

To appear in Luna Filipovič and Kasia M. Jaszczolt (eds.)  
*Space and Time in Languages and Cultures II: Language, Culture, and Cognition.*  
Human Cognitive Processing 37. Amsterdam: John Benjamins.

## **Event-based time intervals in an Amazonian culture.\***

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We report an ethnographic and field-experiment-based study of time intervals in Amondawa, a Tupi language and culture of Amazonia. We analyse two Amondawa time interval systems based on natural environmental events (seasons and days), as well as the Amondawa system for categorising lifespan time (“age”). Amondawa time intervals are exclusively Event-based, as opposed to Time-based (i.e. they are based on Event-duration, rather than measured abstract time units). Amondawa has no lexicalised abstract concept of time and no practices of time reckoning, as conventionally understood in the anthropological literature. We conclude that the abstract conceptual domain of time is not a human cognitive universal, but a cultural historical construction, semiotically mediated by symbolic and cultural-cognitive artefacts for time reckoning.

### **AMAZONIAN LANGUAGES - COGNITIVE ARTEFACTS – SEMIOTIC**

#### **MEDIATION - TIME RECKONING**

**\*Acknowledgements:** Our most important thanks go to the Amondawa community, who have shared their language with us. We wish especially to thank Chief Tari Amondawa and Arikan Amondawa, who is the indigenous teacher in the village school. Support for this study was provided by the European Union, as part of the collaborative project SEDSU, ‘Stages in the Evolution and Development of Sign Use’ under the 6<sup>th</sup> Framework NEST/Pathfinder programme ‘What it Means to be Human’; and by the Federal University of Rondônia and the University of Portsmouth.

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## 1. Introduction

Although both the phenomenological experience of time (Bergson 1910), and the linguistic encoding of temporal inter-event relationships in lexicon and grammar, may be considered to be human transcultural universals, the conceptualisation and linguistic expression of time intervals (that is, lexicalised concepts of intervals of temporal duration) is widely culturally variable. Much anthropological linguistic research has addressed variability in calendric systems, and in the social practices of “time reckoning” (Evans-Pritchard 1939, 1940) that are dependent on, and realised through, such calendric systems. Numerically based calendric systems can be regarded as organising *Time-based time intervals*. Time-based time intervals (such as “Clock Time” and “Calendar Time”: Levine 1997; Postill 2002) are those whose boundaries are constituted by the segmentation of a conceptual domain of “Time” as an abstract and measurable entity: what we may call *Time as Such*. Examples of Time-based time intervals are hours and weeks. Although time-based time intervals are based upon natural (astronomical) cycles of events, they are conventional and their duration is derived from counting in a number system. Time-based time intervals can be distinguished from *Event-based* time intervals. Event-based time intervals are those whose boundaries are constituted by the event itself. In this sense, there is no cognitive differentiation between the time interval and the duration of the event or activity which defines it, and from which in general the lexicalisation of the time interval derives. The reference event is often natural (such as ‘spring’, e.g. “let’s take

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a holiday in the spring”), but sometimes conventional (such as ‘coffee break’, e.g. “let’s discuss this during coffee break”).<sup>1</sup>

We report here an ethnographic and field-experiment-based study of time intervals in a Tupi language and culture of Amazonia, Amondawa.<sup>2</sup> We analyse two Event-based Amondawa time interval systems (seasons and days), and the Amondawa system for categorising lifespan time (“age”). We also show that Amondawa has no Time-based time interval systems, no lexicalised concept of “Time as Such” and no practices of “time reckoning” as conventionally understood in the anthropological literature (Evans-Pritchard 1939).

## **2. Calendars and time reckoning: anthropological perspectives**

There is a considerable body of anthropological research dealing with culturally specific calendric systems.<sup>3</sup> Calendric systems frequently possess a recursive structure such that different time intervals are embedded within each other, and/or a structure of metrically overlapping intervals. These intervals are typically cyclical in nature, with both embedded and overlapping cycles. The most familiar to us is the now widely adopted lunar and solar (more strictly, monthly and annual) Gregorian calendar.

A dramatic example of the complexity that such systems can attain is provided by the classical Mayan calendars. The Mayan civilisation used three different calendar

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<sup>1</sup> The event-based time interval may be characterised as a change of state (e.g. ‘sunrise’), as a stative event attribute (e.g. Amondawa *ara*, ‘daylight’), or as an activity. The lexicalisation may be metonymic or “pars pro toto”, as in Amondawa *pojiwete*, ‘when we start work, morning’ (Whitrow 1988: 15).

<sup>2</sup> The fieldwork on which this paper is based was carried out by the first and third authors; the fourth author had primary responsibility for the fieldwork manual; the first, second, and fourth authors had primary responsibility for the data analysis; the second and first authors have primary responsibility for this text.

<sup>3</sup> We restrict this discussion to time interval systems, rather than attempting to address the much wider topic of the anthropology of time in general. For reviews, see Gell (1992), Munn (1992).

