The Geographical Spread of the Tupí-Guaraní Family: Evidence from Computational Phylogenetics

Zachary O’Hagan, Natalia Chousou-Polydouri, Keith Bartolomei, Erin Donnelly, and Lev Michael

University of California, Berkeley

~

AMAZONICAS V
Belém, Pará, Brazil
May 28, 2014
The goals of this talk are twofold:

1. Present a model for the geographic dispersal of the Tupí-Guaraní languages inferred from
   - A new internal classification of the Tupí-Guarani family (Chousou-Polydouri et al. 2014) and
   - The earliest known locations of the languages in question

2. Contribute to dialogue between linguists, archaeologists, and human geneticists regarding the dispersal of Tupí-Guaraní languages, and identify fruitful areas of investigation in these allied fields
Center-of-gravity Inference

• The migration model we present is based on the center of gravity (CoG) inference heuristic developed in linguistic migration theory (Diebold Jr. 1960; Dyen 1956; Nichols 1997; Sapir [1916]1949)

• CoG infers a likely region in which the shared ancestor of a group of daughter languages was spoken, assuming, *all other things being equal*, that:
  
  • The ancestral language was spoken in the region occupied by the largest number of first order daughters of the proto-language
  • The homeland requires the smallest number of migratory movements to explain the modern distribution of the daughter languages
  • The homeland requires the shortest migratory movements

• This inference process can be applied both to a family as a whole and to particular branches to develop a model for the geographic dispersal of a family
Refining CoG

- **Geographical features** make certain movement trajectories typically more or less costly than others
  - Riverine movement is typically less costly than overland movement (provided the groups in question have water craft)

- **Ecological factors** likewise affect movement
  - Remaining within ecologically similar zones allows for continuity in subsistence practices
    - For example, movements that allow riverine groups to retain riverine subsistence practices are more probable than ones that require such groups to develop interfluvial practices.

- Assessing the effect of geographical features and ecological factors is facilitated by knowledge of **cultural practices** and **subsistence practices**
Language and Subgroup Locations

- In carrying out CoG inference, locations attributed to attested languages plays an important role.
- We increase the accuracy of the inference process by using the earliest known language locations (generally at “time of contact”).
  - For example, Emerillon and Wayampí, now spoken in French Guiana and northern Amapá, respectively, were both spoken on the lower Xingú in the early colonial period (Grenand 1982).
  - Guajá and Ka’ápor were probably spoken on the lower Tocantins not long before the arrival of Europeans (Balée 1994).
- We now consider the location of the various subgroups proposed by Chousou-Polydouri et al. (2014) in order to develop a sense of how the proposed classification maps onto the geography.
Classification (Chousou-Polydouri et al. 2014)
Inferring the PTG Homeland

- We now turn to inference of the PTG homeland
- According to our classification, PTG split into Kamaiurá and the much larger Nuclear TG (NTG) branch
- We will temporarily set aside the question of the PTG homeland as such and focus on the Proto-NTG (PNTG) homeland
- Inference of the PNTG homeland depends on the location that we attribute to its three first order daughters: Proto-Central, Proto-Tocantins, and Proto-Peripheral
- Inferring the location of the Proto-Central and Proto-Tocantins homelands using CoG is relatively straightforward
- The Proto-Peripheral homeland is somewhat less obvious...
Inferring the Proto-Peripheral Homeland

• To infer the Proto-Peripheral homeland, it is helpful to consider the homelands associated with its three first-order branches: eme-way, kay-part, and Diasporic
• The Proto-eme-way and Proto-kay-part homelands can be inferred straightforwardly
• The Proto-Diasporic homeland is less clear, but based on the proximity of Tembé and Tupinambá (of the Omagua-Kokama-Tupinambá branch), we infer a region on the southern banks of the mouth of the Amazon
Inferring the Proto-Peripheral Homeland

- Having posited homelands for the three branches of Proto-Peripheral (i.e., Proto-eme-way, Proto-Kay-part, and Proto-Diasporic), we can infer a homeland for Proto-Peripheral itself.

- The most compact area straddling more than one branch of Peripheral stretches from the western bank of the Xingú to east of the Tocantins, leading us to place the Proto-Peripheral homeland there.
Inferring the PNTG Homeland

- Having located the homelands for the three first-order branches of PNTG (i.e. Proto-Central, Proto-Tocantins, and Proto-Peripheral), the inference of the PNTG homeland is straightforward.
- The locus of genetic diversity is clearly located in a region extending from the Xingú to Tocantins, some small distance upriver from the mouths of these rivers.
Inferring the PTG Homeland

- The two first order daughters of PTG are PNTG and Kamaiurá, which are relatively distant from one another.
- Given that:
  1. Kamaiurá is located upriver of the posited PNTG homeland.
  2. We have seen a general trend for upriver dispersals in the diversification of TG (e.g. Proto-kay-part, Tapirapé, Avá-Canoeiro).
- ...we hypothesize that it was, to a greater degree, Kamaiurá that migrated upriver than PNTG that migrated downriver.
- This leads us to posit that PTG was spoken in a region similar to that of PNTG, but with modestly greater upriver extension.
Migratory Model

