The role of the body in descriptions of emotions.
A typology of the Australian continent

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Abstract

This article presents the first systematic typological study of emotional expressions involving body parts at the scale of a continent, in this case the Australian continent. The role of body parts in figurative descriptions of emotions, a well-established phenomenon across the world, is known to be widespread in Australian languages. This article presents a typology of body-based emotional expressions across a balanced sample of 67 languages, where 30 distinct body parts occur in emotional expressions. The belly is by far the most frequent, and a dozen others also have significant representations. The study shows how the properties of these body parts – e.g. whether they are internal organs, visible facial parts – partly determines which historical scenarios led to their linguistic associations with emotions, and in turn, their semantic and figurative properties.

1. Introduction

This article presents the first systematic typological study of emotional expressions involving body parts at the scale of a continent, in this case the Australian continent. The role of body parts in descriptions of emotions, and in figurative collocations in particular – such as 'she broke my heart' in English – is a well-established phenomenon, identified for many languages and proposed as a putative universal (Wierzbicka 1999:276; Ogarkova 2013:50). However, the relative prevalence of body-based emotional expressions in languages varies (Sharifian et al. 2008; Vittrant 2013); in Australian languages they are known to be widespread. Whilst some instances of the phenomenon are well-described (Turpin 2002; Gaby 2008; Ponsonnet 2014a, and the articles in this volume), this study presents the first systematic exploration of their typology in a significant sample of languages across the continent.

Our purpose is to explore some of the following questions: Which body parts are used in relation to emotions in Australian languages, and which emotions do they respectively correspond to? Are there regional patterns? Do these patterns correlate with genetic affiliations, or geographic proximity, which could be proxy for cultural acquaintance? How are body-based emotion tropes motivated? Can linguistic observations about these figurative representations of emotions tell us about shared cultural practices and/or representations concerning emotions in Aboriginal Australia? Which properties are specific to Australia?

Which point to linguistic universals, in turn reflecting common structures of human societies, or of human minds?

Our study offers a base for future comparisons with other linguistic families and regions, and our enquiry is therefore typologically extensive. For this reason, we are unable to discuss what Australian figurative representations reveal about local concepts of emotions (Lakoff & Johnson 1980; Lakoff 1987). For such fine-grained analyses we refer the readers to language-specific studies such as Kofod & Crane or Laughren & Ponsonnet in the present volume, as well as to Ponsonnet (2014a), Gaby (2008) and Turpin (2002), among others.

As we will show, our balanced 67-language sample revealed some regional patterns – for instance, the throat is productive in the southern half of the continent, while across the northern part we found a single throat-based emotional expression. We observed transcontinental patterns as well, e.g. belly-based emotional expressions, which occurred three times more frequently than any other body part, throughout regions and families. We also identified much more specific trends recurring with remarkable regularity across very distant languages, for instance the figurative association between buttocks and lack of generosity, or between big eyes and surprise. This of course raises the question of whether such tropes are specific to Australia, or whether they reflect universal trends. For lack of space, we will not be able to systematically explore this question here, and we refer the reader to Athanasiadou & Tabakowska (1998), Kövecses (2005), Sharifian et al. (2008), *inter alia*, for comparison.

How body-based emotion tropes emerge is a thorny question, and one that we may never be able to fully answer for Australian Aboriginal languages, given that many of them no longer have speakers and have not been documented. However, based on the typological distribution of the tropes, and insights from language-internal studies (Kövecses 1995; Enfield 2002; Gevaert 2001; 2005; Geeraerts & Gevaert 2008; and Australian studies cited above), we propose to distinguish two main types of motivations underlying the initial association of a given body part with emotions: firstly, pragmatic bridges, where there is a pragmatic association between a state of the body part and an emotional state; secondly, associations driven by semantic shift, which result from changes in the meaning of body-part words. These motivations or 'emergence scenarios' will be presented in more detail in 3.3, along with a few others that appear to be secondary in our data. Distinguishing between these motivations is a crucial step towards understanding whether, and how, body-based expressions for emotions can tell us anything about shared practices and representations concerning emotions. Pragmatic bridges, which are often reasonably identifiable, do shed light on the cultural settings in which they arise and the conceptual associations embraced by speakers (Lichtenberk 1991; Evans & Wilkins 2000). On the other hand, metaphors driven by semantic shift do not tell us much about the lives and thoughts of the speakers who created them. In other words, if we want language to tell us something useful about 'culture', we need to carefully sift through our large sample of expressions to distinguish those that may be informative from those that are not.

The article is organized as follows. Section 2 presents the data, including some discussion of methodological limitations. In Section 3, we outline a number of definitions and frameworks which will shape our presentation of the results. These definitions and frameworks were not imposed on the data *a priori*, but instead emerged from our typological study, via a bottom-up process of classification and pattern-identification. We present and examine the data itself in Sections 4 to 8.

2. The data

2.1 Language sample and data

The data for this study consists of body-based figurative expressions for emotions extracted from linguistic documentation of Australian languages, primarily from the 1970s to the present, in a sample of 67 languages studied through systematically surveying over 80 individual sources (see appendix). These were mainly dictionaries, with some learners guides, grammars with lexicons/vocabulary lists and a small number of online databases, focused presentations and other miscellaneous texts including unpublished archival collections from fieldwork.[1] This produced a list of just fewer than 800 body-based expressions[2] which we compiled in an Excel spreadsheet, with one tab per body part. Each expression was then systematically tagged for the emotion it targeted and for the trope it instantiated.[3] The categories used in these tags are discussed in 3.1 and 3.2.
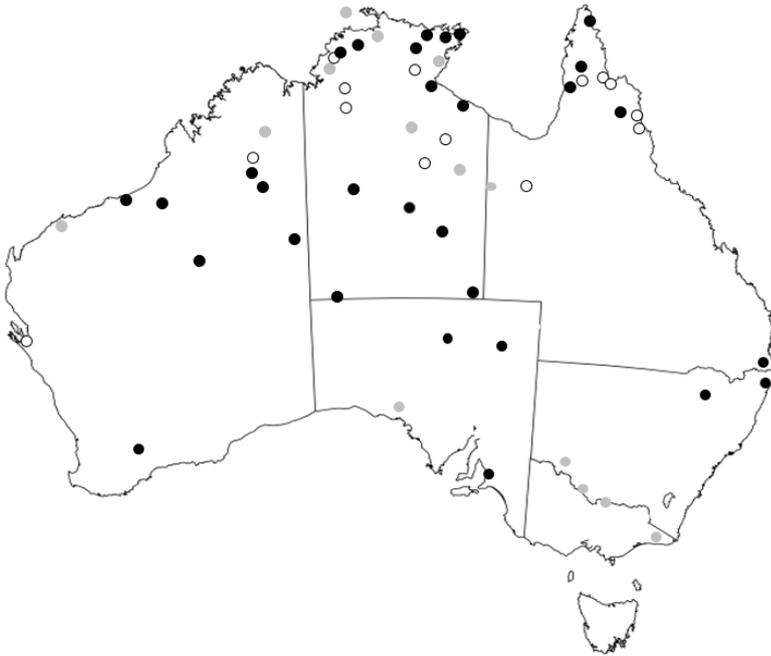
Our language sample is geographically and genetically balanced, with some gaps due to the lack of materials for certain regions/families (e.g. lack of detailed documentation for languages of Western Australia and central Queensland). There is also significant variation in the scope of the documentation across the sources. Fig. *1* visualises the distribution and relative extent of documentation of the languages surveyed.

Fig 1. Map showing extent of documentation. White: meagre, under 30 pages and fragmentary; grey: reasonable, over 30 pages; black: substantial, over 100 pages.

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[1] We conducted systematic searches for a list of key emotion and body-part terms (see appendix), along with search of the Finder list for additional terms.

[2] It is not possible to give an exact figure, due to the difficulty of determining what counts as a different expressions (minor variation, grammatical derivations such as causatives, etc.).

[3] A small proportion of the expressions were coded as 'trope unknown', where the information could not be found.

Draft only
Ponsonnet & Laginha, The role of the body in descriptions of emotions. To appear in *Pragmatics & Cognition*.

Overall, documentation proved to be most comprehensive in Central Australia (Central and Western deserts) and the Top End (particularly Arnhem Land), in line with the present relative 'vitality' of languages in these regions (Lee & Obata 2010; Marmion, Obata & Troy 2014). With regard to the Cape York Peninsula, while the extent of the documentation was less uniform and rich in relevant data, detailed description of languages such as Kuku-Yalanji and Wik Mungkan nevertheless allowed strong coverage. With the exception of Kaurna and Noongar, documentation was more rudimentary among languages of the south of the continent. Nevertheless, even in regions where documentation was meagre, sufficient examples of figurative expressions were found, enabling us to not only confirm the existence of body-based emotion tropes, but also give an idea of cross-continental patterns. The imbalance in the extent and detail of the sources between regions is to be kept in mind when reading the results. Otherwise, our figures may give the impression that body-based tropes for emotions were much more prevalent in Central Australia and Arnhem Land, when in fact this most likely reflects higher levels of documentation in these regions.