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systems. The so-called Long Count calendar organised the historical time of the classic period of Mayan in a fashion comparable to a car's odometer, counting days in geared cycles of ascending size. The Long Count used the number 360 as an approximation of the year, multiplying the 20-day months by eighteen to arrive at a round-figure year of 360 days. This was called a *tun*. Twenty *tuns* composed a *katun*, and twenty *katuns* formed one *baktun*. These time intervals (*tun*, *katun*, and *baktun*) could be used to specify any day in Maya history. The Long Count could also generate time references in an (in principle) infinite scale, a fact which both structured Mayan cosmology and was the main motivation and function for Mayan mathematical knowledge; this worked with place value and the number zero, both unknown to Mediterranean classical antiquity. The *Tzolkin* (counting days or Sacred Year) calendar was a ceremonial calendar, with 20 periods of 13 days, thus completing a ritual cycle every 260 days. The *Haab* was a civil calendar based on a year of 360 days consisting of 18 periods of 20 days. Five days were added at the end of the Haab year to approximately synchronise it with the solar year (Edmonson 1976; Wright 1991).

Calendric systems are not purely quantitative systems of measurement and ordering. They are also expressive of cultural beliefs and values. The Western (Gregorian) calendric system, for example, conceptually superimposes on its cyclic structure a linear model of time as involving motion from an origin (the birth of Christ) to a notional endpoint (the End of Days). This dualistic cyclical-linear conceptualisation (with varying relations of dominance between cyclicity and linearity) is characteristic also of other calendric systems, such as the Mayan (described above), the Islamic and the Vedic (Keyes 1975).

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Geertz (1973), in his classic paper ‘Person, time and conduct in Bali’, argued that temporality (and time interval measurement) in Balinese culture cannot be comprehended without recognising its contextual embedding within Balinese notions of personhood, social status, and social role. Personhood, social role, and time form a complex matrix in which, Geertz (as interpreted by Vickers 1990: 166) argues, “time in Bali is not linear, that is not quantitatively divided, but qualitative—organised in terms of degrees of malevolence and benevolence”. Calendric time is thus co-constituted with social norms of conduct and power (Bloch 1977). It is this interpretation that underlies Geertz’s hypothesis that Balinese time is ‘de-temporalized’: the Balinese, claims Geertz (1973: 398), have “a classificatory, full-and-empty, ‘de-temporalized’ conception of time in contexts where the fact that natural conditions vary periodically has to be at least minimally acknowledged”.

Gell (1992: 72) points out, however, that “the evidence for Balinese detemporalization is specifically connected with the permutational calendar ... that it does not generate regular periodicities (such as solar years subdivide in lunar months, which subdivide into market weeks, etc). Instead the permutational calendar specifies quantum units (days) in terms of combined product of independent five-, six- and seven-day cycles”. Alongside this Pawukon permutational calendar, which commutes a complex trinomial expression whose completion takes 210 days, the Balinese also employ a variant of the luni-solar Hindu (Vedic) calendar. Gell (1992: 73) summarises Geertz’s argument as being that “both Balinese calendars are non-metrical and ‘non-durational’, and thus correspond to the climaxless ‘steady state’ and non-progressive tenor of Balinese life”.

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Geertz's analysis has been criticised on various grounds, ranging from its Durkheimian over-emphasis on ritualistic conduct (Bloch 1977) to its neglect of the significance in everyday time reckoning of the quantitative computations made possible by the Balinese calendar, and the degree of expertise displayed by Balinese in exploiting these possibilities. Without entering too deeply into this issue, we would make a very simple point: whatever cognitive and social significance we may wish to accord to cultural variations in calendric systems (see, for example, Charlier, this volume, on the use of the astrological calendar by Mongolian hunters; Keyes 1975 and Davis 1976 on the Northern Thai system), all such systems are *quantificational*, in the sense of being based upon a measurement system, and all can be considered as *time-based*, segmenting and measuring temporal duration in "Time as Such". The speech practices of *reckoning* or *telling* time, with their etymological roots in Germanic words for *counting* (e.g. Dutch *rekenen*, 'to count'), express and reproduce this quantificational view of time. Analogous arguments to those applying to calendric time can be made for "clock time", that is the conceptualisation and measurement of time intervals in the diurnal cycle, although less attention has been paid to this in the anthropological and linguistic literature (see, however, Postill 2002).

Not all societies employ either calendar or clock systems of the quantificational type. Evans-Pritchard (1939, 1940) described what he termed the Nuer "cattle clock" or "occupational time". Time in Nuer society, he proposed, is based on environmental changes and associated social activities. The concept of time in Nuer society is thus a product of the interplay between "ecological time" and "social structure time".

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In describing Nuer concepts of time we may distinguish between those that are mainly reflections of their relations to environment, which in a broad sense we may call 'oecological time' [*sic*], and those that are reflections of their relations to one another in the social structure, which we may describe as 'structural time' ... time has therefore two movements, an oecological (or occupational) movement and a structural, or moral, movement (Evans-Pritchard 1939: 189-190).

The Nuer *ruon* (year) divides time into two principal seasons, *tot* (rainy season) and *mei* (dry season). These two main seasons are supplemented by classifications based on activities. For example, *Jiom* (meaning 'windy') refers to the period when the cattle-camps are formed, and *Rwil* refers to the period of moving from camp to village, clearing cultivations and planting (*op. cit.* p.196). Although there are names for (roughly) lunar months, Nuer society does not count or measure Time as Such; the language has no word either for the abstract notion of time, or for units of abstract time, and temporal reference points are provided by social activities.