- Having inferred the PTG homeland, as well as homelands for several important daughter nodes, we can reverse our account to yield a migratory model:
  1. PTG → PNTG + kam
  2. PNTG → Proto-Central + Proto-Tocantins + Proto-Peripheral
  3. Proto-Peripheral → Proto-eme-way + Proto-kay-part + Proto-Diasporic
Proto-Southern Migrations

• It is unclear which route or routes were taken by Proto-Southern to arrive in the greater Paraná drainage, where we assume it diversified

• Three routes are in principle possible:
  1. Tocantins/Araguaia: this is the route of shortest distance
  2. Tapajós
  3. Madeira: this is appealing based on the presence of Southern languages in what is now Bolivia

• It is noteworthy that migrations up the Tapajós or Madeira require Proto-Southern to traverse territory previously traversed by speakers of Proto-Omagua-Kokama
Previous Proposals for PT(G) Homelands and Migrations

• Previous proposals for Proto-Tupí and Proto-Tupí-Guaraní homelands and migrations are numerous (Noelli 1996:11-25)
• We review a set of prominent and more recent proposals, by archaeologists, anthropologists, and linguists alike
  • Lathrap (1970)
  • Brochado (1984)
  • Urban (1992)
  • Rodrigues (2000)
• Archaeological claims rely **heavily** on pottery traditions
• Much work only considers the geographical spread and pottery traditions of the Tupinambá and Guaraní, ignoring other Tupí-Guaraní groups
T(G) Homeland and Migration Proposal

- Lathrap (1970:78-79): PTG spoken at mouth of Amazon
  - Spread began $\sim500\text{BC}$, up Madeira, Xingú, Tocantins, and down the Atlantic coast
  - PTG spoken on the Amazon proper
  - Guaraní migrate up the Madeira ($\sim200\text{BC}$) and reach the Paraná-Paraguay basin by $\sim100\text{AD}$
  - Tupinambá migrate down the Atlantic coast by $\sim800\text{AD}$
- Comparison: Homeland and spread broadly compatible with the model presented here
**T(G) Homeland and Migration Proposal (Urban 1992)**

- PTG spoken in Madeira-Xingú headwaters, where it diversified
- Wave 1: Linguistically most divergent groups split off first
  - Omagua and Kokama-Kokamilla migrated towards the Amazon
  - Aché migrated southward into Paraguay
  - Siriono migrated to the southwest into Bolivia
- Wave 2: Amazonian TG languages split off
  - Pauserna and Kawahib migrate west
  - Kayabí and Kamaiurá migrate to the Xingú
  - Xetá migrate to southern Brazil
  - Tapirapé and Tenetehara migrate to the Tocantins and descend to near the mouth of the Amazon
  - Wayampí precede the Tapirapé and Tenetehara, crossing the Amazon into French Guiana (known to not be a prehistoric migration)
T(G) Homeland and Migration Proposal (Urban 1992)

- Wave 3 (∼1000 AD): remaining non-Amazonian languages split off
  - Chiriguano and Bolivia in Bolivia
  - Tapiete and Guaraní in Paraguay
  - Kaiowá in Argentine-Brazilian-Paraguayan border region
  - Tupinambá along Atlantic coast

- Comparison: Homeland and migration model significantly at odds with the homeland, internal classification, and migration model presented here
Archaeological Observations

• Noelli (1998:656; see also Noelli (1996, 2008)):

  ... [W]here occupation sequences are known, confronting the archaeological publications will rule out Paraguay, southern Bolivia, Mato Grosso do Sul, Goiás, southern, southeastern and northeastern Brazil as a centre of origin. In the upper and main course of the Xingu, in the Araguaia and in the upper and main course of the Tocantins, ... no archaeological evidence identifies an origin there...

• Leaves viable the lower Tocantins and Xingú and their associated interfluvial zone (our suggested homeland)
Proto-Tupí-Guaraní diversifies in the Juruena-Arinos interfluvium

Wave 1: II & III split off, migrating southward
- II maintains contact with I
- II & III then each split in two, with one branch of each remaining in contact with each other
- II heads (north)west into Bolivia in two migrations
- III heads (north)east to the Atlantic in two migrations

Wave 2: I splits off, migrating further southward than did II & III

Comparison: The early migrations of II and III, and later, I, are difficult to reconcile with their deep position in our proposed tree
Conclusion

- Our model posits a PTG homeland that spans the lower Tocantins and Xingú Rivers, with out-migrations from this region
- Major migrations are associated with the Diasporic branch:
  - Proto-Omagua-Kokama up the Amazon, Proto-Tupinamba south along the Atlantic coast
  - Southern towards the Paraná River basin, up along the Tocantins/Araguaia
- The PTG homeland we propose
  - Largely coincides with the homeland near the mouth of the Amazon discussed by Lathrap (1970) and Brochado (1984) and is not contradicted by available archaeological evidence
  - But is placed much further north and east that the homelands proposed by Urban (1992) Rodrigues (2000)
- The classification of Chousou-Polydouri et al. (2014) poses significant challenges for Urban (1992) and Rodrigues (2000)
References I


References II