2.2   The limits of documentation

The impact that documentation techniques and their end-product materials have on this study invites us to reflect on the practice of linguistic documentation itself, in particular with respect to the somewhat neglected semantic domain of emotions. In this study, we encountered lexicons with meagre or even no information on the expression of emotion terms despite substantial detail in other domains, such as the natural/physical environment. For instance, no emotion terms were found in a 175-page Yintyingka lexicon (Verstraete & Rigsby 2015). Although this is an extreme example, it shows the extent to which some domains can occasionally fly under the linguistic radar, while some canonical domains attract greater attention. The motivations of the linguist(s), for instance, whether their primary aim is to publish academic work or to support the language community, may influence the data they choose to collect and publish; the consultant speakers may also drive aspects of the elicitation process (see for instance Gippert, Himmelmann

& Mosel 2006). Contextual considerations such as the environment in which the data is collected – e.g. university office or speaker's home in a community – and the relationship between the linguist and the speakers, can all modify which topics and genres are eventually recorded (Gunn & Turin 2010; Truscott 2014).[4] With regard to emotions, such contextual considerations are particularly notable given the 'professional', and therefore impersonal, nature of the language-documentation process limits the scope of topics and genres which can be discussed (Walsh 2016; Ponsonnet 2018a). Personal matters and life histories/narratives (which are likely to involve the emotion domain) may be overshadowed by more 'public' themes, or by formats such as grammatical elicitation (Ponsonnet 2014b).

Given this background, it is valuable to note how, and by who, the documentation was undertaken. Source material used in this study can be separated into two groups. On the one hand, there are grammars, vocabularies and other descriptions which bring together and interpret early source material from the 19th century (Amery, this volume). The work of these early documenters – predominantly white male clergymen or 'protectors' in rural stations – form the basis of a considerable chunk of language descriptions used in this study.[5] Another sizable bulk of our data is extracted from material collected from the second half of the 20th century onwards, with a growth in the number of linguistic descriptions of Australian languages occurring from the 1970s. This more recent documentation follows modern standards, and the identity of the documenters is more diverse, if only in gender (of the linguists and consultants). Documenters are of a non-Aboriginal background, and some are second language speakers of the language they document. On the other hand, due to language endangerment, these more recent works were typically carried out with elderly consultants who in some cases are only partial speakers. As explained above, the practice of language documentation itself brings its own inherent biases, in particular, fairly static expectations as to which topics and genres constitute appropriate data – and emotions certainly fall outside of conventional themes (Ponsonnet 2018a).

The data used in this study of emotion language naturally inherits the consequences of such patterns of research, so that in effect, the present work is as much a study of body-based emotional expressions as *documented by linguists* (and others) as it is a study of body-based emotional expressions as they actually occur in Australian languages. This does not invalidate our results – to a degree, sampling limitations and observers' biases apply to any linguistic study. But given the semantic domain under investigation, we found it important to flag potential shortcomings, if only as a call to pay closer attention to neglected semantic domains.

2.3   Interpreting the sources

It follows from our definition of emotions as internal states (Section 3.1.1 below) that they cannot be directly observed. Instead, emotions and the meaning of emotion words must be inferred on the basis of the experiencer's responses and behaviors (e.g. blushing or crying), and from the real-world context (e.g. experiencer being yelled at, having witnessed a car accident, etc.). This does not make emotions inscrutable,

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[4] Although impressionistically the gender of the linguist seemed to correlate with stronger focus on emotions, this correlation was not borne out quantitatively.

[5] In many parts of the continent, no other data was available.

but it does introduce a degree of complexity, with consequences for language documentation and for comparative or typological analyses in this domain.

Firstly, establishing the exact denotation of emotion words often requires a substantial amount of data. Faced with limited information, and/or with limited space to present it, in our sources linguists often characterized emotional lexemes with a couple of glosses and examples, which may only provide limited insight. Since there is no tradition of documentation in this semantic domain, documenters are not equipped with standards for their translations, which means that the same profiles of emotion can be described in many different ways. This is best illustrated with a counter-example. Linguists and anthropologists have long identified a particular conception of 'shame' as a prevalent social emotion across Australia (Hiatt 1978; Harkins 1990; Ponsonnet 2014a; 2018b). As a result, the lexemes denoting this emotion are reasonably consistently glossed as 'shame'. Yet, other characteristic emotions, for instance compassion (Myers 1979; 1986; Ponsonnet 2014a; 2018b; Blakeman 2015), are glossed far less consistently, including 'pity', 'feeling sorry', 'sympathetic', 'show kindness' etc. In order to reveal patterns in the data, it was necessary to recognize that these glosses cover attitudes governed, among many Australian groups, by culturally significant imperatives to feel compassionate towards others.[6]

This of course raises the question of interpretation. Although we thoroughly consulted the data at hand (including definitions, examples throughout the sources etc.), in a number of cases it was necessary to draw upon our own informed guesses. While less than ideal, given our resources this was indispensable in order to advance typological knowledge of this semantic domain.[7] Importantly, not only were such interpretations informed by Ponsonnet's prior linguistic and ethnographic knowledge (both first- and second-hand) of emotional attitudes and etiquettes among Australian Indigenous communities, they were also supported by emerging patterns in the data itself. The framework governing our labelling of emotional expressions and interpretation of semantic patterns is presented in Section 3. It is hoped that this proposed framework will encourage lexicological standardization in the domain of emotions.

3. Framework and overview of results

Body-based expressions of emotions are attested in 53 of the 67 languages of our sample, and the resulting collection of ~800 body-based expressions features nearly 30 body parts. This includes internal organs (e.g. belly, heart), visible (e.g. head, ear), systemic (e.g. bones, skin), and detachable parts (e.g. hair) and products (e.g. saliva) (Brown 1976; Andersen 1978). It is not possible to give an exact figure for the number of attested body parts, because the unity of each body part is obviously subject to a degree of interpretation (Enfield, Majid & Van Staden 2006). For instance, in one language we may find a word translated as 'cheek', while in another the gloss 'side of the face' occurs, in a third as 'temple', where it is

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[6] Here we will talk about 'compassion', but 'sympathy' would also be appropriate.

[7] With additional resources it may be possible to confer with the authors of the sources in each case, or even with consultants in the field. We apologize for possible mistakes and misinterpretations, and welcome corrections from experts as these will be useful for future work.

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not straightforward whether these should be treated as one and the same body parts, or as three different ones. Boundaries are clearly language-specific. As with the rest, our decisions as to where to place them were guided both by what we found in the data, and by our prior knowledge of body part lexica in Australian languages (Gaby 2006; Ponsonnet 2012; 2014a).

What we call the 'belly', glossed as 'stomach' in some sources, is overwhelmingly the most productive body part across the continent, both in terms of the total number of expressions, and in the number of languages where it occurs. In term of number of expressions, the next most frequent body parts are, in this order: heart, generic terms for the abdomen, eyes, nose, head, face, ears, throat, chest, forehead, and liver. These number at least 25 expressions in our sample, and their semantic and figurative profiles will be analysed in detail in individual subsections (within Sections 4 to 7). In addition, the other 18 or so body parts that occur in less than 25 expressions will be presented more briefly in Section 8. Before we dive into describing each set of expressions, the rest of Section 3 presents some key typological observations that frame the rest of the article.

3.1   Identifying and characterizing emotions

3.1.1   *Working definition of emotions*

The first step in our study consisted of identifying which expressions qualified as emotional. Given that there is no scientific consensus for a definition of emotions (Izard 2010; Wierzbicka 2010), for the purpose of this study we chose to define them as **cognitive internal states featuring a subjective dimension of 'appraisal'** (Ortony, Clore & Foss 1987; Scherer 2013; Ponsonnet 2014a:9–17).[8]

Under this operational definition, emotions are psychological states, and therefore not directly observable. Emotions are regularly accompanied by visible 'symptoms' enabling their identification, typically physiological symptoms (e.g. fast heart beat for fear) or behavioral symptoms (e.g. turning back when sulking). These symptoms will be extensively discussed in this study, but are considered distinct from the emotion themselves, so that words meaning 'cry' or 'argue', for instance, are not treated as emotion words. The cognitive nature of emotions differentiates them from sensations (such as being cold, hungry); and their subjective appraisal component differentiates them from intellectual states (or judgements, for instance knowing, agreeing etc.). Of course, we will also discuss sensations and purely intellectual expressions where necessary. Enduring states such as depression, as well as emotional dispositions (one's propensity to experience a certain emotional state, e.g. be irritable) are included within our definition of emotions. Like most definitions, ours allows for some borderline cases: for instance, is doubt a purely intellectual state, or is it an emotion? In the context of our study, such borderline cases are not a problem. We included them for the sake of exhaustivity, and are not concerned about classifying them as emotions or otherwise.

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[8] We make no claim that this definition corresponds to 'emic' concepts in the languages and cultures we consider. Instead, we use it simply as a tool to circumscribe our object of enquiry for the purpose of cross-linguistic comparison (see Ponsonnet (2014a:5–6) for a discussion). The same observation applies to individual categories for specific emotions (3.1.2 and 3.1.3).

3.1.2 Discrete labels

The next steps in our treatment of the data involved labelling each body-based figurative expression identified as emotional for the emotion(s) it denoted, so as to reduce a myriad of idiosyncratic glosses to a manageable number of comparable terms.

Our set of labels for individual emotions included primary emotions (Ekman 1992) such as fear, surprise, sadness or anger.[9] Also within the realm of primary expressions, we use the label 'unspecified' for expressions glossed as 'feel good' and 'feel bad', as well as 'happy' or 'upset'.[10] Other labels identify those emotions often regarded as 'secondary', for instance love, desire, jealousy, shame, grief, compassion, sulking, composure and so on. We use some culturally specific concepts/labels as well, for instance a notion of motivation and enthusiasm lexicalized in many Australian languages, which we label 'life energy' (Ponsonnet 2010; 2016). Our decisions on which emotions to label and how, and our interpretation of the associations between some of them, was informed both by the structure of the data and our understanding of certain cultural traits. For instance, in Arnhem Land communities, jealousy is characteristically associated with socially damaging, violent behaviors, and this contributes to explain semantic associations between jealousy and anger. Such cultural inferences will be made explicit as we proceed.

