

## Origins and Evolution of Language

### Week 7 tutorial

#### Tutor notes

*Comments for tutors are in italics.*

*As usual week, two aims for today:*

- 1. Read and talk about a couple of very interesting papers with results I find slightly challenging for my world view, as discussed below!*
- 2. More generally, practice reading, summarising, and evaluating research papers, with a bit of encouragement from questions are intended to help think critically about the paper's methods and conclusions. There is also some specific advice on how to handle technical papers, specifically some advice to try to press on and get the gist rather than getting bogged down in the technical detail. Unless a paper is exactly in my speciality area I typically don't understand absolutely everything, at least not on the first reading, and sometimes there are large chunks I basically take on trust. Depending on the circumstances and my aim, that can be OK – am I reading it from a technical perspective with an eye out for errors or biases in the methodology (in which case I better be on top of the details) or am I more interested in the broader claims and how they might relate to other areas in the literature (in which case I might be prepared to take some of the authors' claims at face value).*

In this week's lecture we covered some evidence that languages evolve as a result of their learning and use, and that these processes can explain some of the fundamental design features of human language, including arbitrariness and compositionality. One corollary of this perspective is that languages whose users are under different production constraints or who have different communicative needs will adapt to those requirements, leading languages to diverge in at least some of their details as they adapt to these different constraints and needs. The readings for this week provide two potential instances of this kind of divergence, where languages existing in different environmental or cultural niches show signs of being adapted to those niches.

You may need to be on the University network to access these papers via the direct links below. The papers are short but technical. Read at least one (but ideally both) and focus on understanding the gist if you feel you are getting bogged down /confused by the technical details - one of the skills you can develop by reading papers is figuring out which points are crucial and need to be understood there and then identifying where you can press on, figure out what the broader point is, and then decide whether you need to understand the technicalities or can take them on trust. If you can only read one and are not sure which one to read, the Majid et al. paper is more accessible.

*I already covered this above, and you might already have said similar things in the tutorials in recent weeks, but no harm in emphasising this! We are not trying to foster a superficial approach to reading these papers, but abandoning reading at the first technical term or complex passage is the worst thing to do, and often stuff that is confusing at first becomes clearer later, or it becomes clear it's not actually crucial.*

In a paper that received quite a lot of attention and generated a bit of controversy at the time, [Everett et al. \(2015\)](#) present evidence that languages spoken in arid climates are less likely to use phonemic tone. The early section on vocal fold physiology is quite technical, focus on extracting the gist here rather than worrying about the details (unless they interest you!). If you need a primer on tone you could look at [wikipedia](#) or [this excellent encyclopedia entry](#) by Bert Remijsen, who is based here in Edinburgh.

[Majid et al. \(2018\)](#) show that languages differ in the linguistic resources they devote to communicating about the different senses - while e.g. English has a far larger conventionalised vocabulary for talking about colour and shape than touch, taste or smell, other languages show a different ranking of linguistic codability of the senses, which the authors attribute to differences in cultural practices in the communities using those languages.

Points to consider in your reading and discussion of Everett et al.:

- What is the paper about? What hypothesis were they testing? What did they do? What did they find?

*They test the hypothesis that languages spoken in dry regions (often cold regions, which have low humidity because they are cold) will be less likely to use tone phonemically, i.e. as a carrier of lexical contrasts. This hypothesis is based on the physiological evidence that when your vocal cords are exposed to dry air they become unpredictable, and it can be hard to hit precise pitch targets etc – and producing tone requires exactly that kind of precision. So the idea is that languages spoken in dry regions might avoid using those hard-to-produce contrasts. They test this in a large sample of languages, and basically find evidence supporting their hypothesis – e.g. as shown in Figure 2, languages in regions with low mean humidity (MH) are more likely to have no tone than complex tone.*

- Why are they concerned about trying to show the effect of aridity on tone while controlling for relatedness between languages? Why are isolate languages useful in this regard?

*Relatedness between languages is a big potential confound here – languages spoken in the same region are likely to be related, i.e. share common ancestor languages, and as we saw way back in week 2, we should expect similarities when we have common ancestry. Therefore one explanation for why linguistic features might cluster geographically is due to this common ancestry – e.g. you might see lots of tonal languages in a single region because they all come from an ancestral language that was tonal. Contact and borrowing between languages that are geographically close to each other is another possible confound, which is why they are keen to emphasise that the effects they report are seen across continents.*

*Isolates are handy for them for the same reason, because they provide a sample of languages that are unrelated to other languages or each other (or rather the relatedness is unknown and assumed to be distant).*

- Why do they make a big deal of the experimental evidence on the effect of dry air on the vocal folds? What would be the concern if they were “only” looking at correlations between environment and linguistic features?

*The classic problem with “only” looking at correlation is that correlation does not imply causation – you can have events that are correlated by chance. For many amusing illustrations see e.g. <https://www.tylervigen.com/spurious-correlations>. So it’s very important to have a plausible mechanistic explanation for \*why\* two things (aridity, tone) would be correlated – this gives us a plausible reason for believing the correlation might be due to a causal link rather than just spurious. Although it’s often possible to retrofit a causal story – on that spurious correlation site they have AI-generated explanations for all the correlations, which is a nice touch.*

- How do you think aridity could affect whether or not a language tends to have tone? Try to spell out the process by which this could happen, focussing on how people learn and use language.