Nuer have no abstract numerical system of time-reckoning based on astronomical observations but only descriptive divisions of cycles of human activities (*op. cit.* p. 197... since the months are anchored to oecological and social processes the calendar is a conceptual scheme which enables Nuer to view the year as an ordered succession of changes and to calculate to some extent the relation between one event and another in abstract numerical symbols. (*op. cit.* p. 200)

Nuer months are not strictly lunar (though the Nuer know the lunar cycle), nor based upon any other fixed number of days. Rather, they are conventionally, if

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indeterminately, based on both lunar and ecological cycles, and the associated rhythm of social activities.

Nuer would soon be in difficulty over their lunar calendar if they consistently counted the succession of moons, but there are certain activities associated with each month, the association sometimes being indicated by the name of the month. The calendar is a relation between a cycle of activities and a conceptual cycle, and the two cannot fall apart, since the conceptual cycle is dependent upon the cycle of activities from which it derives its meaning and function. (Evans-Pritchard 1940: 100)

In summary, time for the Nuer is a schematised relation between socially and environmentally defined events, and Nuer time reckoning is not a calculation of, or in, Time as Such, but a rough estimate, only infrequently numerically expressed, based on social-structural relationships and activities. The Nuer seem, according to Levine's (1997) terminology, to be living in "event time" rather than "clock time": activities are not fitted into a schedule governed by the clock or calendar, rather the temporal structure of life emerges from participation in daily activities.

Nuer time is not the only system of time intervals reported in the anthropological literature that employs lunar months in a non-quantified system. The time interval system of the Ainu culture of Southern Sakhalin, which in other respects (economy, social structure, and cosmological time) is quite different from the Nuer system, includes lunar months which regulate ritual as well as trapping and fishing activity. However, "the Ainu are quite oblivious to names of the months as well as the number of months in the year" (Ohnuki-Tierney 1973: 289), and the Ainu, whose basic number system (non-derived numbers) extends to five, rarely or never reckon



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time intervals numerically, using the opposition between two or three and the derived number six to contrast short with long durations. While the Nuer event-based time interval system can be thought of as quasi-calendric, permitting rough time-reckoning practices, the unnamed Ainu lunar months do not participate in anything resembling a yearly calendar. Ohnuki-Tierney concludes that “the Ainu concept of time is basically qualitative; quantitative measurement of time is little developed. Therefore, no temporal divisions represent measurable units; they are distinguished from other units in the same time scale by the special meaning which the Ainu attach to them” (*op. cit.* p. 292).

These descriptions of Nuer and Ainu event-based time interval systems serve as a useful starting point for our ethnographic and field-experimentally based description of time intervals in Amondawa.

### **3. Amondawa culture and society: an overview**

The Amondawa<sup>4</sup> are an indigenous group living in the Uru-eu-wau-wau reservation, in the State of Rondônia in Brazilian Greater Amazonia. Amondawa is classified as a Tupi Kawahib language belonging to the family Tupi-Guarani, closely related to the other Kawahib languages (Diahoi, Karipuna, Parintintin, Tenharim, Uru-eu-uau-uau) of Amazonian Brazil (Sampaio 1996, 1999; Sampaio and Silva 1998).

The population at the time at which the fieldwork here reported was conducted consisted of about 115 people. Before official contact in 1986 by the government agency FUNAI, the Amondawa population was almost 160 people; after contact, this

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<sup>4</sup> *Amondawa* is not the original pre-contact self-designation of this community, but is now the community usage.

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number went down by more than 50%, according to contemporary reports. In 1991, the Amondawa population was no more than 45 people, living in the area surrounding the Trincheira post, which is also the current habitation. The main cause for the precipitate decline of the population was contact-induced disease, such as tuberculosis, colds, measles, malarial fever, chicken pox, and other viruses (Silva 1997). At present, the population is skewed towards the younger generation, which makes up more than half of the population.

The Amondawa kinship system, in common with other Tupi Kawahib groups, is organised in terms of exogamous moieties. Descent is patrilineal. The woman does not lose her paternally derived name when she marries, but her children will be the descendents of her husband and adopt names from his moiety (Menendez 1989: 110). The Amondawa moieties are designated by the bird names Mutum and Arara.<sup>5</sup> The mutum is a black bird living almost all the time on the ground and the arara is a colourful macaw that lives in the highest trees. Descent is reflected in the system of personal proper names, because each moiety has an inventory of masculine and feminine names. Amondawa people change their names during their life course, and these names are indicative of the person's "age"/social role, gender, and moiety. The change of names occurs at the birth of a new baby and/or when the individual assumes a new position, attribute, or role in social life. We describe this system and its significance for the Amondawa cultural conceptualisation of time below.

Amondawa productive activity is based around cultivation. The men work in the field planting corns, beans, rice, potatoes, and manioc. Traditionally, cultivation has been for subsistence but is now also for the market. Manioc flour is the most

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<sup>5</sup> The original indigenous name is *Kanideia*, but the term *arara* has become common usage post-contact.

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important commodity yielding monetary income for the community. Each nuclear family has its own field. The families from the same moiety sometimes share work and profit. This means that in effect each moiety decides how much will be produced each season. There is no culture of accumulation or of keeping produce or seed for the next season; everything produced is consumed or sold and the money is used for buying manufactured products, such as soap, clothes, shoes, TVs. Hunting and fishing, traditionally significant activities, remain the other main sources of food.