3.1.3 Categories of emotions

In offering certain semantic associations in our data, it was useful to group the discrete emotions labelled above into larger, culturally adequate categories, and in this respect we followed Ponsonnet's (2014a:75–77) framework inspired by categories in the Dalabon language (Australian, Arnhem Land). Firstly, emotions may be categorised along the line of valence: whether an emotion is **positive, negative** or **neutral**. Another characterization is orientation, which is less standard but very useful in the Australian context. We call '**other-oriented**' emotions that are essentially triggered by and 'addressed' to an animate stimulus, for instance love, sulk, be angry against someone. '**Self-oriented**' emotions, by contrast, are neutral in this respect, as for instance be sad or be happy. Some emotions, like compassion and grief, are negative in valence to the extent that they imply feeling bad for someone else, but nevertheless morally encouraged, particularly among Australian groups, because they are other-oriented and index sympathy; we will call these '**empathetic**'. The articulation of the dimensions of valence, orientation and empathy is represented in Table *1*. In addition, we label '**social**' emotions, or 'attitudinal' emotions, those anchored in social interactions and expectations. These are, for instance, shame, being self-assertive, distant or cold, reluctant to share, etc. The category of 'social' emotions is orthogonal to the ones represented in Table *1*, i.e. an emotion can be social and negative (e.g. shame), social and empathetic (e.g. generosity), etc.

orientation valence	self-oriented	other-oriented	
		empathetic	not empathetic

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[9] We only found a couple of (or, 'we found few/ very few?') expressions denoting disgust. This is in line with previous observations that this primary emotion is rarely lexicalized in Australian languages (Ponsonnet 2018b:115).

[10] It was necessary to use 'unspecified' rather than 'generic' to avoid confusions with 'generic metonymies' (3.2).

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Ponsonnet & Laginha, The role of the body in descriptions of emotions. To appear in *Pragmatics & Cognition*.

positive	joy happiness courage	love affection	admiration?
negative	sadness fear	compassion grief concern	hatred anger
neutral	Surprise		

Table 1. Classification of emotions along the dimensions of valence, orientation, and empathy. The lists in each box are not exhaustive.

3.2   A typology of tropes

The next step in coding the data consisted of tagging each body-based expression for the trope(s) it instantiated. 'Trope' is used as a cover term for figurative expressions, including 'metaphors' and 'metonymies', which we define following the bases set by cognitive linguists (among many others, see Lakoff & Johnson 1980; Kövecses 2002 on metaphors; and Barcelona 2000; Radden 2000 on metonymy).[11] We tagged our data based on the following types of metonymies and metaphors. This typology is inspired both by previous research in this domain (Ponsonnet 2014a; 2014c), and by the data itself, as the vast majority of body-based expressions in our data fall under one of these types.

A number of these tropes are better regarded as metonymies, because they associate body parts with emotions by virtue of contiguity, via PART FOR WHOLE, or PHYSICAL PART FOR EMOTIONAL PART, and PHYSICAL STATE FOR EMOTIONAL STATE metonymies.

- **Generic metonymies**: where the body part is described as 'good' or 'bad'. (Note that generic tropes – good/bad body part – are not the same as unspecified emotional meaning – feel good/bad.[12])

- **Experiencer-of-emotion metonymies**: where the expression contains a term that is an emotional term itself, for instance, be 'sad from the belly', 'stubborn from the head'.

- **Experiencer-of-responses-to-emotions metonymies**: where a response to an emotion is attributed to the body part, for instance 'shake from the chest', 'cry from the liver'.

- **Body-part-for-emotion metonymies**: where the body part itself represents the emotion, as in 'becoming throat' for 'desire someone'. This also applies if the same word denotes both a body part and an emotion.

- **Somatic metonymies**: where a physiological state of the body part represents an emotion, for instance 'numb belly' for 'surprised'. Some somatic metonymies map plausible physiological states with an

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[11] Metaphors and metonymies are of course not strictly distinct, but this contrast remains useful in the context of this typological study (Dirven & Pörings 2003).

[12] Often generic tropes target unspecified emotion, e.g. an expression meaning 'good belly' for 'feel good'. But this is not systematic, as an expression meaning 'good belly' could also be used as 'to love' for instance.

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emotion that naturally associates with this state – for instance 'have a beating heart' for 'be afraid'. We regard the latter as bridging metonymies (3.3.2), as they may be a source of the association between the body part and emotion. We will refer to them as '**somatic bridges**'. Not all somatic metonymies are somatic bridges, because some of the somatic states involved do not naturally correlate with the emotional state they describe. For instance, an expression meaning 'dry throat' and 'be in love' is somatic, but it is not a semantic bridge, since people who are in love do not normally have a dry throat.

- **Behavioral metonymies**: where an expression describes a behavior that involves the body part – for instance 'bend one's back' for 'sulk'. Some behavioral metonymies map behaviors with an emotion that naturally associates with it – as with 'bend one's back' of 'sulk' – and will be referred to as '**behavioral bridges**' (3.3.2). Not all behavioral metonymies are behavioral bridges.

In addition to metonymies, many expressions in our data are metaphorical.

- **Physical-properties metaphors**: where a property that is not a plausible state of the body part in question represents an emotion. The most widespread properties are:
  - **destruction**, where the body part is described as broken, cut, split, divided etc.;
  - **alteration**, where the body part is described as being two, several, different etc.;
  - **resistance**, where the body part is described as hard, soft etc.;
  - **mobility**, where the body part is described as stuck, or on the contrary 'going', or turning;
  - **posture** or **position**, where the body part is described as high, low, standing, vertical etc.;
  - **color**, where the body part is assigned a color that does not match a plausible, observablesomatic state.
- **Perception metaphors**: where emotions are represented as perceptions of the body part, e.g. 'liver hear/feel' for 'dread'.
- **Patientive metaphors**: where the emotion corresponds with the body part being hit or bitten for instance (e.g. 'chest hitting itself' for 'feeling sorry').
- **Agentive metaphors**: where the body part is described as acting, e.g. eating; these sometimes evoke violence, e.g. hitting, biting, throwing, etc.

The proportions in which each type is represented differ, and different body parts also display different distribution of types of tropes. This will be discussed in Sections 4 to 7, where proportions will be given for each body part. Except where otherwise specified, the proportions will be given relative to the number of expressions and languages attested for a single body part – as opposed to the entire corpus. Figures and percentages must be interpreted as indicative, as the data includes undecidable cases. Overall, most emotional body-based expressions found in Australian languages across body parts fall either under one of the metonymic types, or within the physical-properties metaphors. Perception, patientive and agentive metaphors are more marginal. Metaphors presenting the BODY(-PART) AS A CONTAINER OF EMOTIONS are not attested with the expressions in our data, because this metaphor is apparently more often realized via location adjuncts, i.e. 'feel emotions in the belly', rather than via collocations involving body parts(Kofod & Crane this volume for Gija, Gaby (2008:34) for Kuuk Thaayorre).

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3.3   Typified emergence scenarios

Since Lakoff & Johnston (1980), figurative language has been recognized as an aspects of language that may offer a window into cognition. The idea is that *linguistic* tropes reflect speakers' *conceptual* representations, based on the assumption that if speakers say, for instance, 'my belly is entangled' for 'I am feeling anxious', this is because they see similarities between anxiety and this particular state of the belly. However, the existence of such a figurative linguistic representation in a given language is not, as such, a guarantee that the corresponding conceptual representations are *active* (Enfield 2002; Goddard 2004; Gevaert 2001; 2005; Geeraerts & Gevaert 2008; Ponsonnet 2014d). With time, a conceptual association that may have given rise to a linguistic trope may have receded in speakers' minds and become inactive, while the linguistic form remains. Moreover, with respect to body-based emotional expressions, it is possible to imagine a number of historical scenarios leading to the emergence of these linguistic tropes, and in some of these scenarios there is no point at which speakers would have had to endorse the figurative associations instantiated in their language.

In this article we will not seek to demonstrate whether the tropes we identify correspond to conceptual representations, but discuss possible historical scenarios underpinning the association of a given body part with emotions. As we will see in Sections 4 to 5, most body parts probably became associated with emotions via more than one scenario. Here we present each scenario in turn.

3.3.1   Cultural association

It is possible to imagine that the linguistic association between a given body part and emotions is, for some groups of people, culturally driven. That is, if a group of people construe emotions as located in the belly, they may start talking about being 'good-bellied' for 'feeling emotionally good', and from there develop further tropes along these lines. While such a scenario is plausible, it begs the question of what motivates this cultural association in the first place, and this in turn can be addressed by understanding the sources of linguistic associations.

3.3.2   Pragmatic bridges

A key scenario underlying the figurative association between a given body part and emotions is via pragmatic bridges (Evans & Wilkins 2000). This is when a linguistic expression describing the body gains polysemy with emotions because the event being denoted – say, goose bumps – tends to associate, in the 'real world', with another event – in this case, being afraid. Due to this pragmatic association of the two events, the expression describing one can easily be reinterpreted as referring to the other.

