Shua spatial language and cognition

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Structure of paper

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Introduction

• My concern is with frames of reference (FORs) in the representation of spatial relations in Shua

   – FORs are the coordinate systems used for providing angular specifications of figures with respect to grounds, as in *the tree is to the north of the hill*

   • Used in locating entities, orientating bodies, and specifying direction of motion
   • Where figure and ground are typically not contiguous, as against topological relations, which concern contiguous figures and grounds

   – This characterisation (following Levinson 2003, Levinson & Wilkins 2006) is not unproblematic, though it is adequate for present purposes
• Three main aims:

– To describe the range of FORs available in the language
– To make some remarks on their domains of usage; and
– To comment on possible relations to spatial cognition

• Speakers show a range of variation in the way that they replicate table-top arrangements under rotation
• These do not correlate well with the way speakers themselves talk about the arrangements
• I comment on the implications of these findings to the recent debate on the Whorfian attributes of spatial language
• Spatial relations was one of the foci of my fieldwork, and aside from standard elicitation the following stimuli were employed in gathering information:

– Bowped
– Frog stories (all 4)
– Descriptions of configurations of objects in proximal space
– Object arrangement tasks, using a set of animals

• Rearrangement of animals under rotation (90° and 180°)
• Descriptions of arrangements of these animals
• Replication of arrays by another

– Route descriptions
– Pointing to near and distant locations
Spatial frames of reference

• All three FORs identified by Levinson 2003, Levinson & Wilkins 2006 are in regular use in Shua speech about spatial relations

  – **Absolute** – figure is located with respect to ground in terms of fixed bearings defined by the world (at certain bearing from G)
  – **Intrinsic** – figure is located with respect to an axis of a ground object, defined by some facet of the ground (in line with facet)
  – **Relative** – figure is located with respect to ground from ego’s perspective (฿FEG)
Absolute

• In the horizontal dimension, two main absolute systems are in use:

  – A cardinal system
  – A landmark system
Cardinal system

• The cardinal system is a reduced one, distinguishing just:

  – |am ke ty’ua ngu ‘east’
  – |am ke kai ngu ‘west’

• These are descriptive terms:

  – ‘where the sun rises’
  – ‘where the sun sets/enters’

• Another term ||ao-k’i ‘east’ is not descriptive – rarer, and now so well known

• There are no corresponding terms for ‘north’ and ‘south’, though it seems that in closely related Cirecire there is a third term covering these two cardinal directions
• The following example describes two people standing back to back, looking in opposite directions

- They are depicted on a computer screen oriented north-south

\[
\begin{align*}
\text{hēxoe} & \ \text{ʔa} \ \text{etsara tēː} \ \text{ema} \ \text{|am ke} \ \text{ty’ua ngu tyiro} \ \text{ʔa} \ \text{ha} \\
\text{here} & \ \text{LOC 3du} \ \text{stand} \ \text{3sgM sun PRS rise} \ \text{look LOC be:at} \\
\text{nyēma} & \ \text{|am ke} \ \text{kai ngu tyiro} \ \text{ʔa} \ \text{ha} \\
\text{that:M sun PRS enter} & \ \text{look LOC be:at} \\
\end{align*}
\]

‘They are standing here. He is looking to the east, and the other one is looking west.’

- As this indicates, absolute FOR is used on table-top space

* Frequently used in identifying objects on computer screens
* Used in all larger spaces I tried, but not in relation to the human body
• As in these examples, the speaker is usually the centre from which the absolute directions are determined

– This is not always the case
– The centre can shift to another entity – in which case the ‘side’ forms are generally used:

The big bottle is the |am ke kai hā: ka hā: (‘western side’) one – although it is to the east of me
Landmark system

- Second absolute FOR is landmark system, where some geographical place or location distal from the figure is employed as a reference point

  - This system appears to kick in when it is necessary to provide more precise directional information, and in directions not covered by the cardinal system
  - Often accompanied by pointing towards the landmark
• For instance, in describing animal arrangements on table tops landmarks were sometimes used to give more precise specification of directions animals were facing, or direction of line-ups

  – Especially when not oriented east-west

• Landmarks employed included:

  – Nata (town "centre") – also referred to as Shua
  – The ward meeting place
  – Residences of individuals, including speech participants
• For instance, in specifying the direction roughly south for an animal’s orientation, a speaker said (omitting stuttering):

\[
xota \quad tse \quad ?a \quad idi \quad ha:ngu \quad k’ayo \quad k’i \quad ?a \quad tē\
\]
meeting.place us LOC POS towards face LOC stand

‘It is standing facing towards our meeting place.’