The traditional mode of Amondawa education is oral and informal, but since 1994 formal schooling has also been provided by the State. Today the majority of the Amondawa people are bilingual in Amondawa and Portuguese. Portuguese has high status because it is the main vehicle for communicating with others outside the village. Communication between community members is still in Amondawa, and Amondawa is the language of first acquisition. Schooling is bilingual, with a predominance of spoken and written Amondawa as medium of instruction. The teacher is a trained community member supported by the specialist from the State Department of Education. The curriculum emphasises Amondawa history and tradition and knowledge of the local environment.

#### **4. Time intervals in Amondawa language and culture**

Amondawa does not employ cardinal chronologies such as ages of individuals, or ordinal chronologies such as yearly or monthly calendars, since the Amondawa number system has only four numeral terms, of which the equivalents of ‘three’ and ‘four’ are derived. The non-derived terms are *pe’i* ‘one’ and *monkōi* ‘two’.

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*Monkōiape* 'i or *ape* 'i *monkōi* are alternative lexicalisations of 'three'; *monkōiuturaipei* and *monkōimeme* are alternative lexicalisations of 'four'.

An abstract term for *time* does not exist in Amondawa. The word *kuara* ('sun') is preferentially used to denote time intervals in general, since it is the movement of the sun which governs the passage of both the *time of day* and the *seasons*. Our ethnographic research has failed to identify any co-occurrence of numerals with any time interval designation. These features of the Amondawa language mean that Time Reckoning simply does not occur in Amondawa discourse. This does not, however, mean that the language lacks a lexicon of time intervals. The two time interval systems on which, together with the personal proper name system, we focus in this section are the seasonal and diurnal systems. As far as we know, these are the only such systems.

## **4.1 Method**

A field manual was developed, which consisted of elicitation games and questionnaires (Zinken, Sampaio, Silva Sinha and Sinha, 2005). The manual was specifically constructed to identify temporal expressions and their ranges of use in Amondawa. Two of the tasks in the field manual addressed the lexicalisation of time interval terms: The *calendar questionnaire* and the *calendar installation*. These tasks are described below.

### **4.1.1 Calendar questionnaire**

The aim of the calendar questionnaire was to provide data on the inventory of calendar event-types that are lexicalised in Amondawa. The questionnaire contains a list of interval terms in Portuguese, relating to time intervals based on the moon (the

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‘month’ and its subdivisions), and on the sun (the ‘day’ and its subdivisions).<sup>6</sup> It also contains questions about sowing, harvesting, and festivals.

**4.1.1.1 Participants.** Data were collected during five field trips between September 2005 and January 2006. The participants were six adult bilingual native Amondawa language consultants (four male and two female), all of whom were familiar with the researchers administering the instruments and experienced in the role of language consultant.

**4.1.1.2 Procedure.** The researcher started by asking direct questions in Portuguese about Amondawa calendar units, names of festivals, parts of the day, and time adverbials as the central topic of the conversation. The researcher did not ask for literal translations, but asked more general questions about broadly equivalent terms in Amondawa and developed on this basis a conversation. It was emphasised to the participants that there were no right or wrong answers and that it was the Amondawa cultural knowledge that was the focus of investigation. The participants’ responses were video and audio recorded and post-transcribed.

**4.1.1.3 Results.** There is no word meaning ‘time’ in Amondawa. There are in Amondawa no words for weeks, months, and years, and there are no names for time-referenced festivals. In fact, there are no such festivals in contemporary Amondawa culture, only marriage parties and traditional ceremonies that are not referenced to specific time intervals.<sup>7</sup> There are names for seasons and parts of the seasons, for the day and night and parts of the day and night, and some temporal deictic and adverbial

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<sup>6</sup> The standard version of the Field Manual (Zinken *et al.* 2005) is written in English but was translated by the field researchers into Portuguese.

<sup>7</sup> We know little of the deep pre-contact history of Amazonian cultures, especially before the Spanish/Portuguese conquest. The only thing of which we can be certain is that it would be a grave mistake to view the existing (surviving) cultures of indigenous groups as being representative of some “unchanging” primordial state “without history” (Hornborg and Hill, in press; Wolf, 1982).

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terms. Some of these are listed in Table 1, which is not exhaustive. The remaining tasks reported here focused on the elucidation of the time intervals and their systematic organisation in lexical and conceptual fields. For further analysis of temporal reference in Amondawa, see Sinha, Silva Sinha, Zinken, and Sampaio (2011).

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*Insert Table 1 about here*

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#### **4.1.2 Calendar installation: seasons**

This elicitation game gave participants the opportunity to build a map of their model or schema of the ‘year’ (or other interval longer than a month) and its sub-intervals or constituents, by placing a series of paper plates, each representing a conventional time interval, on the ground.. The participants were requested by the researcher to “make a map of the year using the objects”.

**4.1.2.1 Procedure.** Four participants (all men) were interviewed in Portuguese with simultaneous translation into Amondawa. Paper plates were given to the participant who was then asked to “make a map of time in Amondawa with them”, in which each plate should represent one interval of time in Amondawa culture. The example provided was that in Portuguese each plate would represent a month. The participants’ responses were video and audio recorded and post-transcribed. Plate 1 shows the results of playing the game with one participant, who has used the plates to construct a schematic representation of the succession of seasons in Amondawa.