With respect to body-based expressions, it is useful to distinguish three types of pragmatic bridges. The 'goose bumps' case illustrates a somatic bridge, because having goose bumps is a *somatic* (i.e. physiological) response to fear. Secondly, *behavioral* bridges occur when an expression associates an emotion with a corresponding behavior, for instance when an expression meaning 'follow with the eyes' (i.e. watch) is reinterpreted to mean sexual desire. Expressions motivated by somatic or behavioral bridges are well-attested in our sample. In addition, our data illustrates a third type, namely *intellectual* bridges. This

occurs when a body part is primarily associated with an intellectual function, which in turn associates pragmatically with an emotion. For instance, in many Australian languages the head represents the seat of the intellect; since intelligence is associated with positive attitudes such as composure, we find many expressions involving the head denoting such attitudinal emotions.[13]

3.3.3   Semantic shift

Another possible drive for the linguistic association of a body part and emotions is via a shift in the meaning of another body part term that is already associated with emotions. Semantic shift between body parts is well attested (Wilkins 1996). Therefore, in a language that already has a number of emotional expressions involving, say, the term for 'belly', this term may come to shift metonymically from meaning 'belly' to meaning 'liver', resulting in an association between the liver and emotions. In this scenario, the figurative association is not rooted either in a cultural association or in a pragmatic bridge involving the liver; the speakers of such a language may not have construed emotions as associated with the liver prior to this semantic shift. Indeed, our data suggests that this scenario could explain the association of the liver with emotions in some Australian languages (5.1).

3.3.4   Contact

Apart from pragmatic bridges and semantic shift, a third way in which languages can come to associate a given body part with emotions is by borrowing expressions from neighboring languages where the association in question is present. O'Keeffe, Coleman & Ruth (this volume) suggest that this is the best explanation for throat-based expressions in Kunbarlang (Gunwinyguan, Arnhem Land) for instance. The data and methodology in this study cannot shed much light on such contact mechanisms, but the question is being addressed in another study (Ponsonnet, Bednall & O'Keeffe 2019).

3.3.5   Sources of additional expressions

Once a body part is linguistically associated with emotions, further emotional expressions can be created on the basis of figurative elaboration. For instance, in a language where an expression meaning 'sick belly' also means 'be in a bad mood' – because one often accompanies the other in reality, see 3.3.2 – speakers may innovate further figurative expressions where 'blocked belly', 'hard belly', 'flowing belly', for example, may also denote emotions. In addition, some body-based expressions may emerge based on analogical compounding. This is when the body part occurring in a series of expressions is replaced by another body part. Imagine a language with a large set of figuratively coherent belly-based expressions, featuring metaphors of destruction (3.2), and including, for instance, 'cut belly' for 'being angry'. This is a fairly abstract metaphor, but in the belly set it may fit in well with other destruction metaphors. Imagine that the same language also has a small set of head-based expressions, mostly denoting emotions linked to intellectual states. This set exhibits little abstract metaphorical elaboration, but includes 'head cut' for 'angry'. If this is the only destruction metaphor within the head set, a likely scenario is that speakers have constructed this expression on the basis of an analogy with the belly set, where this destruction metaphor is

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[13] Intellectual bridges are not listed in 3.2 because the corresponding tropes (e.g. CONFUSION FOR ANXIETY) do not involve body parts directly. Instead, they link emotion with intellection, and this creates an association with body parts that are *already* associated with intellection by means of other tropes.

anchored. This process is difficult to identify based on typological data, but it is documented for Dalabon (Ponsonnet (2014a:Chap10)).

3.4   Body part profiles

The above scenarios are not mutually exclusive. With most body parts, some expressions in some languages would have historically resulted from one scenario and others from another scenario. Yet, as one would imagine, the co-occurrence of certain scenarios with certain body parts is not random. Instead, close analysis of the tropes reveals a number of profiles within which the 12 most attested body parts can be grouped, depending on the nature of their figurative link with emotions. This link often partly correlates with the properties of a body part – whether it is an invisible organ, a highly visible facial body part, etc. In addition, to some degree body parts that share comparable emergence scenarios also share a number of characteristics including their semantics, i.e. which emotions the body part maps onto; and their figurative profile, i.e. which types of tropes are instantiated, and in which proportion. These meaningful correlations between body part types, emergence scenarios, semantics and figurative profile, allow us to draw out a number of body-part profiles, which provide the structure and order of presentation in this article.

Section 4 presents body parts with clear somatic bridges. This comprises predominantly two abdominal organs, the belly and heart; as well as the throat. All of these body parts feature clear somatic bridges. Semantically, the belly specializes for other-oriented emotions, including those that are negative (e.g. anger) and empathetic (e.g. compassion); the heart specializes for love as well as fear-related emotions; the throat is clearly specialized for desire, love and anger. In terms of the distribution of tropes, belly- and heart-based expressions exhibit remarkably comparable patterns, while the throat differs significantly from all other body parts. Section 5 presents internal body parts that do not feature somatic bridges, and plausibly became associated with emotions via semantic shift from other abdominal organs (belly and heart). This category includes the liver, generic terms for the abdomen, and the chest. Semantically, the liver set resembles the belly set, while the abdomen and chest appear to be blends of the belly and heart sets. The distribution of tropes with these body parts resembles that of the belly and heart, albeit less strictly.

Sections 7 and 8 discuss productive visible body parts – which all happen to be parts of the head (or the head itself). Some – mostly the eyes and nose – feature strong behavioral bridges. These are presented in Section 6. Reflecting the strong presence of pragmatic bridges, they have comparatively fewer metaphors than other body parts. Semantically, the eyes mostly link to love and desire, as well as to surprise and fear. The nose links to negative other-oriented emotions such as being sulky/angry, as well as to social attitudes around compliance. In Section 7, we discuss expressions based on visible body parts with intellectual bridges, namely the ear, head and forehead. These body parts are involved in expressions that denote intellectual functions, some of which also have an emotional meaning. Semantically, this set relates primarily to compliance and socially adequate behaviors. Its figurative profiles are less coherent than in the other sets of body parts. For the sake of exhaustivity, in Section 8 we briefly discuss less-productive body-part sets.

As in many typological studies, the organization of information serves the purpose of describing and discussing *types*, and thus does not necessarily exhibit the typical structure of an argument. In this case, the typology itself guides the presentation of information, in the sense that sections are organized by body part in order to systematically present each semantic and figurative profile. The guiding imperative to cogently set out and discuss the classification of types means that a degree of repetition is inevitable. Sections can therefore be consulted individually, and/or read in a different order. This organization was chosen because it is the least conditioned by analysis, and therefore closer to the data. It will therefore be the most useful for readers seeking inspiration to reconstruct evanescent heritage languages, as well as for cross-linguistic comparison with other language families/regions in the future. Other foci, such as particular tropes, emotions etc. will offer their own insights, and this represents opportunities for future research.

4. Internal body parts with prevalent somatic bridges

The following subsections account for body parts connected to emotions via prevalent somatic bridges: the belly, heart, and throat. Semantically, they are relatively similar, all relating to core, often other-oriented emotions rather than attitudinal ones. With respect to tropes, these internal body parts present a clear split in terms of their figurative profiles. As represented in Table 2, the belly and the heart display very comparable trope distributions, but the throat stands far apart from the other two (and in fact from all other body parts). In this section we present the belly set first (4.1), then heart-based expressions (4.2), and throat-based expressions (4.3).

		belly	heart	throat
TOTALS	Expr	275	85	41
	Lgg	26	12	12
Generic metonymies	Expr	16%	18%	7%
	Lgg	60%-	50%	25%+
Experiencer metonymies	Expr	30%-	30%	20%
	Lgg	55%	35%+	25%+
Body part for emotion	Expr	7%	8%	35%
	Lgg	40%	35%	50%
Somatic metonymies	Expr	13%	14%	25%
	Lgg	50%	50%	45%
somatic bridge(s)		✓	✓	✓
Behavioral metonymies	Expr	Ø	Ø	Ø
	Lgg	Ø	Ø	Ø
behavioral bridge(s)				

Metaphors, among which:[14]	Expr	35%	35%	2%+
	Lgg	55%	65%	9%
destruction		✓	✓	
alteration		✓	✓	
resistance		✓	✓	
accessibility		✓	✓	
movement		✓	✓	
position/posture			✓	
color		✓	✓	
perception		✓	✓	✓
patientive		✓		
agentive		✓		

Table 2. Trope distribution in the belly, heart and heart sets. Figures in this table and the following do not necessarily total 100%, because for some expressions we did not have enough data to identify which trope was instantiated.

4.1 The belly

As mentioned above, the belly is by far the most productive body part in the emotional domain: in our sample we found about 275 belly-based emotional expressions, in 26 languages scattered across the continent.[15] The next most productive body part, the heart, occurs in three times fewer expressions, in only 12 languages. Belly-based emotional expressions are attested in most regions for which we have reasonable documentation, with the exception of south Western Australia.[16] The data also suggests that belly-based expressions are less widespread in South Australia and Cape York.

Given the large number of belly-based expressions, it is unsurprising that they cover a very broad range of emotions: most of the emotions lexicalized by other body parts also occur in at least one expression involving the belly. However, around a dozen emotions produce more than 10 instantiations, and belly-based expressions clearly specialize for other-oriented emotions, i.e. what one feels for other people (3.1.3). This prominently includes anger as well as empathetic emotions such as affection, compassion, grief etc.

The figurative profile of belly-based expressions is described below, including a discussion of generic and somatic metonymies, somatic bridges, and metaphors. Belly-based expressions are presented in greater

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[14] Due to smaller numbers, overlaps and occasionally blurred boundaries between types, it is not possible to provide meaningful figures for each type of metaphor. When these are significant they are mentioned in the text.

[15] The number of expressions may have been magnified by the recension of 3 different Yolngu dialects, where *nguy/ngoy* compounds have long lists in each, amounting to 75 expressions just for Yolngu. Although we only listed expressions reported as formally different, there may be some redundancy across the dialects.

[16] For which our only data point is Noongar, where the heart is prevalent.

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detail than other sets because they serve as a base-line for the discussion of other body parts, in Sections 4 and 5 in particular.