– Landmarks seem to be used in specifying directions towards, not away from
For the vertical dimension, the terms primarily specify intrinsic FORs, but can be used absolutely.

- The terms for ‘top’ and ‘bottom’ are also used for ‘up(wards), above’, and ‘down(wards), below’

  \textit{ta aka ke g\|ou karo nyam }\textit{?a k}\^{\text{\textipa{u}}}: \\
  1sg PST CNT steep hill top LOC go \\
  ‘I walked up the steep hill.’

  \textit{ta nyam tyiro aha} \\
  1sg top look PST \\
  ‘I looked upwards.’

  \textit{ta k’un tyiro aha} \\
  1sg below look PST \\
  ‘I looked downwards.’

- In the first example, it is not implied I reached the top
- In the second and third, there is no featured ground with a top and bottom
In Shua these mainly employ terms for parts of the human body – as per Levinson 2003

- Front/Back dimension
- On top/Below
- Left/Right

In what follows we will look briefly at each of these
• The front-back dimension employs the terms using terms *k’ayo* ‘face, forehead’ and *nydjoro* ‘back’

```
aba em k’ayo ?a têː em we ke xa aba nydjoro ?a gleː
dog 3sgM face LOC stand 3sgM also PRS this dog back LOC run
```

‘The dog is in front of him, and he is running behind it.’

— Used for featured grounds

• Animates
• Inanimates that have more or less conventionalised fronts and backs – e.g. cars, houses, wheelbarrows, shoes; not usually objects such as trees and rocks

— A tree will have these features if bent by the wind – ‘front’ is leeward, in the direction of the bend
• The terms for the vertical dimension don’t relate to any body-part terms for humans

– *nyam* ‘top’;
– *k’un* ‘bottom, below’

• They appear to primarily specify intrinsic parts or aspects of inanimates


\[
\text{nyī: watau xu: nyam ʔa tyōē}
\]

classify frog something top LOC sit

‘The frog is sitting on top of something.’
• I must qualify the claim that these terms specify inherent parts of featured inanimates

– In contrast to the front/back dimension of a featured entity, these do not appear to retain their reference to the corresponding part when the inanimate is inverted:

• I have at least one instance where chewing gum is located *nyam* in relation to a chair/table, being on the seat/table-top

• When the furniture was turned over, it became *k’un*, i.e. on the underneath of the chair/table
• The left/right terms are \textit{\textipa{are \textipa{?a}} ‘left’} and \textit{\textipa{k’am ‘right’}}
• These are usually used relatively, though they can be used intrinsically to specify inherent aspects of featured grounds (we will return to this again in discussing relative FORs)

  – Human beings
  – At least some inanimates, according to the prototypical position of a human user
    • E.g. left and right arms of a chair according to the left and right of a person sitting in it in the normal fashion
    • For a car, according to the usual position of the driver
    • For a wheelbarrow, according to how it is held in use

• If an object is located in terms of such a featured entity, the left and right side will be in accordance with the left and right of the entity, not the speaker

  – Such objects will be in close proximity to the featured ground, right next to and beside it
• This does not exhaust the range of part terms that can be used in intrinsic FORs

– In the context of table top arrangements corners and ends of tables are also used

• Does not appear to be as ”grammaticalised” as the front-back system
• The body-part nominals used to indicate intrinsic FORs are also used to indicate relative FORs

– This is typically when the ground is non-featured, e.g. an inanimate ground such as a tree, rock, fire, or whatever

– In such circumstances ego is brought into account
• Relative uses of the terms for front-back axis are illustrated in:

```plaintext
ngu: doa \( \ell e: \) nydjoro ?a h\( \hat{a}: \)
```
that grass fire back LOC be:at

‘The grass is behind the fire.’