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*Insert Plate 1 about here*  
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**4.1.2.2 Results.** In Amondawa, there is no word for ‘year’. Linguistically, time is divided not into years, but into two seasons: the dry season *Kuaripe* (‘in the sun’) and the rainy season *Amana* (‘rain’). The term *Kuaripe*, referring to the hot, dry season, derives from the noun *Kuara* (‘sun’), with the locative postposition *pe*, meaning ‘in’ or ‘at’. The rainy season is designated simply by the noun *Amana*, which means rain. The passage of the seasons is marked by changes in the weather, and consequent changes in the landscape, and also by the rhythm of agricultural activities. Each season is further subdivided into three intervals corresponding to the beginning, middle (or “high”), and end parts of the season. Table 2 lists the Amondawa bi-seasonal lexical system.

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*Insert table 2 about here*  
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Figure 1 represents, approximately, the way the seasons were mapped by participants. It is based upon the constructions of all four participants, each of whom constructed a curvilinear representation which fitted into the available working space, more or less on the horizontal axis perpendicular to the direction in which the participant faced, in either a left-to-right or right-to-left order of placement. No participants attempted to create a circular, cyclic representation. It is unclear whether the curvilinear responses

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were a result of a compromise between an intended rectilinear configuration and the length of human reach, or signify that neither cyclicity nor rectilinearity are relevant to the Amondawa seasonal schema.

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*Insert figure 1 about here*  
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### **4.1.3 Calendar installation: days**

This elicitation game gave participants the opportunity to build a map and/or installation of their model or schema of the diurnal cycle. The procedure was identical to that described above for the calendar installation. The day installation game was administered immediately after the calendar installation game.

**4.1.3.1 Results.** The term for ‘day’ in Amondawa, *Ara*, refers only to the daylight hours and also has the meaning ‘sunlight’. There is no Amondawa term for the entire 24-hour diurnal cycle. *Ara*, ‘day’, contrasts with *Iputunahim*, ‘night’, which also means ‘intense black’. There is a major subdivision of *Ara*, ‘day’, into two parts, *Ko’ema* (morning), and *Karoete* (noon/afternoon). Thus, additionally to the binary day–night contrast, it is also possible to say that the 24-hour period is divided into three major parts, *Ko’ema*, *Karoete*, and *Iputunahim*. Both day and night are further subdivided into intervals which are conceptualised and named on the basis of the daily round of activities. Table 3 lists all time interval terms produced by the participants in the day installation game.

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*Insert table 3 about here*



The schematisation of the diurnal cycle does not seem to be cyclical or circular. In trying to explain this task, the researchers used a circular diagram resembling a clock, with light and dark areas. However, none of the participants produced a circular installation. Instead, they produced curvilinear representations similar to those produced in the calendar installation game.

### **5. Time and the human lifespan in Amondawa**

As we noted above, the age of an individual is not measured chronologically in Amondawa culture, which lacks a numerical system able to enumerate above four. Rather, individuals are categorised in terms of stages or periods of the lifespan based upon social status and role, and position in family birth order. As we have also noted, each Amondawa individual changes their name during the course of their life, and the rules governing these name changes form a strict onomastic system. The Amondawa onomastic system is based upon the cross-cutting category systems of life stage, gender, and moiety. It is obligatory for each individual to change his or her name when “moving” from one life stage to another, and each name is selected from a finite inventory of names, each of which has a semantic value indicating moiety, gender, and life stage. Thus, by knowing the name of an Amondawa person, one can infer these dimensions of their social status.

The principal event which can cause a change of names is the birth of a new member of the family. The new baby will be given a “Newborn” name, and may even assume a name previously held by the youngest existing family member; who then takes a new name. Regardless of the name given to the newborn, all the existing

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children will acquire a new name. The other situation that can provoke the changing of names is a change in the role of the individual in the family or in the group. No individual can be a child forever, in other words no-one can have a child name beyond a certain life stage. They have to grow up and assume responsibilities in the family. For example, when an older son changes his name, the father will change his name too. An adult woman will change her name when she is married, and her previous name will go to the youngest sister. (Peggion 2005: 132). The names do not appear to have spiritual significance, and in assuming a new name and new social identity, the individual does not become identified with the personality of previous living or dead bearers of the name. Table 4 gives examples of names in each Amondawa moiety with an indication of their status meanings, although it is important to note that this is only an approximation. Table 4 does not represent the entire name inventory.

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*Insert Table 4 about here*

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The Amondawa language also has a number of generic nouns referring to categories of persons of a particular age (Table 5). Our own and others' research (Sampaio 1996, Silva 2000; Peggion 2005) has not been able to identify any other age-based person categories such as "adolescent".

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*Insert Table 5 about here*

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Although we are not fully certain of this, our research to date suggests that there is only one more general expression, namely *etiawa'ea* ('old', an adjective of quality or state applicable to any object), used for reference to life stage:

(1) *Aron jihe etiawa'ea*

waiting I old (Adj)

'I am waiting for my old age'

In other cases, life stage is referred to by means of the relevant life stage category, e.g.

(2) *a-kuahaw-a-him jie kurumin ga inguarai-awer-a*

1S.imagine-GER-INTENS. I child he play-PAST-NOM.

'Imagining I played as a child'

In summary, the temporal intervals making up human life stages in the Amondawa culture and language are designated in the kinship-related onomastic conceptual system, and to a more limited extent in categories of person of a particular age. They are not related to any calendric or numeric system segmenting Time as Such, and they are not constituents of either exact or rough quantitative time reckoning.