4.1.1 Semantics

One of the most widespread meanings for belly-based expressions are unspecified emotions, whether negative (feel bad: sad, upset, etc.), positive (feel good: happy, cheerful, etc.), or the neutral term 'feel'. This represents 80 expressions or about a third of all belly-based expressions, a relatively standard proportion for unspecified emotions with many body parts in our sample. The number of languages featuring these expressions is more remarkable: 20 out of 26 (or more than 75%), which is much higher than other body parts. In fact, belly-based expressions with unspecified emotional meanings are unattested only in languages for which just a couple of belly-based expressions are reported, which could reflect the shortcomings of documentation rather than an actual absence of such expressions.

Beyond these unspecified meanings, anger is the most commonly denoted specific emotion in the belly set, with more than 50 expressions (about 20% of the total) in 14 languages (more than half of languages featuring the belly). Looking at other expressions conveying other-oriented negative feelings, including sulking, resentment and hatred, we find that this cluster covers nearly 100 expressions, or more than 35% of all expressions. This number is thus higher than for unspecified emotions, which numbered 80 expressions, however negative other-oriented emotions are reported for fewer languages: 18 or about 70%. Languages in which a large number of belly-based expressions were documented tend to have several – or even many – belly-based expressions denoting anger. Unspecified emotions, on the other hand, are often instantiated by only a couple of expressions in each language.

The next cluster most represented by belly-based expressions are emotions that reflect attachment to others – in other words, the opposite of the previous anger-related cluster. These include affection and love,[17] but also prominently empathetic emotions such as compassion and grief (feeling bad for someone one feels attached to). None of the empathetic emotions score very high individually,[18] yet considered together they cumulate 35 expressions in 15 languages, which represents between 10 and 15% of expressions, in over half the languages. In addition, a number of expressions denote a *lack* of empathetic emotions. These include, for instance, being emotionally and socially cold, or being ungenerous, which is often equated with lack of compassion amongst Australian groups (Myers 1986:113–117; Ponsonnet 2014a:197–199; Blakeman 2015). With these, the total number of belly-based expressions denoting empathy, or a lack thereof, totals above 40 (about 15%).

Other significant emotion clusters in the belly set revolve around fear, including anxiety and surprise, with 37 expressions in 7 languages; as well as desire and jealousy, with 14 expressions in 10 languages.

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[17] Some of which, such as expressions for mild affection, are also included amongst unspeficied positive emotions, because the meanings 'like, be nice to' are sometimes colexified with 'feel good'.

[18] E.g. compassion is instantiated in 7 expressions in 5 languages.

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4.1.2   *Figurative profile*

4.1.2.1   *Non-somatic metonymies*

Considered altogether, non-somatic metonymies – i.e. generic, experiencer and body-part for emotion metonymies (see 3.2) – account for more than half of the body-based expressions in our data. One of the most prevalent tropes represents the belly as the experiencer of emotions (3.2), as in Pitjantjatjara *tjuni tjulypily(pa)*, 'stomach upset, sad', 'feeling terrible, sad, depressed'. Such metonymies are present in 15 languages (over half), with a total of 68 expressions – about one in four. In addition, there are 11 expressions, in 5 different languages, in which the belly is described as experiencing physical responses to emotions, most typically crying: *dyarda wadyarn*, 'stomach cry', 'sad, dejected', in Wirangu. This brings the total number of expressions representing the belly as the experiencer of emotions to 79, or nearly 30% of all belly-based expressions, across 15 languages. We also found a significant number of generic good/bad generic metonymies (3.2), as in Walmajarri *ngaru yakurrjarrinyu*, lit. 'stomach becomes bad', 'become worried, concerned, sad'. These represent 45 expressions, or 16% of belly-based expressions, in 15 languages. Both the experiencer and the generic metonymies clearly represent the belly as the part of the person that feels the emotions, i.e. the seat of emotions. Body-part-for-emotion tropes (3.2), like *miyalu-jarri-mi*, 'belly+INCHOATIVE', 'worry, feel sorry for' in Warlpiri, occur in 18 expressions in 10 languages (more than a third). There is variation as to what emotion the belly represents in these cases: anger has 4 instantiations, others being enthusiasm/life energy, desire, love, compassion, and fear.

4.1.2.2   *Somatic metonymies*

Belly-based somatic metonymies account for 37 expressions –13% – in just half the languages. Among them, we find a plausible bridging metonymy linking emotions with digestive (dis)comfort, which can be concomitant with bad or low moods in real life. This is illustrated in Kaytetye, where *aleme angkenke*, 'stomach speak', means 'have a rumbling stomach from something you ate', as well as 'feel worried, anxious, or jealous'. Such direct somatic metonymies, including references to hunger, satiety, general digestive disorder, or constipation are attested in 13 expressions across 6 languages.

Another widespread somatic metonymy represents the belly as hot or on fire, which also corresponds to a plausible physical sensations of 'burning' in the belly. Such metonymies typically denote anger, as in Arrernte *atnerte ampeme*, 'stomach burn (usually from hunger)', 'be really angry'. Tropes associating anger with heat are cross-linguistically very common (Kövecses 1995; 2005), and anger associates with heat in many body parts. Our sample contains 20 expressions where higher temperature in the belly represents anger (found in 10 languages, predominantly in Central Australia). Other, more marginal somatic metonymies include descriptions of the belly as tired, rested or sensitive.

4.1.2.3   *Property metaphors*

Metaphors in which emotional states are associated with properties of the belly that are not plausible physiological/somatic states of the belly (3.2) represent about 80 expressions – around 30% of all 275 expressions, in 15 languages, i.e. more than half of them. In order of prevalence, the most frequent properties concern:

- resistance: whether the belly is soft, hard, tight, etc., which may derive conceptually from digestive somatic tropes;

- accessibility: whether the belly is open, can be touched, etc.;

- destruction: the belly being cut, cracked, etc.;

- alteration: where the belly is divided, two etc.;

- mobility: whether the belly moves or turns, which may also relate to digestive metaphors;

- marginally, color

- Note that posture metaphors are absent.

Some of these metaphors are ambivalent, mapping onto both positive and negative emotions in our data. Representations of the belly as hard are more often associated with negative attitudes such as being selfish, harsh, unkind; however, resistance also maps onto composure and strength of character. In Dalabon for instance, the same expression endorses both valences: *kangu-murduk*, 'belly hard, strong' means both 'selfish' (negative) and 'emotionally strong' (positive). Accessibility metaphors map openness to positive emotions (e.g. Warlpiri *miyalu raa-pi-nyi*, 'stomach open', 'make happy, gladden'), but accessibility can map onto negative emotions when the belly is being metaphorically affected (e.g. Djinang *budjirr gatjigi* lit. 'hold/catch/touch the belly', 'feel emotion, usually anger'). Movement of the belly more often maps onto positive emotions, as in Ngankikurungkurr *minta ge yenim*, lit. 'stomach doesn't go', 'be unhappy, irritated' where immobility is negative. Yet we also find associations of movement with negative emotions, such as *ŋoy-wandirri* 'belly run', 'restless, disturbed' in Yolngu Matha.

Unsurprisingly, destruction metaphors are typically negative[19]: representations of the belly as split or cut mostly associate with deeply negative emotions, as in Dalabon *kangu-barrh(mu)* 'belly cracked', 'be surprised, shocked (typically upon hearing of a death or accident)'. Alteration metaphors are always negative: in Nyangumarta we find *ngarlu warinykurnu* 'belly different, other', 'callous'. Alteration is the only metaphorical property of the belly with a clearly areal pattern in our data, occurring mostly in northern Western and Central Australia.

4.1.2.4   Other metaphors

In a small set of expressions, the belly is represented as perceiving emotions, yielding the metaphor EMOTIONS ARE PERCEPTIONS OF THE BELLY, as in *alemele arenke*, 'stomach see', 'have a premonition', in Kaytetye. In another small set, the belly plays the role of a semantic patient, presented as being attacked (hit, killed, chased, sometimes eaten), for instance in Yolngu Matha we find *ngoy-ḏur'yun* 'stomach push, bump, knock', 'be stirred up to anger'. Such metaphors occur in only 8 expressions, i.e. less than 3% of belly-based expressions, in 4 languages (mostly those with the most extensive documentation). Conceptually, these tropes seem to derive relatively naturally from destruction and accessibility metaphors (e.g. 'touch the belly', 4.1.2.3). We also found a handful of metaphors where emotional states are associated with violence enacted *by* the belly, e.g. belly strikes, bites, etc., as in the Warlpiri *miyalu yarlki-rni*, 'stomach bite', 'make very angry'. These metaphors occur in a small number of expressions (10 or 3%, in 4 languages), with a higher concentration in Central Australia (Laughren & Ponsonnet, this volume). Finally, there are also 6 expressions (in 4 different languages) that represent the belly as 'containing' the person who triggers affection or love, as in *dege-wa* 'stomach pick up', 'like, love' in Ngankikurungkurr. As pointed out in the

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[19] Although there are exceptions, see Ponsonnet (2014a:259) as well as O'Keeffe, Coleman & Singer this volume.

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introduction, belly-based expressions do not represent the belly as a container of the emotion itself, probably because this is usually achieved via clausal constructions where the belly stands as a locative complement (Kofod & Crane this volume, Gaby 2008:34).

4.2   The heart

Terms for 'heart' feature in 85 emotional expressions in 12 languages. The figures suggest a high prevalence in Cape York languages (44 expressions, 2 languages), which is largely due to the 40 expressions collected for Wik Mungkan alone, where the term *ngangk* means 'belly area' as well as 'heart'.[20] Apart from Cape York, the heart is well represented in 3 Arnhem Land languages, totalling 18 expressions. In Central Australia, on the other hand, the heart is only marginally attested, which, given the dense documentation, is good evidence that it does not play a strong role in association with emotions in this region.