– Here the figure, the grass is located with respect to the ground, the fire – not via a facet of the fire, but according to the location of ego with respect to the fire and grass

• The grass is between ego and the fire

• Thus ‘in front’ and ‘behind’ as relative terms in Shua work in the opposite way to English
The little bottle is *k’ayo* of the big one
The big bottle is *nyjoro* of the little one
• In describing arrangements of animals on tabletops body-part nominals are normally used intrinsically rather than relatively

\[ bori-ma \ doa:-m \ nyjoröka \ tē : \]
\[ eagle-M \ antelope-M \ back-INS \ stand \]
‘The eagle is standing behind the antelope.’

— More accurately, the eagle is standing by the back of the antelope

• It appears that there are some systematic formal tonic and/or prosodic differences associated with the intrinsic vs. relative uses of the body-part terms

— This needs to be investigated further
• Unsurprisingly, ‘left’ and ‘right’ terms are typically used relatively

  – For objects that are not used by human beings prototypical ways like vehicles and chairs, the left and right sides are in accordance with the left and right of ego

• Thus these are normally reversed when ego faces directly to the object and away from it
• The left and right terms are normally found in some modified form, such as ‘side’ forms:

– ǁare ?a hã: ka ‘left side’
– k’am hã: ka ‘right side’

• These designate ‘sides’ of the ground object in accordance with the relative position of ego – presuming ego is facing in the direction of the ground.

Generally if ego is facing away from the tree the bottle is represented as being on the right side, although occasionally it is said to be on the left side. This has not yet been resolved.

The bottle is k’am hã: ka of the tree.
Another mode of expression involves use of ‘公司的 ‘arm’

The dog is on the right, the warthog on the left.
• The "ego" chosen as centre for the calculation of left and right is typically the speaker

– It may alternatively be the hearer

• In the spatial task where a director instructs another to place objects in a particular arrangement the latter, the hearer was often chosen as the centre

– Put the warthog on your right (of the tree)

• Presumably this specification was employed for purposes of exactitude, to avoid possible misunderstandings if the hearer interpreted the instruction as applying to the director’s right and left
• Usages such as these of the handedness terms might appear to be intrinsic rather than relative

  – They clearly pick out things according to an intrinsic feature of ego, which remains invariant under rotation
  – I analyse them as relative because in contrast to the situation for featured inanimates like chairs and vehicles:

    • These FORs are not restricted to objects located next to or beside ego
    • At least three entities are involved, ego, a figure and a ground, whereas for the inanimates just two are germane (location of ego as speaker or hearer does not come into the picture)
• Other types of relative FORs include:

  – Deictic – side forms of demonstratives ‘this’ and ‘that’, which can be used in what seems to be a relative way (involve at least 3 entities in the specification of the angle)

• ‘this side’ vs. ‘that side’ relative to ego to distinguish objects at different distances in front of them
The little bottle is that side of the big one
The big bottle is this side of the little one
– Speech participant may be selected as the ground in what looks like a relative FOR

• Participant + ‘side’ specification to distinguish an entity from within a group

– Participant can be speaker or hearer, or another third person in the interaction, e.g. specified by name

The t̂iː hā ka hā ņ̃e ng̃ubi ‘my side bottle’ is the big one
Domains of usage of the frames of reference

- All of the FORs can be used regardless of the “size” of the spatial domain

  – Contrary to the predictions of Levinson & Wilkins 2006, we don’t find cardinals restricted to — or even strongly associated with — geographical space, and intrinsic and relative to smaller space

- Some exceptions, in that cardinals are not used for body space, and speakers found the suggestion funny
• Absolute, intrinsic, and relative are demonstrably used in reference to spatial relations in:

  – Table-top space (including what is shown on a computer monitor) – what is within reach
  – Visible space – e.g. house and compound
  – Geographical space – local (micro) of e.g. Nata and macro of known visited places such as Francistown and Maun

