Directed Motion as Comparison: Evidence from Samoan

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1. Introduction

This paper investigates the common core of directed motion verbs and comparatives in Samoan, a Polynesian language with around 200,000 speakers on the Pacific islands of Independent and American Samoa, and with approximately 370,000 speakers worldwide.1 In the terminology of Stassen (1985), Samoan employs a "separative comparative" with the directional particle ata ("forth", "away"). A first example is provided in (1).

(1) E umi ata Malia ia loame.  
TAP tūl a wai Mary PREP John  
'Mary is taller than John.'

Comparative constructions employing directional particles or source prepositions are cross-linguistically very common: More than a third of the 110 languages in the sample of the typological study reported in Stassen (1985, 40) use a separative comparative, among them several languages of the Americas as well. Consider the data in (2) from Quechua, a language spoken in the Andes region, and the example in (3) from Navaho, an Athabaskan language, for instance.

Footnotes:
1 Standard reference works include Milner (1985), Marsack (1975), and Mostil and Hovdaasen (1992). Unless indicated otherwise, the data presented come from my own fieldwork. In working with consultants, I used the elicitation techniques presented in Matthews (2004, 2011). I only make use of data from the elicitation data that was produced in the following: (i.e., the macro to indicate vowel length and the inverted comma to indicate the global status) if required for disambiguation. Abbreviations used in glosses include INFL = inflectional determination, obj = object, part = particle, perf = perfective, pl = plural, poss = possessive pronoun, PREP = preposition, sg = singular, subj = subject, and tap = tone-aspect particle.

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References


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2. The Data

2.1 Directed Motion Predicates

The directional particle *atu* ("forth, away") forms a pair with the particle *mai* ("hither, hereeto"); cf. also Mosel and Hovdhaugen (1992, 376-378). Consider (6) and (7). Note that out of this pair of particles, only *atu* can occur with degree predicates. Whereas the use of *atu* indicates movement along a path away from a contextually provided reference location, the use of *mai* requires movement along a path in the direction of that location.

(6) Savali mai le mati ma opo *atu* Tavita ma Sieni.
walk *hither* the chief and embrace away Tavita and Sieni.
'The village chief enters and Tavita and Sieni greet him with a hug.'
Directed motion verbs with *atu locate the subject as having progressed by some or an overtly provided amount on a path that is directed away from the reference location.

2.2 Separative Comparatives

Comparatives with *atu on the other hand locate the subject as by some or an overtly specified amount further on the respective scale than the standard of comparison:

\[
\text{atu} \quad \text{X} \rightarrow \text{---
\text{---
\text{---
\text{---
\text{---
\text{---
\text{---
\text{---
\text{---
\text{---\ldots}}}
\]

In Samoan, this standard of comparison is introduced by a Prepositional Phrase. We find it with proper names and *i lo with definite descriptions, e.g. (12) and (13). The preposition *i is in complementary distribution with *i lo, cf. (14). The preposition *i also marks the direct object of a verb, cf. (15), and I will therefore consider it to be semantically vacuous. Its presence is due to syntactic reasons.

(12) E māmuatu *atu Malia la Ioane.
    TAP heavy away Mary PREP, John
    'Mary is heavier than John.'

(13) E umi *atu Malia i lo lona uso.
    TAP tall away Mary PREP, PART, POSS.3.sg. sister
    'Mary is taller than her sister.'

(14) *E umi *atu Malia i lo Ioane.
    TAP tall away Mary PREP, PART, John
    'Mary is taller than John.'

(15) E alofa le tumu i le teina.
    TAP love the boy PREP, the girl
    'The boy loves the girl.'
    (Mosel and Hovhannisian 1992, p. 428, no. (9.91), my glosses

For English and German, the question of how to analyse the three-constituent in sentences like (16) has been subject to a controversial debate, cf. also Hohensee (this volume).

(16) Mary is taller than John.

One possibility is to derive (16) from a clausal source viaellipsis and then apply the same semantic analysis as for clausal comparatives, a reduction analysis. Under a direct analysis, however, interpretation applies to the structure visible at the surface (cf. e.g. Heim 1995). In Samoan, evidence for a direct, phrasal analysis of the comparative comes from the ungrammaticality of sentences such as (17). A grammatical alternative to (17) is (18).