## 6. Discussion

We have found that:

- a. Amondawa time interval conceptualisation is not integrated or coordinated with the four-number Amondawa numeral system. This fact precludes numeric time reckoning as a cognitive and linguistic practice.

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- b. The rhythms of the natural world dominate the seasonal and diurnal time interval systems. The prominence of the sun, in terms of the intensity of emitted heat and light in different seasons, and its position in the sky at different times of day, is reflected in language consultants' choice of the lexeme *kuara* 'sun/sunlight' as the nearest Amondawa equivalent term for the Portuguese word *tempo*, 'time', for which no strict translation equivalent exists.
- c. Both the seasonal and the diurnal time interval systems involve division and subdivision. The superordinate level of the seasonal system is bi-partite (dry season–rainy season), while that of the diurnal system seems to have two alternative divisional structures, a primary bi-partite one (day–night) and a secondary tri-partite one (morning–afternoon–night). Beneath these superordinate divisions are lower level subdivisions.
- d. In both cases it is the subdivision level of organisation that is coordinated with the organisation of social and, in particular, labour activity, regulating planting and harvesting times and working times during the day.

The seasonal and diurnal time interval systems can therefore properly be thought of as cognitive, cultural, and linguistic schemas, but they differ from more familiar calendric and clock schemas in that there is no evidence that they are conceptualised by speakers as being cyclical in structure. Cyclicity is schematically characterised in terms of a circular or orbital path of motion in which “moving time” returns recurrently to the positions which demarcate the time intervals. None of our language consultants either verbally described a temporal cycle or produced a physical schematic model (installation) that possessed a circular structure. Rather, the

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schematisation seems to be simply in terms of succession, which may be (as we have seen) spatially modelled as a line, though not necessarily a straight one. Amondawa seasonal and diurnal time intervals are best thought of as high-level event categories – “happenings”, as it were, in the natural and social world, with which other happenings may coincide, or to which other activities and events are indexed.

The third time interval system that we have analysed above is the conceptual system of Amondawa life stages, as this is reflected in Amondawa onomastic practices and knowledge. Time intervals in this system are conceptually inseparable from the Amondawa kinship and descent system, and form the basis of the social identity of individuals within that system. The names themselves have at least in some cases a meaning derived from gender and social roles, e.g. *Kunha'pó* derives from *Kunha* (‘woman’) and *po* (‘make/do/work’), “doing as a woman”.

The time intervals that co-constitute (with gender and moiety) the onomastic system are not linguistically independent concepts, that is, they are not (or not all) designated by nominals (although there are nouns for child, adult, and elder). Hence, we cannot say of these time interval concepts that they are “high level events” in the same way as are the seasonal and diurnal time intervals. In fact, from a linguistic point of view they are implicit or covert categories which are, in at least some cases, lexicalised only in conflation with other (gender and moiety) categories, and then only as personal proper names. Life-stage time intervals are thus even further removed from the calendric conception of a time interval than the event-based seasonal and diurnal time intervals. Kinship as a basis for temporal reference is widespread; historical time for the Nuer is largely defined in terms of the initiation-based “age-set

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system”, and is therefore conceptualised in terms of “the movement of persons, often as groups, through the social structure” (Whitrow 1988: 10).

Amondawa time bears yet other similarities to Nuer time as described by Evans-Pritchard (1939; 1940). The social and linguistic construction of time is based upon the interplay between ecological facts in the natural environment, and social facts or structures. The basis for social structure time in Amondawa, as in Nuer culture, is twofold: first, the rhythm of activity, especially work, and second the stages of life constructed in social affiliation, although, whereas for the Nuer this is based upon cohort groups who experienced ritual initiation together, for the Amondawa it is based upon individual “movement” through a kin-defined onomastic system. In the terms that we have employed above, for both Amondawa and Nuer, time intervals are event-based and social, rather than time-based.

There are also two notable differences between Nuer and Amondawa time intervals. First, the Nuer employ a “quasi-calendar” of twelve months. Second, the Nuer months can be enumerated, although “Nuer do not reckon [months] as fractions of a [year] unit. They may be able to state in what month an event occurred, but it is with great difficulty that they reckon the relation between events in abstract numerical symbols.” (Evans-Pritchard, 1940: 103-104).

Amondawa time intervals do not include months, and time reckoning is apparently entirely absent from the repertoire of cultural practices. We might hypothesise, then, that while both Amondawa and Nuer time interval systems are event-based, the Nuer system possesses more features potentiating an evolution to a time-based system. Amongst the symbolic resources necessary for the cultural emergence of time-based time interval systems, such as true calendric and clock systems, is the existence of a

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more elaborate number system than the restricted Amondawa quantificational system. However, comparison with the Nuer case suggests that while necessary, this, in itself, is not sufficient.

