Mapping words reveals emotional diversity

Semantic networks reveal cultural variability in emotion

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After seeing an elephant mother standing over her dead infant's body, prodding the baby as if to wake it up (1, 2), it is hard not to believe that elephants grieve—just as we do. It seems some emotions are so elemental they are evident even in non-human animals. At the same time, some cultures' emotional worlds may appear utterly alien to others (3). For example, in Papua New Guinea, Baining hosts feel *awumbuk* when guests leave after having stayed overnight. *Awumbuk*, which has been called a three-day "social hangover" (4), leaves people listless, unable to wake in the morning or to complete mundane tasks. How do we reconcile these disparate observations? Does each culture have its own emotional universe or is there a bedrock of similarity that unites us all? Centuries of debate has not resolved the issue, but on page XYZ, Jackson et al. present the most ambitious cross-cultural study to date of emotion concepts, mapping semantic networks for over a third of the world's languages to reveal substantial variability in how emotion concepts are expressed cross-culturally.

It is difficult to study the subjective, phenomenal aspects of emotions, but language can provide insight into how people conceptualize their inner worlds (5). Communicative need and cultural preoccupations lead people to assign words to specific concepts, so when unrelated languages exhibit recurrent patterns, despite idiosyncratic differences between cultures, this is indicative of common conceptualizations. Using a database of more than 2,000 unique concepts, including 24 emotion concepts, Jackson et al. examine the semantics of emotion across 2,474 languages, from 20 language families, by establishing how emotion concepts are connected to one another. This builds on a venerable tradition in linguistics where the meaning of a word is determined not only on the basis of what it refers to, but also through the relations between words. Jackson et al. rely on data about "colexifications" where a single word is used to refer to multiple concepts. Persian, for example, does not have distinct words for 'grief' and 'regret'; instead *ænduh* refers to both. In Dargwa (spoken in the Republic of Dagestan), the term dard is used for 'grief' and 'anxiety'. Using network analyses on such colexifications in thousands of languages, Jackson et al. show that the semantic structure of emotion concepts varies dramatically across language families. They find that the semantics of emotion vary far more than the semantics of color, a domain with known cross-linguistic variation (6). The variation is not unbounded, however. Jackson et al. find that all languages differentiate emotions primarily by valence and arousal. Moreover, the closer languages are geographically, the more similar their networks.

These findings raise many questions. Are emotion semantics similar among neighbours because of shared communicative or cultural needs? Other work suggests that people from Western individualistic cultures report their ideal affective state as involving high arousal (e.g., 'happiness'=being upbeat), but people from Eastern collectivist cultures prefer low

arousal emotions (e.g., 'happiness'=being solemn and reserved) (7). Such broad differences suggest similar cultural scripts among neighbours. Jackson et al. leave open the question of what drives similarities between neighbouring languages. They may borrow nifty concepts from their neighbours (e.g., English has borrowed *schadenfreude* from German), or inherit from a common ancestor (e.g., English rue and German *Reue* for 'remorse' is inherited from proto-Germanic **hrewwō*). Since languages that descended from a common ancestral language (like English and German) are found close together, Jackson et al. do not adjudicate between borrowing versus inheritance, but they pave the way for such explorations through phylogenetic methods and computational simulations of historical process (8).

One of the exciting things about the Jackson et al. study is that it incorporates data from small languages, with speakers numbering in the thousands, as well as large languages with millions of speakers that are the usual target of cross-cultural study. But it is important to be aware of the limitations of their data. Perhaps the geographical similarities do not reflect shared emotion semantics so much as shared traditions of linguistic description. For example, most small languages are under-described and much of what we know about them comes from lists of words they use. Since field linguists usually work on languages in a particular part of the world, they may use a lingua franca to elicit word lists from multiple languages making such lists prone to areal traditions of nomenclature and analysis, and to the well-known limitations of translation (9), especially fraught with potential for semantic slippage and misunderstanding when translating ineffable emotion concepts. So similarity between neighbouring languages may be influenced by methodological and analytic choices of linguists. A challenge for the future is to establish word meanings not just through translation, but through systematic elicitation methods too (10).

In the approach taken by Jackson et al., concepts are treated as Platonic ideals: there are things in the world, e.g., 'grief' and 'regret', and words simply refer to these pre-existing concepts. Jackson et al. show differences in the connectivity between these concepts. But the basic assumption of universal concepts is problematic, since numerous studies find tremendous variation in the concepts themselves (11). For example, if a language has a single term that encompasses the continuous color spectrum encompassing hues ranging from green to blue, it seems wrong to say that language has two concepts 'green' and 'blue'. Instead, it is more parsimonious to posit a unitary concept 'grue'. Similarly, if a language has a term encompassing 'grief' and 'regret', as in Persian *ænduh*, one might wonder whether there are really two distinct concepts in Persian rather than a single underlying meaning. This reflects a general debate in which some linguists favor analyses of meaning in terms of polysemy (multiple concepts) and others monosemy (unitary concept). If basic concepts differ as indicated by prior work (12), then comparing networks across languages becomes even trickier.

None of this undermines the diversity uncovered by Jackson et al. If anything it suggests there may be more variation to unpack. Whereas previous studies have focused on close comparison of one or two cultures and a limited selection of emotions, it is hard to dispute the cross-cultural variation uncovered by the unprecedented scale of Jackson et al.'s study. Critically, they shed light on how people conceptualize emotions through language, but not necessarily how people experience emotions. This leads back to the question of whether different ways of talking about emotions change how people experience emotions. Some evidence suggests it does not (12, 13), while other studies show compelling evidence for such

an influence (14, 15). Jackson et al.'s important contribution enables researchers to pin-point where languages differ in their emotion semantics, to guide future empirical inquiry, and then perhaps we will finally be able to answer this most fundamental of questions.

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