(17) *E mauauat Malia i lo sa faapea au.
    TAP rich Mary PREP, PART, SUPPOSE PRN.3sg.
    'Mary is richer than I thought.'
    (Villalta 2007a, p. 5, no. (10c), my glosses)

(18) E mauauat *atu Malia i lo le mea
    TAP rich DIR, Mary PREP, PART, the thing
    na ou faapea e i ai
    TAP PRN.1sg. SUPPOSE TAP PREP, PRN.
    'Mary is richer than the wealth which I supposed her to have.'
    (Villalta 2007a, p. 5, no. (10b), my glosses)

Evidence for a degree-based analysis of this comparative construction comes from the availability of comparison with a degree as in (19) and from the availability of differential measure phrases as in (5) in the introduction, repeated in (20) below. (The reader is referred to Beck et al. (2009) and Beck (2011) for a detailed discussion of the significance of these particular constructions.) Note that *i lo is not required in (19).

(19) E umi *atu Malia i lo lona futu.
    TAP tall away Mary PREP, the five foot
    'Mary is taller than five foot.'

(20) E umi *atu Malia i le lona i le i le i le i le.
    TAP tall DIR, Mary PREP, the two inch PREP, PART, POSS.3.sg. sister
    'Mary is two inches taller than her sister.'

Before turning to the analysis, let me briefly point out a structural difference between directed motion verbs and comparatives: Prepositional Phrases with *i lo and *i, specifying the standard of comparison, are limited to the comparative. With motion verbs, the majority of my consultants finds them unacceptable. This is illustrated in (21) and (22).

(21) *Sa savali *atu Malia i lo lona uso.
    TAP walk DIR, Mary PREP, PART, POSS.3.sg. sister
    'Mary walked further than her sister.'

(22) *Sa savali *atu Malia i lo lona uso.
    TAP walk DIR, Mary PREP, the two kilometer PREP, PART, POSS.3.sg. sister
    'Mary walked two kilometers further than her sister.'

If directed motion verbs indeed involve a comparison, the standard of comparison must already be implicitly present. Trying to overtly specify the standard of comparison therefore leads to uninterpretability.

The table on the next page repeats the informal paraphrases discussed in the previous two sections for sentences with directed motion verbs and for separative comparatives. In both constructions, a measure phrase may specify the exact amount of difference.
3. The Analysis

3.1 A Degree-Based Analysis of Separative Comparatives

Introducing the notion of degree and a corresponding type \( (d) \) helps us to capture the intuition that "... when we make comparisons we have in mind points on a scale" (Cresswell 1976, 266). Degrees are "highly abstract entities" (see Siegel 1984, 47) that are elements of scales. Scales consist of a set and a total ordering relation on that set.

(23) a. Call each pair \( \langle S, > \rangle \), consisting of a set \( S \) and an order \( > \), a scale.
   b. The order \( > \) is irreflexive, asymmetric, transitive (and thus strict), as well as connected (and thus total).

The denotation domain of degrees, \( D_{df} \), is the union of all mutually disjoint sets of degrees. Each set comes with its own ordering relation. The reason for assuming such abstract objects is that there are expressions that operate on them. In the analysis of Samoan, one of these expressions is the comparative in the shape of the particle \( anu \), which I suggest has the lexical entry in (24) below. A definition of the maximality operator is in (25).

\[
\text{[anu]} = \lambda R(x_d), \lambda d, d' \in [d]. \max \{ d \cdot R(d)(x) \} \geq d + d'
\]

(25) \[
\text{[max]} = \lambda D_{df}. t \in [d', \cdots d, d'] \rightarrow \max \{ d \cdot R(d)(x) \} \geq d + d'
\]

This is a perfectly well-behaved phrasal comparative operator that has among its arguments the degree specifying the standard of comparison and a differential degree argument. It maps them onto true if the maximal degree to which \( x \) is \( R \) exceeds the standard of comparison \( d \) by degree \( d' \). When not comparing directly with a degree but two individuals along the dimension provided by the gradable predicate, Samoan employs the comparative operator below. In combination with this lexical entry, \( i \)-phrases simply contribute the denotation of their overt material.