The Amondawa seasonal and diurnal time interval systems exemplify an exclusively *event-based* schematisation of time intervals. We suggest that a cultural-historical precondition for the schematisation of time-based time interval systems is the material anchoring of quantified time intervals in symbolic cognitive artefacts for measuring, segmenting, and reckoning time, such as calendar notations and clocks. All human artefacts are in a broad sense cognitive, inasmuch as they embody human intentionality (Sinha 1988; Bloom 1996). However, there is a special subclass of what we can call *symbolic cognitive artefacts*, which can be defined as comprising those artefacts that support symbolic and conceptual processes in abstract conceptual domains. Examples of cognitive artefacts are notational systems (including writing and number), dials, calendars, and compasses. Cultural and cognitive schemas organising the relevant conceptual domains may be considered as *dependent upon*, and not merely *expressed by*, the employment of cognitive artefacts. A key property of cognitive artefacts is thus that they are *conventional* and *normative*. Cognitive artefacts may be *motivated* by natural facts and the human phenomenological experience of these facts (e.g. the orbit of sun or moon; the number of fingers on a human hand), but they are not *determined* by them (witness, for example, the variety of arithmetical bases for number systems).

Symbolic cognitive artefacts are instances of the *extended embodiment* of cognition (Sinha and Jensen de López 2000), instantiating the intersection of material and symbolic cultural forms. The symbolic systems and conceptual schemas that they

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support are *materially anchored* (Hutchins 2005) in the artefacts, which permit the socio-cognitive practices (and the reproduction of these practices through inter-generational transmission) constituting a segment of the life world of individual and group (Schutz 1966). Symbolic cognitive artefacts are thus a crucial (and species-specific) exemplification of the “ratchet effect” (Tomasello 1999) in human cultural evolution and development; that is, they stabilize cultural invention and permit cumulative intergenerational transmission

What implications does this analysis hold for understanding time as a concept and as a conceptual domain? We advance two linked hypotheses. First, we suggest that time-based time interval systems and categories are in a fundamental way linguistically constructed, that is, they cannot be “thought” without thinking them *through* language and *for* speaking (Slobin 1996). The conceptual schematisation of time-based time interval systems is not based in pre-linguistic and pre-conceptual image schemas (Lakoff and Johnson 1999). Rather, the schemas are actually constituted by the use of linguistically organised, materially-anchored symbolic cognitive artefacts such as calendar systems.

Our second hypothesis is that the conceptual domain of Time as Such (or time abstracted from events) is not a human cognitive universal, but a cultural and historical construction constituted by schematised time-based time interval systems, and semiotically mediated by symbolic and cultural-cognitive artefacts for time reckoning. In this respect our analysis converges with Jaszczolt’s contention (Volume 1) that while temporal “location”, temporal relations and (we would add) time intervals are expressed in all languages, this does not require the postulation of time as a conceptual “primitive”—or, to put it another way, slightly divergently from



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Jaszczolt's formulation, there are many ways of conceptualising temporality, not all of which depend on a "concept of time". Langacker (this volume) distinguishes between time as a domain within which a profiled relationship occurs, and time as a profiled object of conception or abstract "thing", commonly designated as a noun. It is this latter, reified time that corresponds to our notion of the conceptual domain of Time as Such, grounded in the construction of time-based time intervals. We did not find any time-based time intervals in Amondawa, and our finding that there is no Amondawa word meaning 'time'—speakers using the word *kuara*, 'sun', to translate the Portuguese word *tempo*—further tells against both the universality of Time as Such, and the contention by Priestley (this volume) that the lexical concept 'time' is a semantic primitive or prime.

Both Langacker (this volume) and Wallington (this volume) address the phenomenon of space-time analogical or metaphorical mapping, a phenomenon frequently asserted or assumed to be universal (Fauconnier and Turner 2008). We suggest that what Wallington describes as the (metaphorical) reification of events is concomitant with the cultural historical and linguistic construction of the cognitive domain of Time as Such, the metaphorical "space" containing event-objects including time-based time intervals. Elsewhere (Sinha *et al.* 2011), we have reported, on the basis of our analysis of the expression of temporal inter-event relations in Amondawa, that linguistic space-time mapping, and the recruitment of spatial language for structuring temporal relations is absent from Amondawa. Our contention is that this constellation of linguistic facts—the absence of time-based time intervals, the absence of lexicalisation of 'time', and the absence of space-time analogical

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mapping—is not accidental, but attests to the still largely neglected importance of  
socio-cultural processes in language and cognition.

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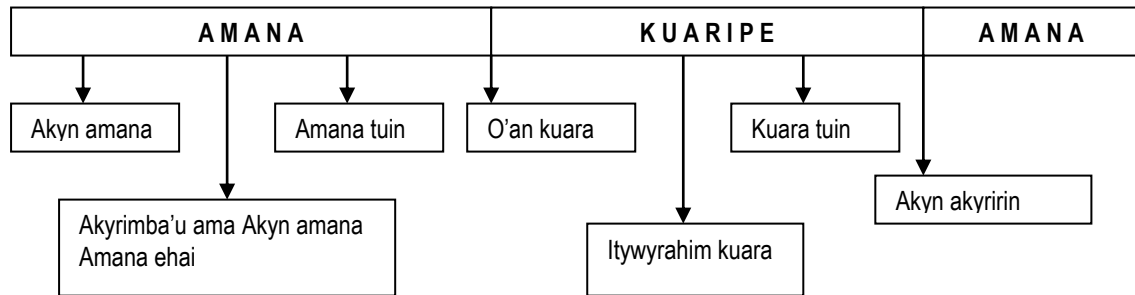
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**Plate 1: One participant's representation of the Amondawa "year".**