*The aim here is to think about how the fact that tone is harder to produce in a dry climate would affect whether languages spoken in those climates tend to avoid tone. Hopefully they will have some ideas for how to build a causal story like this based on the papers and lectures from this week, but the story might be something like: in a dry climate, you have trouble accurately producing tone. This might make communication difficult or a little more error prone if your language relies on tone, meaning that speakers use additional redundant ways of marking the distinction (e.g. saying some extra stuff, avoiding words that might be ambiguous and confusing in context if the tone doesn’t come out right), making the tone contrasts less central. At the same time, learners of the language might be exposed to messy data, where the tone contrasts are not always sharp and crisp, meaning they are more prone to collapse contrasts, and/or more likely to look for and use alternative means of conveying the contrast. Over generations these effects will add up – tone contrasts become less and less important and the other ways of carrying distinctions become more and more relied upon.*

- Do you find their conclusions plausible? If so, why, and are there other places where similar methods could be applied? If not, why not?

*This is pretty open-ended, it will be interesting to see what reasons they come up with for finding them plausible or implausible. I don’t find the proposal that languages adapt to environmental influences which might affect producibility or perceivability of certain speech sounds particularly controversial (see e.g. sign language for an extreme and completely uncontroversial case!), although some do, so I am inclined to believe it, at least on a preliminary basis. Worth knowing that there are screeds of commentary out there on this article though, see e.g. [https://academic.oup.com/jole/search-results?f\\_TocHeadingTitleList=Target+Article+with+Overview%2c+Commentaries+and+Response](https://academic.oup.com/jole/search-results?f_TocHeadingTitleList=Target+Article+with+Overview%2c+Commentaries+and+Response)*

Points to consider in your reading and discussion of Majid et al.:

- What is the paper about? What hypothesis were they testing? What did they do? What did they find?

*They test the longstanding claim (dating back to Aristotle, so maybe it's based on Ancient Greek but consistent with English) that there is a universal hierarchy or ordering in how amenable different senses (vision, hearing, touch, taste, smell) are to linguistic description. They compare codability (basically cross-speaker agreement) in how shapes, colours, textures, tastes and smells are described in a sample of languages, and find essentially that every language ranks the senses differently (and if there was one candidate "basic" cross-linguistic ordering based on this sample, it wouldn't be the Aristotelean one). They also look at demographic and cultural correlates of the orderings, on the very reasonable hypothesis that some of these differences might be due to differences in the cultural salience or significance of these senses, but the picture here is not super clear, often because they have only e.g. one hunter-gatherer population, so it's hard to tell if languages spoken in hunter-gatherer communities are more likely to have a highly developed lexicon for smell, or if it just happens to work like that in their language from a hunter-gatherer community.*

- What factors influenced the sample of languages they selected? Why were they using languages from different language families and different modalities?

*They are looking for languages from different language families (see notes above for the importance of controlling for relatedness), but also from a range of demographic and cultural contexts (including e.g. hunter-gatherer communities). But crucially, they emphasise the importance of having researchers with intimate knowledge of the language and an established relationship with the communities they are collecting data in, so they can actually recruit participants, put the questions in the language- and culture-appropriate way, and correctly analyse and code the responses. Banging the words into google translate is not a suitable substitute.*

- What kinds of demographic and cultural factors did they explore, and why? How do you think cultural factors could have an effect on codability? Try to spell out the process by which this could happen, focussing on how people learn and use language.

*The ones they report are things that are probably a proxy for industrialization (e.g. population size), formal schooling, material culture (pottery) with geometric patterns, and subsistence type and smell codability. In terms of the mechanism, the one that would make most sense to me is that culturally-salient and important domains require precise and conventional vocabulary or constructions for talking about them, and this pressure on language use leads to growth in the language's resources for talking about that domain. But formal education could also scaffold the learning of terms that are otherwise tricky, or encourage conventionalisation of existing terms through standardising teaching of the vocabulary, promoting interaction and horizontal transmission with a population, that kind of thing. But again, the worry here is that these are to some extent just-so stories – I am confident in the mechanism that the stuff we need to talk about tends to become encoded or*

*encodable in the language we use, but how that precisely maps onto these domains is less clear.*

- Do you find their conclusions plausible? If so, why, and are there other places where similar methods could be applied? If not, why not?

*I find it highly persuasive, although I do have a slightly hard time working out what codability means – e.g. if a language had a very few highly ambiguous but widely agree terms in a given domain, that would score high on codability. I'd be interested if languages that score high on codability on a given sense have more terms and or less ambiguous terms for concepts in that domain, as well as more agreement across speakers. I am also very interested in the causes of these sorts of differences – it's very hard given this sample size (which is constrained for the reasons given above) to infer too much from that, and for the reasons discussed above on the Everett paper we should worry about spurious correlations, but I think understanding *\*why\** a language ends up with high precision or high codability in a given domain is very interesting.*