(26) \[
\text{[anu]} = \lambda R(x_d), \lambda d, d' \in [d]. \max \{ d \cdot R(d)(x) \} \geq \max \{ d \cdot R(d)(y) \} + d'
\]

Comparative \text{[anu]} maps its argument onto true if and only if the maximal degree to which \( x \) is \( R \) exceeds the maximal degree to which \( y \) is \( R \) by degree \( d \). Let us take a brief look at these two operators at work. The comparative in (27) below, a slightly simplified version of the example in (20) above, has the Logical Form in (28).

(27) E \text{ anu ate Malia}\_i le lua inisi i Joune.
    TAP long 2IR. Mary PREP. the two inch PREP. John
    "Mary is two inches taller than John."

(28) \[
\begin{array}{c}
\text{(a)} \\
\text{in Joune} \\
\text{PREP. John} \\
\end{array}
\]

\[
\begin{array}{c}
\text{Malai} \\
\text{(b)} \\
\text{May} \\
\end{array}
\]

\[
\begin{array}{c}
\text{long} \\
\text{PREP. the two inch} \\
\end{array}
\]

\[
\begin{array}{c}
\text{ata}\_i \\
\text{le lua inisi} \\
\text{PREP. John} \\
\end{array}
\]

Just as gradable predicates in English, \text{anu} ("long") denotes a relation between a degree and an individual. At the core of its meaning is a measure function of type \( \langle e, d \rangle \) which maps an individual to the maximal degree to which it is long. With this particular lexical item, length as well as height degrees are acceptable.

(29) \[
\text{[anu]} = \lambda d, d'. \text{anu}(x, y, d'), \text{height}(x) \geq d
\]

However, Samoan gradable predicates differ from their English counterparts in that they come with a — crosslinguistically very common — syntactic restriction on their degree argument slot, which can be cohered in terms of a negative setting of the Degree Phrase Parameter in (30) below. The Samoan equivalent of the English measure phrase construction is thus ungrammatical, compare (31) and (32).

(30) Degree Phrase Parameter:
    The degree argument position of a gradable predicate
    (may) may not be overtly filled.
    (Beck et al. 2009, p. 21, no. (84))

(31) Mary is five foot tall.
    *E \text{ anu Malia}\_i le lima fastu.
    TAP long Mary PREP. the five foot
    "Mary is five foot tall."
I take measure phrases in Samoan to be of type \((d)\) and to refer directly to a degree. The example in (27) then receives the interpretation in (33) below. The sentence is true just in case Mary’s height exceeds John’s height by two inches.

\[
\begin{align*}
(33) \quad & [(27)] = 1 \\
& \text{iff } \max(\text{Height}(\text{Mary})) > \max(\text{Height}(\text{John})) + 2 \text{in} \\
& \text{iff } \text{Height}(\text{Mary}) > \text{Height}(\text{John}) + 2 \text{in}
\end{align*}
\]

In those cases where the difference measure is not overtly provided, existential closure quantifies off the degree argument, as is illustrated for the example in (34) in (35). The interpretation of (34) relies on \(\text{ata}\), which takes two degree arguments. The sentence is true if and only if there is a degree \(d’\) and Mary’s height exceeds five feet by \(d’\).

\[
\begin{align*}
(34) \quad & \text{E umi atu Malia i le lima futu.} \\
& \text{TAP Tall away Mary FREE, the five foot } \\
& \text{‘Mary is taller than five foot.’}
\end{align*}
\]

\[
\begin{align*}
(35) \quad & [(34)] \neq 1 \\
& \text{iff } \exists d’ \left( \max(\text{Height}(\text{Mary})) > d’ \right) \geq 5 + d’ \\
& \text{iff } \exists d’ \left( \text{Height}(\text{Mary}) \geq 5 + d’ \right)
\end{align*}
\]

Let me add a couple of remarks before we turn to the interpretation of directed motion verbs. Note that the lexical entry suggested for the comparative differs from the phrasal comparative operators in the literature (e.g., Bhut and Takushi 2007, to appear) in the way it is schockedfitted. It requires a degree predicate as its sister and is unable to undergo movement; cf. Hohaus et al. (2010, 34-40) for a more detailed discussion of the differences in the light of data from first language acquisition.

