

Modeling Language Spread in Australia: Family “Trees” as Consensus Networks

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Roadmap

- ▶ Pama-Nyungan and Karnic
- ▶ Summary of Karnic problems
- ▶ Previous solutions
- ▶ A breakup model
- ▶ Representation
- ▶ Discussion/Conclusions

Introduction: Pama-Nyungan

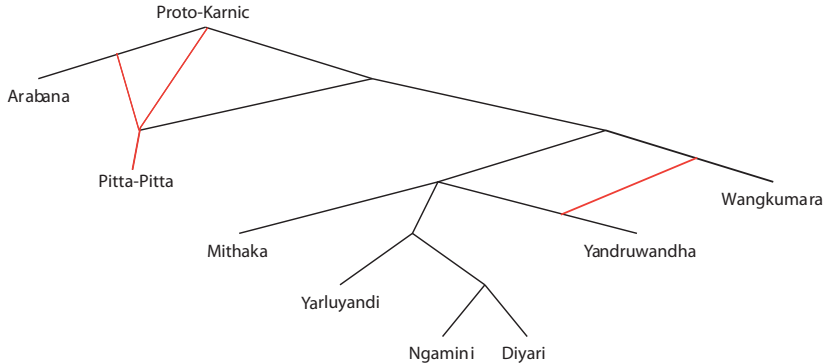
- ▶ 90% of Australia's land mass
- ▶ c. 150 languages
- ▶ > 20 subgroups
- ▶ many singleton (unclassified) languages
- ▶ problems for reconstruction and subgrouping

Introduction

Previous models Karnic: Tracing Change Conclusions



Major Karnic subgrouping proposals



Evidence for Northern Karnic

- ▶ e.g. Hercus (1994)
- ▶ shared vocab: marrpanthi “centipede”
- ▶ pronouns: e.g. (but not limited to) **ngantya* 1sg dative > nominative; possibly *uka/nhuwa* (< **nhuka*) 3sg nominative
- ▶ -pa increment to pronouns (e.g. 2sg nominative)
- ▶ locative allomorph *-*la* > causal (perhaps an archaism)

Innovations which group Pitta-Pitta (and dialects) with other Karnic languages

- ▶ *matha* “bite” (and many other lexical items)
- ▶ locative allomorph > dative (*-nga)
- ▶ emphatic -ni
- ▶ 2nd singular accusative nyuna (archaism?)

(There are also many shared retentions which Arabana does not share.)

Previous Approaches

- ▶ Punctuated Equilibrium (Dixon 2002)
- ▶ Family tree
- ▶ (Speech Community model)

All these models are problematic (for Karnic and for Pama-Nyungan).

Problems:

- ▶ PuncEQ requires assumptions of diffusion of shared suppletion (Bower 2006) and is implausible for other reasons (e.g. requires a different model of language acquisition).
- ▶ Family tree is stipulative in such cases; choosing which branches get represented is misleading.
- ▶ The speech community model is a different type of model; communities and languages have different properties.

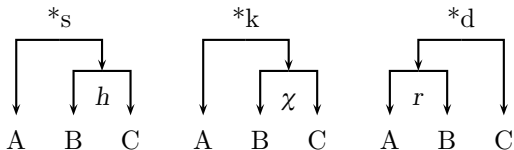
Alternative

- ▶ **Consider** the causes of conflicting branching:
 - ▶ Diffusion
 - ▶ Dialect areas
 - ▶ Descent from dialect area without dialect levelling.
- ▶ Most areas have more or less messy breakup (that is, some incompatible splits) but one situation produces this in particular:
 - ▶ Rapid population expansion. . .
 - ▶ Followed by subsequent dialect differentiation *in situ*. . .
 - ▶ Without later full dialect leveling.

(See Bower in preparation for more details.)

Alternative Proposal

- ▶ Model all the splits.
- ▶ **Problem:** implies that languages can have more than one parent. (Not what we want)
- ▶ **Solution:** Conceive the terminal nodes of the tree as ‘sets’ of features. Draw a tree diagram for each change:



- ▶ map the results as a “aggregate” tree (aka consensus tree/network); can use SplitsTree, PAUP, etc

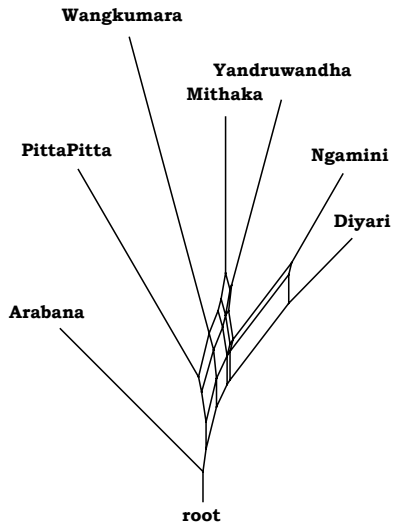
Advantages

- ▶ We want a picture of our hypotheses as to how these languages split and how the family differentiated.
- ▶ To assemble it with the Comparative Method, we compile correspondence sets and infer from the changes what the subgroups are.
- ▶ Can model different paths
 - ▶ clean splits will show as trees
 - ▶ messy splits will show as networks
- ▶ This can in turn be used to make quantifiable inferences about contact and split.
- ▶ This models only linguistic items, but allows inference about communities too.

Method

- ▶ Reconstruction and identification of borrowings using the Comparative Method;
- ▶ Splitstree, NJ and NeighborNet (Huson and Bryant 2006) (distance-based method);
- ▶ PAUP 4.0*: parsimony analysis
- ▶ 480 characters (425 lexical, 55 morphological) for 8 languages.
- ▶ 263 characters for 14 languages (more problematic)

NeighborNet Rooted Tree



Discussion/Conclusions

- ▶ Tools like NeighborNet are useful for recent groups and large data sets (perhaps more so than the large-scale small-set work favoured recently).
- ▶ One of the big problems in Australia is the subjectivity in evidence presented for subgrouping; this obviates that problem.
- ▶ Provides lets us quantify and represent a third option for language split: language diversification from dialects *in situ* without full dialect levelling.

Acknowledgments

- ▶ This work was funded in part by NSF CAREER BCS-0643517 “Pama-Nyungan Reconstruction and the Prehistory of Australia”.
- ▶ Many thanks to Luise Hercus and Gavan Breen for access to unpublished data/fieldnotes for Karnic languages.
- ▶ SplitsTree is available from <http://www.splitstree.org>.