**Figure 1: The Amondawa Season Schema**





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<b>Nominals with temporal meaning</b>	<b>English translation</b>
<i>Kuara</i>	Sun
<i>Jahya</i>	Moon
<i>Ipytuna</i>	Night, Black
<i>Ko'ema</i>	Morning
<i>Ko'emameme</i>	"Tomorrow"
<b>Other (adverbial) time referencing expressions</b>	
<i>Koro, koroite</i>	Today, now, right now (fut.)
<i>Tiro</i>	Today, now, right now (fut.)
<i>Tirove</i>	Today, in the immediate past (earlier today)
<i>Awo</i>	Here, now
<i>Ki...ko</i>	Past
<i>Poti ... nehe</i>	Future
<i>Emo</i>	Past

**Table 1: Am on da wa te mp ora l refe rence ter ms**

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<i>Ramo</i>	Past
<i>Ki ... i'i</i>	Past

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**Table 2: Amondawa seasonal time interval words**

<b>AMONDAWA</b>	<b>ENGLISH</b>
<i>Kuaripe</i>	<b>Time of the sun (“SUMMER”)</b>
<i>O’an kuara</i>	‘The sun is born’. The arrival of the sun (beginning of the time of the sun).
<i>Itywurahim kuara</i>	‘Burning sun’. Very strong, hot sun, high summer.
<i>Kuara Tuin</i>  <i>Or</i>  <i>Akyririn Amana</i>	‘Small sun’. End of the time of the sun.   ‘Almost rain’. The time of falling rain is close.
<b>Amana</b>	<b>Rain / Time of the rain (“WINTER”)</b>
<i>Akyn Amana</i>	‘Falling rain’. The arrival of the rain.
<i>Akyrimba’U Amana</i>  <i>Or</i>  <i>Amana Ehãi</i>	‘Heavy falling rain’. Time of the heavy rains.   ‘Great rain’. Rain of long extent and duration.
<i>Amana Tuin</i>  <i>Or</i>  <i>Akyririn Kuara</i>	‘Small rain’. End of the rainy season.   ‘Almost sun’. The time of the sun is close.

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**Table 3: Parts of the day in Amondawa**

<b>Ara or ajia</b>	<b>Day (daylight)</b>
<b>Ko ʼEma</b>	<b>Morning</b>
<i>Pojiwete</i>	'When we start work'. Early morning.
<i>Kojawahim</i>	'When we feel hungry'.
<i>A ʼU Matera</i>	'When we eat'. Lunchtime.
<i>Ajia Katua</i>	'Good morning time'. After lunch.
<i>Ajimbu ʼU</i>	'Heavy morning'. Late morning.
<i>Pyriete Kuara Ruwi</i>	'The sun is high'. High noon.
<i>Ajia katua</i>	
<b>Karoete</b>	<b>Noon; afternoon.</b>
<i>Pyryrym Kuara</i>	'The sun is turning'. Early afternoon.
<i>Momina Werin Kuara</i>	'The sun is almost gone'. Late afternoon, dusk.
<i>Momina Kuara</i>	'The sun is gone'. Early evening. Twilight.
<i>Iputuna</i>	<b>Night (black)</b>
<i>Opon Jahya Tiro</i>	'The moon leaps up now'. Moonrise.
<i>Apehyahim</i>	'No more work.intense'. Sleep time.
<i>Apoji Katua</i>	'Good .... '
<i>Ypytunahim</i>	'Intense darkness'. Middle of the night.
<i>Pyriete Jahya Ruwi</i>	'The moon is high in the sky'.
<i>Jahya Pyryrym</i>	'The moon is turning'. Dawn is coming.

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<i>Ko ʻEma Werin</i>	‘Almost morning’. Dawn.
<i>Opon Kuara Tiro</i>	‘The sun jumps up now’. Sunrise.
<b><i>Ko ʻema</i></b>	<b>Morning</b>

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**Table 4: Amondawa names and life stages**

<b>Arara (F)</b>	<b>Arara (M)</b>	<b>Mutun (F)</b>	<b>Mutun (M)</b>	<b>Life stage</b>
<i>Tape</i>	<i>Awip</i>	<i>Morãg</i>	<i>Mbitete</i>	Newborn to toddler
<i>Potei</i>	<i>Tangãe</i>	<i>Pote´i</i>	<i>Kuembu</i>	Child to pre-adolescent
<i>Poti´I</i>	<i>Pure- Tebu</i>	<i>Mbore´i</i>	<i>Koari</i>	Adolescent (from puberty)
<i>Kunhate</i>	<i>Juvipa</i>	<i>Mboraop</i>	<i>Tarup</i>	Young adult
<i>Mande´I</i>	<i>Purap</i>	<i>Mboropo</i>	<i>Yvaka</i>	Adult
<i>Adiju</i>	<i>Mboria</i>	<i>Kunha´pó</i>	<i>Moarimã</i>	
<i>Umby</i>	<i>Mboria</i>	<i>kunhaviju</i>	<i>Mboava</i>	
<i>Mytãg</i>	<i>Jari</i>	<i>Mbore´a</i>	<i>Uyra</i>	Elder

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**Table 5: Generic nouns referring to categories of persons**

<i>Kurumin</i>	Baby/child
<i>Kwambáea</i>	Man
<i>Kuñã</i>	Woman
<i>Amu</i>	Old man
<i>Tiwi</i>	Old woman