The two lexical entries for atu above differ with respect to the semantic type of one of their arguments. This difference is reflected in the Prepositional Phrases that introduce the argument. When the argument is of type \((e)\), we find \(a\) or \(i\) \(lo\). When the argument is of type \((d)\), only the preposition \(i\) is sufficient. Hohaus (2010) therefore discusses the possibility that \(a\) and \(i\) contribute a type shift from individuals to degrees, i.e. that they introduce a free variable \(f\) of type \((e,d)\), a value for which has to be provided by the context. Consider (36).

\[
\begin{align*}
\text{[a]} & = \{\text{lo} \} = k \lambda e_0. f(e) \\
\end{align*}
\]

Under such an account, we could do with \(\text{ata}\), which is of type \(\{(d, e, t), (d, e, t, e)\}\). The idea of a mapping function from individuals to degrees has also been contemplated by Oda (2008) and Hayashishita (2009) for Japanese, and by Hoffsetter (this volume) for Turkish. As the \(i\) \(lo\)-phrase does not exhibit the interpretative flexibility of its Japanese or Turkish counterparts, there is little evidence in favor of one analysis or the other.

My last remark concerns the surface structure of Samoan comparatives. VSO at surface is derived by obligatory I-to-C movement of the verb, as suggested for Tongan in Otuka (2000) and for Tagalog in Aldridge (2004).
Just as times, locations are primitives in the universe of discourse. They have the semantic type (t). Places are spatial areas, and any "...physical object occupies a particular place at each moment of its existence" (von Stechow 2006, 10). The path of an object during a particular time span is the set of places that the object has occupied during that time (cf. e.g. Cresswell 1978). And indeed, as von Stechow (2006, 11) puts it: "There is nothing mysterious with paths." Locations can play a double conceptual role and can be understood as degrees. This is a particularity I propose they share with times (cf. von Stechow 2009).

Recall from the discussion in the previous section that we take degrees to be elements of scales, with a scale consisting of a set and a total ordering relation on that set. The path of some object may correspond to a scale if there is an ordering relation on the set of contiguous points of locations it provides. In our case, it is the job of the contextually provided reference location, often the utterance location, to provide the zero point of the scale and thus an anchoring place for the ordering relation. For any pair of locations (l, l') that is an element of the Cartesian product of the set of locations of the path in question, if l' is reached later than l, then l' is farther away from the reference location than l.

In what follows, a scale consisting of this particular ordering relation and the aforementioned set will be referred to as $\mathcal{S}$. Just as the height scale comes with an associated measure function $\text{height}$, which maps an individual to its maximal extent on the scale, $\mathcal{S}$ is associated with the measure function $p$. Corresponding dimensions for measurement for this scale are measures for spatial distances such as miles and kilometers. In the original version of $\text{ana}$, referred to below as $\text{ana}_0$, the measure function $p$ has been incorporated into the lexical entry. The scale along which comparison takes place is indicated by a subscript.

$$\text{ana}_0 = \lambda \text{d} \lambda x. \lambda y. \max(\lambda d. p(x) \geq d) \geq \min(\lambda d. p(y) \geq d) + d'$$

The lexical entry for $\text{ana}_0$ in (38) above is of type $(d, (\mathcal{S}, r))$. (Clearly, we will want this item to have a temporal argument in the end. I’m neglecting this here.) $\text{ana}_0$ is true of a degree $d'$ and an individual $x$ if the degree the measure function $p$ assigns to the individual exceeds the minimal degree in the set of degrees smaller or equal to the degree that $p$ assigns to $x$ by $d'$. Let us ponder on the meaning of this for a moment. On our setup, $p$ assigns to $x$ the maximal degree on $\mathcal{S}$. This degree is also a location, namely the endpoint of $x$’s path of movement. The minimal degree in the set of degrees smaller or equal to the degree that $p$ assigns to $x$ is likewise a location, namely the initiation point of the path. The minimality operator in (38) is defined as in (39).