Semantically, heart-based expressions clearly target two clusters of emotions, surrounding love and fear respectively. The figurative profile of heart-based expressions compares with belly-based expressions as for the relative proportion of main types of tropes, with nuances . In particular, our data suggests that the two organs relate to emotions via distinct bridging contexts. Although there is evidence of semantic shift from 'heart' to 'belly' in Australian languages (Ponsonnet 2019), in our data Wik Mungkan is the only language in which the term for 'heart' also denotes another body part. Therefore, the association between the heart and emotions is probably anchored primarily in pragmatic bridges.

4.2.1   Semantics

As with the belly, a significant number of heart-based expressions denote unspecified emotions, i.e. feel good/bad: these represent a quarter of heart -based expressions (22), present in nearly half the languages. As for specific emotions, 21 expressions cluster around sexually-oriented/romantic love, also including desire and want. This amounts to a quarter of all expressions, in 4 languages (a third). Love alone occurs in 14 expressions (more than 15%) in 4 languages, and another 7 expressions relate to desire and want. Another frequent emotion in the heart set is fear (or anxiety), amounting to 14 expressions in 7 languages. Whilst a lower count than the love cluster, fear is represented in a larger number of languages.

Love and fear can be conceptually linked, via desire and anxiety. Love and desire can foster a sense of anxiety for the welfare of the beloved person, or if the object of desire is not accessible. Indeed, linguistic associations between love and fear are attested in our set of heart-based expressions. The Noongar expression *goor-duk* is glossed as polysemous: 'desirous of, wanting, anxious'; and expressions evoking heartbeat, which typically map onto fear, occasionally map onto desire as well – as in Yolngu, *ḏuk-ṯuk* 'desirous; need, want, liking, love', *kṯukun* 'beat, palpitate (of heart)'.

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[20] These expressions are also included in the abdomen set (5.2).

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Apart from love and fear, there exist 7 expressions denoting anger, though these occur solely in Wik Mungkan (where a very large number of heart-based expressions are reported). Hatred, compassion, sorrow, grief, lack of generosity, composure and assertiveness are also marginally instantiated in the heart set.

4.2.2 Figurative profile

As presented in Table 2 above, the distribution of tropes in the heart set presents strong resemblances with the belly set. Experiencer metonymies involving responses to emotions[21] are slightly higher, and the responses more diverse, including crying and shaking (as is common for many body parts), as well as lying down (sadness) or hiding (fear), as in Wik Mungkan *ngangkang ngoonchan* 'heart hide', 'be apprehensive (e.g. that someone may die), have sympathy'. Somatic metonymies related to heartbeat are clearly dominant, accounting for 9 expressions in 6 languages. They mostly map onto fear and anxiety, as in Dalabon *ngerh-(r)dow(r)dow(mu)* 'heart beat', 'feel bad, worry'; as well as to desire as in Yolngu (4.1.1). These metonymies provide a clear bridging context.

As for metaphors, in the heart set, resistance is the most frequent property, mostly associating lack of resistance with sensitivity or empathy, as in Diyari *ngara danthu* 'heart soft', 'tender-hearted'. Accessibility is also well represented, with 8 occurrences (nearly 10%, albeit in only 3 languages), mapping onto affection, love and other empathetic emotions, as in Djinang *ḏurkḏurk inydji ḻapmiygi*, lit. 'open one's heart', 'be magnanimous, have compassion'. Movement, destruction and alteration are not as prevalent with the heart as with the belly; and the most notable difference concerns position/posture metaphors, well-attested in the heart set but absent in the belly set. The heart being high, vertical or raising only maps onto positive emotions felt towards others (love, affection, compassion etc.), for instance *ngerh-waddi* 'heart be high up', 'feel strong affection' in Dalabon. The metaphors of orientation are cross-linguistically frequent (Lakoff & Johnson 1980:14–21), and higher is normally positive, however the particular emotions associated with height in Australian languages are not necessarily the same as in other languages (Ponsonnet 2014a:274–276). We did not find any clear patientive metaphor with the heart. Perception and agentive metaphors are marginal, and there are no instances of metaphors involving violence of the heart (3.2).

4.3 The throat

Apart from the belly and heart, a third body part where pragmatic bridges probably play a significant role is the throat – which is also far less commonly connected to emotions across the world's languages (Sharifian et al. 2008). We found 41 throat-based emotional expressions, in 12 languages. These are mostly in Central Australia and the Western Desert, plus some attestations further south (Noongar in the south-west, Kaurna in South Australia, Yorta Yorta in Victoria). In our sample, throat-based expressions are rare in the northern half of the continent, with a single attestation in Dalabon in Arnhem Land.[22] Given the thorough documentation available at least for languages of Cape York, Arnhem Land and the Kimberley, throat-based emotional expressions are clearly not widespread in these areas.

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[21] Not distinguished from 'experiencer of emotions' metonymies in Table 2, as both are grouped under 'experiencer metonymies'.

[22] The throat is also reported in other Arnhem Land languages not included in our sample, namely Kunbarlang, Njébbana and Na-kara (O'Keeffe, Coleman & Singer this volume, Eather (2005)), as well as in Kuuk Thayorre in Cape York (Gaby 2008:33–34).

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A number of observations suggest that the linguistic association of emotions with the throat may be more recent than with most other body parts discussed at length in this article. The throat is semantically very specialized, mostly denoting emotions related to desire and anger. This could be because the meanings of throat-based expressions have not had sufficient time to diversify. This semantic specialization is consistent with the absence of throat-based expressions in the north of the continent, indicating that the throat/emotion association may not have had enough time to diffuse. Finally, the low incidence of metaphors in this set suggests that these more elaborate tropes may not have had sufficient time to develop either.

4.3.1 Semantics

Apart from isolated tokens of social emotions such as non-compliance or feeling offended, the semantic profile of throat-based expressions displays a clear-cut areal split between desire and anger. In Central Australia, throat-based expressions primarily denote desire and related emotions such as love, want, frustration etc., accounting for 14 expressions out of 19 in this region (~75%). Desire is also the only meaning attested in Arnhem Land. In the Western Desert, throat-based expressions primarily denote anger, with 11 expressions out of 15 in this region (~70%). Noongar in the south-west aligns with Central Australia, while Kaurna in South Australia aligns with the Western Desert – a spread which does not suggest a simple historical scenario. Yorta Yorta is an outlier, linking the throat with fear. Along with the eyes (6.1), which are also specialized for love and desire, the throat is the only set where not a single expression denotes an unspecified emotion (e.g. generic feel 'good/bad').

4.3.2 Figurative profile

As shown in Table 2 above and 6 in Section 9, the tropes instantiated by throat-based expressions and their distribution present notable differences with other body parts. Amongst body parts with more than 25 emotional expressions in our data, the throat is the only one where metaphors are marginal, and instead the vast majority of expressions fall into the generic, experiencer, body-part-for-emotion or somatic types (3.2). We found one single perception metaphor associating vision of the throat with anxiety, and none evoking resistance, destruction, mobility of the throat, etc.

Generic and experiencer metonymies are attested, but the highest proportion goes to body-part-for-emotion tropes: 14 expressions, i.e. 35%, across half the languages – which is higher than for any other body part. With the throat, these tropes mostly map onto desire and want, as in Pitjantjatjara *unytjuringanyi* lit. 'become throat',[23] 'like, want, desire'. Conversely, most throat-based expressions denoting love, desire and want instantiate body-part-for-emotion tropes rather than any other trope.

Throat-based expressions also display a high proportion of somatic expressions: 11 i.e. more than 25%, distributed across nearly half the languages. This is nearly twice as much as with the belly and heart sets. Kaurna offers a very plausible somatic bridge, with the expression *yurni mintu minturninthi* 'throat contracting', 'become angry'. We find another possible somatic bridge in Dalabon, where *kom-nunj-*

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[23] From *unytju* 'inside of throat'.

wukmurrun 'neck/throat spit swallow' also means 'be sexually attracted', but no throat-based expressions evoking swallowing saliva in the rest of the throat set.

Other throat-based somatic metonymies almost exclusively relate to having a dry throat, as in Pintupi *lirri pilti* 'throat dry', 'angry'; or a burning/hot throat, as in Arrernte *ahentye ampeme* 'throat burning', 'feel angry'. These somatic expressions represent nearly 25% of all throat-based expressions, and map systematically onto anger. Hot and dry are plausible somatic states of the throat, and likely to be fairly common in the arid Australian centre, where throat-based expressions are most prevalent. This would seem to offer a reasonable pragmatic bridge to desire, via thirst and want for water – a semantic association attested in Kaurna with another body part: *kuntu warpurninthi* 'chest bone-becoming', 'to grow thirsty; to wish, desire'. However, somatic 'hot/burning throat' expressions only correlate with anger in our corpus, to the exclusion of desire and love. Since the association of anger with heat is a continental and even wider trend (Kövecses 1995; 2005), 'hot/burning throat' expressions could have emerged by analogy with other body parts, for instance the belly (4.1).

The exact path of development of throat-based expressions thus remains a matter for future investigation. Yet, given their linguistic prevalence and real-world salience in this particular geographic environment, it is likely that somatic bridges involving dry throat played a role, perhaps in combination with some analogical innovation (3.3.5).

