on the time introduced in the superordinate structure.

Data. Unlike in English, where a past tense embedded under a past propositional-attitude verb is ambiguous between a simultaneous and a shifted reading, Samoan only allows for a shifted interpretation, (4). The sentence is only acceptable when Mary's surprise originates at some past time after Tupe had worn the blue dress, as confirmed in a paraphrase selection study. The simultaneous reading requires *'o l'o* in the embedded clause.

(4) ***Sā***   *te'i   Malia* [*ona* ***sā***   *fai   e   Tupe le 'ofu   moana...*]
     past.pfv. surprised Mary that past.pfv. wear ERG. Tupe the dress blue
     'Mary was suprised that Tupe had worn a blue dress...'

This pattern can also be observed in relative clauses: In a picture context forcing the simultaneous reading, where Mary is trying to talk to one of the performers at a fiafia night while he is dancing, (5) is unacceptable. The desired reading requires *'o lo 'o* in the relative clause.

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[1] All examples in their original orthography. Abbreviations used in glosses include ERG. = ergative case, DIR. = directional particle, ipfv. = imperfective, perf. = perfective, and prep. = preposition.

(5) #***Sa***   *talanoa Malia i*   *le*   *tama* [***sa***   *siva*].
     past.pfv. Mary   talk   PREP. the boy   past.pfv. dance
     'Mary talked to the boy who was dancing.'
     Consultant's comment: "They are talking after he's finished."

These data are in line with observations from the descriptive literature. Mosel & Hovdhaugen (1992, pp. 338-339) report that the relevant particles "...exclusively relate the reported event to the time of the speech event. ...the point of reference is not the speech event, but the event reported by the main clause..." In line with this interpretive strategy, temporal subordinate clauses that share the evaluation time and the aspectual interpretation of the matrix clause lack the respective particles altogether in Samoan, as illustrated in (6).

(6)   *O le'a asiasi Puaina i*   *Samoa* [*pe'ā toe*   *fo'i Sina i*   *Niusila*].
     fut.   visit   Puaina PREP. Samoa when again also Sina PREP. New.Zealand
     'Puaina will visit Samoa after Sina has gone back to New Zealand.'

The data can straightforwardly be accounted for when extending the analysis sketched in (1) to (3) to the embedded cases, despite the fact that deriving the shifted reading of past-under-past is usually considered a challenge when adopting a pronominal approach towards tense (see e.g. Heim 2015, Mucha 2015), as we do for Samoan.

Analysis. In the case of the embedded imperfective, the temporal variable which it takes as an argument is bound, (7). Modulated by the matrix verb, this will result in a simultaneous interpretation. In the case of the embedded past perfective, binding necessarily has to target the presupposition introduced by the operator, however. The presupposition has thus to be syntactically accessible, requiring a refinement of the lexical entry of the past perfective, (8). We derive the requirement that the contextually provided evaluation time for the embedded sentence must proceed the matrix evaluation time, the dependent reading sketched in (9).

(7) $\exists e'\,[\tau(e') \subseteq g(7, \langle i \rangle)$ & $\mathsf{surprised}(\mathsf{Malia}, e', w_@)$
     $([\lambda w_{\langle s \rangle}.\,[\lambda t_{\langle i \rangle}.\,\exists e\,[\mathsf{wear}(\mathsf{Tupe}, \text{the blue dress}, e, w)$ & $t \subset \tau(e)]]]])$
     with $g(7, \langle i \rangle) \ll t_{\mathsf{utterance}}$ from the context and $w_@$ the actual world

(8) $[\![\,s\bar{a}\,]\!] = \lambda t'_{\langle i \rangle}.\,\lambda p_{\langle v,t \rangle}.\,\lambda t_{\langle i \rangle} : t \ll t'.\,\exists e\,[p(e)$ & $\tau(e) \subseteq t]$

(9) $\exists e'\,[\tau(e') \subseteq g(7, \langle i \rangle)$ & $\mathsf{surprised}(\mathsf{Malia}, e', w_@)$
     $([\lambda w_{\langle s \rangle}.\,[\lambda t_{\langle i \rangle} : g(3, \langle i \rangle) \ll t.\,\exists e\,[\mathsf{wear}(\mathsf{Tupe}, \text{the blue dress}, e, w)$ & $\tau(e) \subset g(3, \langle i \rangle)]]]])$
     with $g(7, \langle i \rangle) \ll t_{\mathsf{utterance}}$ from the context and $w_@$ the actual world

Presupposition binding is independently needed in the analysis of quantifier-dependent readings of other presupposition triggers (see Beck 2007, Hohaus 2015). Furthermore, we suggest that the unavailability of the simultaneous reading of the embedded past perfective in sentences like (4) and (5) is due to the fact that the lower *sā* cannot undergo the deletion operation usually assumed in English (e.g. Ogihara 1995, 1996) as it not only encodes a temporal presupposition but also aspectual meaning, which would otherwise be lost. The behavior of embedded tense in Samoan compared to English (and other languages with a simultaneous/shifted-ambiguity) is thus determined by variation in the functional lexicon.

Conclusion. Under the architecture of tense and aspect developed for Samoan above, the dependent temporal interpretation of subordinate constructions falls out naturally: Subordination requires lambda-abstraction over an embedded temporal variable. For reasons of morphological transparency, the embedded marker must be interpreted.

Selected References. HOHAUS, V. (to appear). "The Inchoative Aspect in Samoan." *Proceedings of AFLA* 23. ::: KUSUMOTO, K. (1999). *Tense in Embedded Contexts.* PhD thesis, UMass Amherst. ::: MOSEL, U. & E. HOVDHAUGEN (1992). *Samoan Reference Grammar* (Oslo: Scandinavian University Press). ::: OGIHARA, T. & Y. SHARVIT (2012). "Embedded Tenses." In R. I. Binnick (ed.), *The Oxford Handbook of Tense and Aspect* (Oxford: OUP), 638-668.