$$\text{ana}_0 = \lambda \text{d} \lambda x. \lambda y. \max(\lambda d. p(x) \geq d) \geq \min(\lambda d. p(y) \geq d) + d'$$

Let us put $\text{ana}_0$ to work. A Logical Form for the example in (37) above is provided in (41) on the next page. After having worked with the degree argument, $\text{ana}$ combines with the verb via predicate modification. Interpreting the Logical Form in (41) will result in the desired truth conditions, provided in (40) below.

$$\text{ana}_0 = \lambda \text{d} \lambda x. \lambda y. \max(\lambda d. p(x) \geq d) \geq \min(\lambda d. p(y) \geq d) + 10m$$

$$\text{ana}_0 = \lambda \text{d} \lambda x. \lambda y. \max(\lambda d. p(x) \geq d) \geq \min(\lambda d. p(y) \geq d) + 10m$$

Before I turn to the relation between $\text{ana}_0$ and $\text{ana}_{\text{oc}}$, let me briefly discuss the relationship motion involve a difference comparative has also been put forward by Hay et al. (1999) and semantic analyses of the aspectual properties of degree achievements in English which, too, make crucial use of the idea of an operator at the core of which is a differential: Hay et al. (1999), p. 132, No. (160) POOR INCREASE which is true of a gradable property, an Hay individual, a degree and an event just in case the degree to which the individual has the gradable property at the beginning of the event plus the degree equals the degree to which the individual has the gradable property at the end of the event. Kennedy and Levin (2008, p. 18, No. (25)) introduce a “measure of change,” defined as in (42) below.

$$\text{ana}_0 = \lambda \text{d} \lambda x. \lambda y. \max(\lambda d. p(x) \geq d) \geq \min(\lambda d. p(y) \geq d) + d'$$

The definition in (42) employs a different notation and comes with a slightly different assumption about the semantic type of gradable adjectives, for which the type $(x, (\mathcal{S}, r))$ is adopted. It is nevertheless a differential comparative. Notice that both operators rely on degrees. Under such an account, the parallel to the difference comparative proper is slightly less transparent. Based on the parallel aspectual behavior of degree achievements and directed motion verbs in English, Hay et al. (1999, 139-142) then hypothesize that their analysis of Levin’s (2008, 26), too, conclude: “It therefore remains to be shown that our proposals will extend to the other classes of verbs as well. In the case of directed motion verbs...” we believe that the account we have proposed here carries over entirely: such verbs encode
measure of change functions over scales that measure directed movement along a path. While they do not always have corresponding adjectival forms, the kinds of meanings they express are identical to the kind of meanings we have described here for verbs directly related to gradable adjectives. Through not a direct extension of their analyses, the analysis of Samoan presented above shows in a very explicit and compositional manner that directed motion verbs can successfully be analyzed as difference comparatives.

4. Discussion

Nevertheless, the analysis relies on a set of closely related operators rather than on one lexical entry. Evidence about the historical development of these different nuances in the meaning of astu is hard to come by. Ross (2004, 311–314) observes that many of the directional particles in the Oceanic languages were once directional movement verbs in serial verb constructions. Various authors furthermore comment on language change in the Samoan comparative (e.g. Marsack (1975, 66–67) and Villalta (2007b, 2)). Stassen (1985, 350–351) expresses the view that the comparative in its present form is a "... relatively recent innovation and that the original Polynesian comparative is a conjoined comparative."

However, conjoined comparatives such as (43) are rejected by many of my consultants as inadequate means of expressing comparison.

(43) #i1esaluga Afoa at pusupu Sula.
    'Afoa is tall but Sula is small.'

The extension of the use of astu to the comparative involves two plausible changes: First, the extension to other gradable predicates of type (\(d, (x, x'))\), and second, a move away from the minimal degree in the set of degrees smaller or equal to the degree that \(p\) assigns to \(x\) to an open degree argument. Two very simple changes to the argument structure thus allow to derive (43) from (46).