5. Abdominal body parts sensitive to semantic shift

In this section we present the three body parts for which we hypothesize that semantic shift is a salient emergence scenario: the liver, abdomen and chest. Semantically, they all resemble the belly and the heart. Figuratively, the abdomen and chest pattern similarly to the belly and heart, from which they are probably partly derived. By contrast, the liver, where the semantic shift scenarios is probably even more prevalent, departs from other abdominal organs. Table 3 recapitulates these patterns, which are discussed in turn in 5.1 (liver), 5.2 (abdomen) and 5.3 (chest).

		belly	liver	abdo	chest
TOTALS	Expr	275	29	72	34
	Lgg	26	8	6	7
Generic metonymies	Expr	16%	7%	9%	9%
	Lgg	60%-	25%	50%	30%
Experiencer metonymies	Expr	30%-	30%	40%	30%
	Lgg	55%	75%	85%	55%+
Body part for emotion	Expr	7%	Ø	1%	9%

	Lgg	40%	Ø	17%	45%-
Somatic metonymies	Expr	13%	10%	7%	15%
	Lgg	50%	25%	50%	45%-
somatic bridge(s)		✓			✓
Behavioral metonymies	Expr	Ø	Ø	Ø	3%
	Lgg	Ø	Ø	Ø	15%
behavioral bridge(s)					✓
Metaphors, among which:	Expr	35%	40%	25%	30%+
	Lgg	55%	50%	50%	45%-
destruction		✓	✓	✓	✓
alteration		✓		✓	
resistance		✓	✓	✓	✓
accessibility		✓	✓	✓	✓
movement		✓	✓	✓	✓
position/posture				✓	✓
color		✓	✓	✓	
perception		✓	✓	✓	
patientive		✓		✓	
agentive		✓	✓	✓	✓

Table 3. Trope distribution in the liver, abdomen and chest sets, with the belly for comparison.

5.1 The liver

Words for liver are attested in 29 emotional expressions in our sample, across 8 languages from Cape York, Central Australia, South Australia, New South Wales and Queensland. Sixteen expressions are attested in South Australia alone (in Diyeri and Kaurna). Top End and Western Australia languages do not feature liver-based emotional expressions at all. Given the extent of documentation for Arnhem Land, the Kimberley or the Pilbara, it is highly plausible that the liver does not occur in emotional expressions in these regions.

There are reasons to hypothesize that at least some liver-based expressions are motivated by semantic shift (3.2), deriving from belly-based expressions where the word for 'belly' would have come to mean 'liver'. The semantic profile of liver-based expressions resembles those of the belly, and indeed liver/belly polysemies are well attested in our data (see 5.1.3). In addition, as we shall see, the figurative profile of liver-based expressions suggests that they may be older than for most body parts, so that their body-part component would indeed have had more time to shift in meaning.

5.1.1 Semantics

The particular emotions described by liver-based expressions clearly varies by region. In South Australia, empathetic emotions, including affection, compassion and grief, are markedly prevalent, accounting for about half liver-based expressions. In Central Australia, on the other hand, many liver-based expressions map onto violent other-oriented emotions, namely anger and jealousy. As discussed in 4.1.1, empathetic emotions and anger are both predominant with belly-based expressions as well. The liver also displays marginal associations with a miscellaneous range of emotions such as want and desire, fear, surprise and self-control, consistent with the semantic diversity found in belly-based expressions. Overall, apart from a slightly stronger representation of jealousy, the semantic profile of liver-based expressions bears significant resemblances with belly-based expressions.

5.1.2 Figurative profile

In our sample, body-part-for-emotion metonymies are unattested for liver-based expressions; and we only found 2 generic metonymies, in Kaurna and Yugambeh (*yilgan bugal* 'liver good', 'pleased). This represents less than 7% of all liver-based expressions, which is half as much as with the belly (16%) and lower than all other abdominal organs. We found only 3 somatic expressions (~10%), and none offering a convincing somatic bridge between the liver and emotions.

Two somatic expressions, both in Alyawarr, link heat with anger, as in *alem rwenperreyel* 'liver get hot', 'get angry'. Comparable belly-based expressions occur in other languages of Central Australia (e.g. Kaytetye *aleme arlkarle* 'belly cold, cool', 'calm, relaxed (not angry)'), and indeed, Alyawarr *alem* 'liver' also means 'stomach area', suggesting that such expressions may have previously read literally as 'hot belly', before the meaning of *alem* shifted to 'liver'. There is also an expression meaning 'blood liver', the latter mapping onto violent emotions (horror, rage, see Amery, this volume).

Liver-based expressions feature a higher proportion of metaphors than all other abdominal organs (40%). These metaphors include resistance, destruction, accessibility and movement. For instance, Diyari *kalhu miltyari-* 'liver become-soft' means 'to be compassionate' (resistance); Arrernte *aleme altywere* 'liver open' means 'be friendly, like someone' (accessibility). The nature and proportions of liver-based metaphors compare well with those in the belly set, which is also consistent with a semantic-shift scenario.

Two expressions refer to colors, including red, mapping to desire (Diyari *kalhu marra-* 'liver be-red', 'hanker, hard up for') and green, mapping to jealousy (*alem atherrk-atherrk* 'liver green (redupl.)', 'jealous'). Such expressions are less likely to be derived from belly-based expressions, since only one of the 275 belly-based expressions in our sample feature color.[24] Instead, 'red' (as well as 'bloody', see above) are plausible descriptions of a liver considered as offal, manipulated when cutting up game; green(ish) may also be plausible color for liver when cooked, or after a few days. In some other languages of the world, the association of the liver with emotions relates to divination practices based on the observation of the liver as a detached body part (see Siahaan (2008:45) about Indonesian). It is therefore possible that words for liver

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[24] Green mapping onto jealousy, in Alyawarr.

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gained an association with emotion based on semantic shifts from 'belly' to 'liver', and then, in turn, color tropes developed based on the observation of liver as meat.

5.1.3 Semantic-shift scenario

Although indisputable historical evidence is beyond the scope of the present study, several observations make semantic shift a very plausible scenario for the emergence of liver/emotion associations. The first indication is the absence of pragmatic bridges in the liver set. Of course, plausible somatic expressions may exist that are not represented in our data, but it is somewhat difficult to imagine a real-world context that would provide such a bridge.

Secondly, words that mean both belly and liver in synchrony are attested in the regions where liver-based expressions are found, which makes semantic shift from one to the other extremely plausible. As mentioned above, in Alyawarr *alem* is polysemous for 'liver' and 'stomach area', with Kaytetye cognate *aleme* meaning 'belly' and Arrernte cognate *aleme* meaning 'liver' respectively. In Kuku Yalanji (Cape York), *jiba* 'liver' also denotes 'guts, inside', and most likely derives from *jibar* 'stomach'. The semantic-shift scenario is also consistent with a third observation, about the semantic resemblance of the liver and belly sets (i.e. which emotions they denote).

A fourth point in support of the semantic-shift emergence scenario is the distribution of tropes in the liver set. The lower proportion of generic tropes suggests that the liver set is relatively old. Generic tropes (good/bad liver), being present in body-part sets numbering few expressions, and frequent in use, are probably amongst the first to emerge and be replaced. If liver-based emotional expressions across Australia are old enough to have undergone semantic shift of their body-part component from 'belly' to 'liver', they may also have had sufficient time to 'lose' some of these early expressions, possibly replaced by new generic expressions based on another body part. This is consistent with the more general prevalence of metaphors over metonymies in the liver set.

5.2   The abdomen

We chose to group together expressions with body-part words referring to an area of the abdomen which corresponds neither to a specific organ nor to the chest (5.3), thus including terms glossed as 'guts', 'abdomen', 'abdominal organs', 'trunk', 'stomach area', etc. This relatively broad category amounts to 72 expressions, across a mere 6 languages. Forty-two of these expressions are concentrated in Wik Mungkan in Cape York (where the term also means 'heart', see 4.2) and 15 in Ngarla in the Pilbara. Languages of Arnhem Land and Central Australia are also represented in this set.

The glosses of terms denoting abdominal organs often seem to refer primarily to a major organ, for instance in Ngarla *ngayiny* is glossed as 'internal organs', and a list of organs is added ('heart, stomach, womb…'). Given that body-part terms typically shift from smaller parts to larger wholes (Wilkins 1996:271–282), it is likely that some terms grouped in the 'abdomen' category previously denoted isolated organs. Suitable candidates include the heart, the belly (e.g. Wik Mungkan *ngangk* 'heart and stomach

area'[25]), the liver (e.g. Kuku Yalanji *jiba* means 'liver' as well as 'inside, guts', and *jibar* means 'belly' (5.1)).

As will be argued in 5.2.1 and 5.2.2, abdomen-based expressions present strong resemblances with belly- and heart-based expressions, both in terms of semantics and figurative profile. This also derives from the fact that in some languages – and notably Wik Mungkan, which contributes a significant proportion of the data – the shift is still in process, with the word for heart also denoting a larger part of the abdomen. Combined with the absence of plausible somatic bridge in the abdomen set (5.2.2), this suggests that at least some abdomen-based expressions are shift-driven, derived from belly- and heart-based expressions.

5.2.1   Semantics

The semantic profile of abdomen-based expressions presents a relatively balanced split between three emotion clusters: firstly, anger and other negative other-oriented emotions; secondly, fear and related emotions; and thirdly, desire, love, along with empathetic emotions. These are precisely the emotions that dominate in the belly set on the one hand (anger and empathetic emotions); and in the heart set on the other hand (fear and love).