• No particularly strong differences in statistical associations are apparent between the FORs and size of the domain

  – Absolute FORs – including cardinal specifications – seem to be no more common in route description than in descriptions of table-top configurations
Spatial frames of reference and spatial cognition

- I mentioned above a range of experimental stimuli used in the field, mostly from the kit supplied by MPI Nijmegen
- I used most of these stimuli with 20 or so Shua speakers and part speakers, some with more, some with less
- The bulk of the elicited speech has been transcribed, but remains in notebooks
  - I have video recordings of most of the sessions
  - Plus photographs of most of the arrangements and rearrangements
    - Data needs to be systematised
    - The analysis still has a long way to go
- Here I want to outline some of my preliminary conclusions based on an overview of the corpus, and on zeroing in on a few of the specific cases
  - I restrict attention to the animal rearrangement tasks
• A few qualifications before we begin:

  – The experimental conditions were not rigidly controlled

• There was not a single set of instructions to each participant

  – Instructions were in general not overly precise – basically the instructions were to put the things in the “same arrangement”, without any specification being given of what counts as the same
  – But different wordings were given to different people, which might have effects on the outcomes, what they did

• Due to material deficiencies it was not possible to have two identical tables to do the stimuli on, and the differences could have affected the outcomes

• It was not always possible to do the experiments in the same location due to various factors including the time of day (sun, shadows)

• None of the experiments could be considered to provide convincing evidence re the Whorfian hypothesis since everyone participating was bilingual in Setswana
• About 20 speakers participated in a fairly standard animal rearrangement task

  – 2-5 animals and 1 plant were arranged in a dozen different arrays on one table

    • Not too many objects to tax memory

  – A second table was located a few paces away, either in the same arrangement as the first, or at right angles to it

  – Participants were asked to arrange the animals and plants in the same way on the second table

    • Depending on the arrangement of the second table, the speakers themselves faced either the opposite direction or at right angles

    • Speakers carried the animals with them to the other table
• Here is a sample of an arrangement (camera facing west):
• Example of a rearrangement by one speaker (again camera facing west):

Original set up

Rearrangement on table rotated 90°
• The previous photo shows rearrangement preserving absolute configuration and orientation

• Responses also included:

  – Rearrangement according to a relative FOR

    • Many younger (and so better educated) speakers and part speakers used this type of rearrangement – though some older speakers also did, who had little if any education

  – Rearrangement according to an intrinsic FOR defined by the animals themselves

    • A few individuals did the reorganisation preserving only the relative arrangement and orientation of the animals

      – E.g. following one another, the direction of the line being apparently unrelated to the direction of the source line
• The different sets of responses to the rearrangement task might be expected, given Levinson 2003 and Levinson & Wilkins 2006

  – Depending on how the speaker would speak about that arrangement, which FOR they use
  – I tested this by asking – in a later interview session – speakers to describe each of the arrangements to me in Shua
  – The results were not in strong support of the expectations:

    • Some individuals who consistently arranged things in an absolute way spoke about the arrangements in a relative and/or absolute way
    • Some who consistently arranged things in a relative way spoke about the arrangements in an absolute way
      – Of course, as the descriptions were later, it is possible that the same speaker simply used a different FOR

    • A number of respondents used mixtures of FORs
• In one interview the arranger explained what she was doing at the same time as she was examining the arrangement of the items, prior to rearranging them

  – Her rearrangements were variable, including absolute, relative, and intrinsic
  – In most cases what she said involved a mixture of absolute, relative and intrinsic FORs
  – In most cases her descriptions were quite inexplicit

• They describe only a part of the arrangement, and other aspects of the arrangement had to be remembered in order to replicate correctly
• She describes the first arrangement, which she placed at 90° rotation in the following way (schematically):

  – Bird stands behind
  – Antelope in middle
  – Warthog is in front, facing west

• The behind and front terms were used intrinsically – they were not in this configuration relative to the speaker
• The warthog is actually to the east of the other animals
• The fact that the animals were arranged diagonally across the table is not mentioned, and not replicated