(44) \([\text{astu}] = \lambda x. \lambda y. \lambda x \lambda y. \max(\lambda d. (x) \geq y) \geq \min(\lambda d. (x) \geq d) + d')

(45) \([\text{astu}] = \lambda x. \lambda y. \lambda x \lambda y. \max(\lambda d. (x) \geq y) \geq \max(\lambda d. (x) \geq d) + d')

(46) \([\text{astu}] = \lambda x. \lambda y. \lambda x \lambda y. \max(\lambda d. (x) \geq y) \geq \max(\lambda d. (x) \geq d) + d')

From there, a comparative operator that compares two individuals along the dimension specified by the degree predicates, as in (46), is easy to deduce. (The latter step in fact is one that Hohaus et al. (2010, 34-40) identify for the acquisition path of the English phrasal comparative as well.) I take the availability of both, astu and astu in contemporary Samoan to explain the diverse judgments in the case of (21) and (22). Some speakers seem to be able to use astu with motion verbs, thereby enabling them to overtly specify a standard of comparison, an covert or covert property in those cases.

To sum up, I have argued for an analysis of the semantics of astu under which it always expresses degree comparison. When building directed motion predicates with astu,

the locations included in the path of motion are conceptualized as degrees on a scale. On that scale, astu compares the endpoint of the path of movement to its initial point. In comparatives, astu express a comparison between the maximal degree to which the subject has some gradable property and an overtly provided degree, while astu compares two individuals with respect to the maximal degree to which they have some gradable property.

Under this account, the crosslinguistic pervasiveness of separate comparatives is quite expected. The data furthermore provide support for a scalar approach to directed motion as envisioned by Huy et al. (1999) and Kennedy and Lewis (2008). In the light of the Samoan data discussed above, such an analysis is not only plausible but, as we have seen, it is also plausible. Starting point of much of the research on scalarity in the meaning of degree achievements, incremental theme verbs and verbs of directed motion is the variable itility of those verbs in English. The aspectual behavior of directed motion verbs in Samoan is thus a possible direction for future research.

References

Natural Language and Linguistic Theory.
Temporal and Aspectual Reference in Basula Anii'

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1. Introduction

This paper explores temporal and aspectual reference in Anii, a severely underdocumented West African Kwa language spoken in Togo and Benin. In particular, it describes and analyses clauses with non-finite perlocution and imperfective aspectual reference. The data given here illustrate the importance of taking into account Aktionsarten in the interpretation of temporal and aspectual reference in Anii.

The majority of Anii clauses (79 out of 120) in the small corpus used for this paper contain no tense or aspect markers. Such clauses are referred to in this paper as 'unmarked clauses'. For example, the clause in (1) consists only of the class C2 noun, gara2 'hornbill', which is the subject, a (class C2) noun class agreement marker ga and a verb, dp 'eat', with no other verbal morphology present. As will be shown below, clauses such as (1) have past perfective interpretation:

(1) Context: what did the hornbill do yesterday?

   ga dp t-ga2
   cl.C-hornbill AGR, cl.C-eat cl.C-fool
   'The hornbill ate.'

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\footnote{As in many African languages, Anii nouns are divided into noun classes, and all verbs require subject agreement by noun class, for example the agreement marker ga in (1). Tone transcriptions given here are phonetic rather than phonemic, since an analysis of the Anii tone system has not yet been completed. High tone is indicated by an accent, low tone by lack of accent, and downstep by an exclamation point.}

\footnote{Tone transcriptions given here are phonetic rather than phonemic, since an analysis of the Anii tone system has not yet been completed. High tone is indicated by an accent, low tone by lack of accent, and downstep by an exclamation point.}

\footnote{Abbreviations used in this paper: AGR = Agreement (based on noun class), cl. = Class (Anii noun classes are identified by letter), FOC = Focus, FUT = Future, IMPER = Imperfective, OBJ = Object, PL = Plural, PERS = Person, PP = Part, REL = Relativeizer, 3SG = Singular, 1 = 1st person, 2-3 = 2nd person}