• Perhaps the mistake in the stated orientation of the warthog led to the error in the rearrangement
• Another 90° rearrangement:
  – Tree is in middle
  – Squirrel is looking at tree
  – Warthog is on the east facing the tree
  – The dog is by the side, looking towards the tree
  – The bird also is standing in the west and looking at the tree

• The rearrangement is intrinsic, and neither relative nor absolute
  – Possibly some of the linguistic choices have influenced the rearrangement:
    • The dog being put by the speaker’s side
    • But the bird is here not in the west, and nor is the warthog in the east
• Another rearrangement task was done with just two sets of two participants

  – Involved a director, with a set up of animals in front of them
  – A second speaker with the same (full) set of animals
  – The two individuals were separated by a vertical barrier so they couldn’t see one another or one another’s arrangement
  – In different parts of the session they faced in different ways:
    
    • Same direction
    • Rotated by 90°
    • Rotated by 180°

  – The director describes their set up, and the two discuss things until they agree that the way the other has arranged things is correct
  – Then the barrier was raised, and the participants asked:
    
    • Are the arrangements were the same or different?
    • If different, how are they different
Director describing arrangement

Respondent’s arrangement
• The results of the experiment are as follows:

– In this task absolute rearrangements were the only ones accepted as identical

• Although there was no discussion prior to the experiment as to what counted as an acceptable arrangement, for these 2 pairs this was the presumption

– Speakers used all resources available to them to describe their arrangements

• Using absolute FORs, cardinal and landmark
• Using relative FORs, primarily the handedness system
• Intrinsic FORs, primarily front-back, but also with respect to intrinsic features of the table
• Much of the talk concerned relative orientations of the animals with respect to one another – following one another, side by side, etc.
• The two pairs differed strikingly in terms of their success

  – One pair succeeded at almost 100% in replicating the arrangement
  – The other pair had a much lower success rate, around 50%

  • This pair seemed to focus more on inessential and/or irrelevant features not germane to the problem
  • One of their few successes is shown on the next slide, where the woman is director

    – Note this involves a 90° rotation
    – Her success rate as director was much higher than the man’s
Conclusion

• I have overviewed the FORs employed by speakers of Shua
  – Showing that the 3 main types identified by Levinson 2003 are employed
  – Though there is little apparent connection between them and any particular “size” of spatial domains in which they are used

• I have some doubts concerning:
  – The most appropriate analysis of the FORs
    • In terms of which dimensions? Which dimensions are emic?
  – The Levinson-Wilkins typology of FORs
    • And how some of the Shua subsystems best fit into it
• The evidence from rearrangement tasks in Shua does not strongly support a Whorfian story

  – Nor does it strongly conflict with Whorf

• My overall impression is that speakers habitually use all of the resources available to them to achieve their purposes in specifying spatial relations, when speaking

  – My interpretation is that they conceive of space (initially, primarily) non-linguistically, and translate this into linguistic form when necessary
Shua is an endangered language, and there is evidence that younger speakers – those less than 40 or so – do not usually have good control of spatial language, even if in other domains they have reasonable competence.

- This is evident from the reactions of older speakers to recordings.
- Younger speakers often don’t know the Shua terms for ‘left’ and ‘right’, and invent terms like ‘eating hand’.
- In many cases younger people had to be assisted considerably in their descriptions.
• I did some related linguistic and expiremental work with speakers of Cirecire (a Tshwa variety)

  – The findings are largely in agreement with the findings for Shua

    • The FORs systems for the two languages are remarkably similar
    • Speakers behave in a very similar way in their responses to the spatial tasks

• It would be interesting to compare the situation for these two languages with that for other Khoe-Kwadi languages, and nearby unrelated languages such as Setswana

  – The only relevant work seems to be on Haiǁ’om, where Haun 2007 and Widlok 2008 have shown that there is a high level of consistency in their responses on the spatial rearrangement tasks

    • Overwhelmingly Haiǁ’om respond in an absolute fashion
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