In the negative other-oriented cluster (i.e. negative feelings targeting others), we find 8 occurrences of anger and 2 of hatred, which, combined with expressions for 'sulking', 'be moody' etc., brings the number of negative other-oriented expressions to 14 (~20%). However, these emotions are only attested in three languages, and most occur in Wik Mungkan. The fear cluster, including anxiety and surprise, also accounts for 14 expressions, in 5 languages (more than 80%). Another 14 expressions (in 3 languages) relate to desire, love, affection and empathetic emotions such as grief and compassion. Semantically, abdomen-based expressions thus look like a blend of the belly and heart profiles. A larger sample may reveal that the abdomen aligns with the belly in some languages and with the heart in others, but this is not apparent in our current data.[26]

5.2.2   Figurative profile

As shown in Table 3, the distribution of tropes in the abdomen set follows the same trend as with the belly and heart, with some variation. Abdomen-based expressions present a higher proportion of experiencer tropes: 30 expressions (~40%) in 5 languages, vs ~30% for the belly and heart (e.g. in Ngarla: *ngayiny wiju* 'abdominal organs sulky', where the collocation also means 'sulky'). In a significant proportion of these experiencer tropes, the expression is an intensified version of the emotion experienced by the abdomen, as in Arrernte *atne atere* 'guts, abdominals afraid', 'shitscared (very scared)'. Intensification may be a feature of words denoting extended body areas: it is also well represented amongst expressions based on the body and flesh (Section 8, Ponsonnet (2014a:357–358)). Body-for-emotion tropes, on the other hand, are marginal in the abdomen set (only 1 full-fledged attestation).

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[25] Assuming the term has both shifted to another organ and extended at the same time, which seems the most plausible scenario.

[26] The blend applies within Wik Mungkan itself, where the *ngangk* means both 'heart' and 'belly area'.

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As with the liver, abdomen-based expressions feature few somatic tropes (only 5, or 7%, compared to nearly 15% with belly and heart), and no convincing somatic bridges of their own. Two somatic tropes relate to heat (both in Wik Mungkan, e.g. *ngangk kuchar* 'belly area cold', 'calm'), which maps onto anger with most body parts. Others allude to an itchy or ticklish abdomen (e.g. Ngarla *ngayiny warlujangu* 'abdominal organs ticklish', 'nervous, jittery').

Abdomen-based metaphors resemble those of the belly and heart, involving destruction, alteration, resistance, accessibility, movement and position, in comparable proportions. Position metaphors (high/low) are limited to Wik Mungkan, where the abdominal term also denotes the heart. This is consistent with the attestation of position metaphors in the heart set but not in the belly set (4.1).

5.3   The chest

Expressions involving a word glossed as 'chest' are reported in 7 languages in our sample, totalling 34 expressions.[27] However, some of them denote not only the chest, but at the same time the entire upper-half of the body/torso, or the heart. Chest-based expressions occur frequently in the north-east of the continent, in particular in Wubyu/Nunggubuyu (east Arnhem Land), which on its own accounts for 19 expressions or over half of the total (and see Bednall, this volume about Anindilyakwa, east Arnhem Land). The chest is also relatively well-represented in Kaurna, and attested in 3 Cape York languages as well as in Yanyuwa, south of the Gulf of Carpentaria. Notably, chest-based expressions are virtually absent in Central Australia.

Like abdomen-based expressions, chest-based expressions combine properties attested in the belly and heart set. Semantically, they are a blend of the two, and figuratively they also present resemblances with both. On the other hand, the chest set also instantiates a small number of pragmatic bridges. This seems to confirm a combination of emergence scenarios including some shift-driven expressions, as well as marginal pragmatic association specific to the chest.

5.3.1   Semantics

As stated, chest-based expressions blend the semantic foci of belly- and heart-based expressions, with a high incidence of anger-, fear- and love-related emotions. Expressions denoting anger total 7 (~20%), albeit concentrated in Wubuy/Nunggubuyu. Fear, anxiety and shock account for 5 expressions (15%) in 3 languages; love and desire for 4 expressions (>10%); while the rest are somewhat scattered.

5.3.2   Figurative profile

As with abdominal terms, the distribution of tropes in the chest set, shown in Table 3 above, presents some resemblances with the belly and the heart, as well as with the abdomen. A major difference with the abdomen is that the chest set features some pragmatic bridges, and a major difference with the belly and heart is that one of these bridges is a behavioral one. A possible chest-based somatic bridge is Yidiny

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[27] We chose to treat these independently from abdominal terms because 'chest' was a well-identified gloss. This choice is also supported by notable differences between the two sets.

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walngga duwa N (sic), lit. 'shake breast', 'want someone sexually', which may relate to deeper or irregular breathing associated with sexual desire. A behavioral bridge is found in Guugu Yimidhirr *dumu yima* 'chest puff', 'act proud'.

The range of chest-based metaphors also resembles those instantiated with other internal organs. Kaurna features 3 expressions involving violent actions of the chest, which is high given that agentive tropes are relatively rare overall. In this case, they map onto compassion, hatred and anxiety, for instance *kuntu pungkurrinthi* 'chest hit itself', 'be concerned, sorry'. Comparable violence metaphors are attested in belly sets, for instance in Warlpiri in Central Australia (4.1.2.4) and, with striking similarity, in Walmajarri (southern Kimberley) *ngaru manyan pinya* lit. 'hit his own belly', 'be apprehensive, worried' (Laughren & Ponsonnet, this volume).

6. Visible body parts with behavioral bridges

The visible body parts with significant representations in our data are all parts of the head – or the head itself. Limbs, their parts, and other parts of the body such as the back, buttocks etc., are far less prevalent. The head and its parts are more diverse than abdominal parts both in their semantics and in the figurative pathways that tie them up with emotions. As presented in Table 4, they display less homogenous distributions of tropes, although there are resemblances between the eyes and nose sets on the one hand, and between the ear and head sets on the other hand; the forehead shares properties of each. Compared to abdominal parts, there is a trend for visible parts to yield lesser generic tropes, experiencer metonymies, and metaphors (lower number and less diversity); and a higher number of somatic and behavioral metonymies. This section presents visible body parts with strong behavioral bridges (eyes in 6.1, nose in 6.2), and also discusses the face set, where many expressions derives from other sets, via semantic shift.

		belly	eyes	nose	ear	head	forehead
TOTALS	Expr	275	70	62	42	59	29
	Lgg	26	18	16	15	18	8
Generic metonymies	Expr	16%	4%	Ø	7%	15%	Ø
	Lgg	60%-	17%	Ø	20%	40%	Ø
Experiencer metonymies	Expr	30%-	25%-	15%	12%	20%	30%
	Lgg	55%	35%	19%	25%	40%	25%
Body part for emotion	Expr	7%	7%	13%	25%	5%	3%
	Lgg	40%	30%-	30%	55%	11%	12%
Somatic metonymies	Expr	13%	17%	30%+	19%	25%	35%
	Lgg	50%	35%	40%	25%	60%	75%

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Ponsonnet & Laginha, The role of the body in descriptions of emotions. To appear in *Pragmatics & Cognition*.

somatic bridge(s)		✓					
Behavioral metonymies	Expr	Ø	17%	11%	Ø	Ø	17%
	Lgg	Ø	35%	45%	Ø	Ø	25%
behavioral bridge(s)			✓	✓			✓
Metaphors, among which:	Expr	35%	13%	13%	24%	15%	25%
	Lgg	55%	30%-	25%	40%	35%	35%
destruction		✓	✓	✓	✓	✓	✓
alteration		✓			✓		
resistance		✓	✓	✓	✓	✓	✓
accessibility		✓					✓
movement		✓				✓	✓
position/posture							
color		✓					
perception		✓	✓				
patientive		✓					
agentive		✓	✓	✓		✓	✓

Table 4. Trope distribution in visible body parts with more than 25 expressions in our data, with the belly for comparison.

6.1 The eyes

With 70 tokens in 18 languages, eye-based[28] expressions represent the largest set with a visible body part, and one of the largest sets of all . The linguistic association of the eyes and emotions is attested across the continent, with substantial representation in all the languages offering significant documentation, and a particularly high prevalence in Yolngu languages. Semantically, eye-based expressions specialize for desire-related and surprise-related emotions. Figuratively, eye-based expressions are anchored in behavioral bridges, and the distribution of tropes displays some resemblances with other visible body parts such as the nose (6.2) or forehead (7.3).

6.1.1 Semantics

Eye-based expressions frequently denote desire, jealousy or love: this applies to 21 expressions (30%), across nearly half the languages, in all regions except the Western Desert. Nearly as frequent are surprise and fear, instantiated in 19 expressions (over 25%) in 11 languages (60%), also widely-distributed. The cluster of expressions associating eyes with surprise is clearly dominant in the Western Desert. Other emotions with significant representation in the eyes set are anger, shame and respect, as well as compassion.

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[28] Since many Australian languages do not (systematically) mark plural on nouns, it is irrelevant whether we gloss 'eye' or 'eyes'.

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Along with the throat (4.3), also specialized for desire and related emotions, eye-based expressions are unique in not denoting unspecified emotions (feel good/bad).

6.1.2 Figurative profile

As is perhaps unsurprising for a visible body part salient in social interactions, eye-based expressions contain the highest proportion of behavioral metonymies, and some of them constitute plausible pragmatic bridges. A number of expressions associate 'watching, staring' with emotions that trigger such behaviors, typically desire and jealousy, as well as fear or concern, as in Wik Mungkan, *mee'ang wakan*, lit. 'follow from the eyes', 'covet'. This applies to 7 expressions. Another well-attested behavioral bridge involves widening eyes, mapping onto surprise, as in Kukatja *paniya tjarlu-rri-* 'eyes become big', 'be surprised'. We found 7 such expressions.[29]

Somatic eye-based expressions are relatively common in the data, (12 or about 17%, in 6 languages) but do not offer definite pragmatic bridges. Most somatic expressions evoke irritation, via descriptions of eyes as itchy, dry or burning. Having itchy eyes maps onto jealousy, as in Yolngu Matha *mel-ḏe'* 'eye(s) itchy, dry', 'jealous, envious'. Some expressions for dry eyes map onto bravery, which can be interpreted under the metaphor LACK OF EMOTIONS IS DRYNESS, attested in Arnhem Land in expressions denoting fear and courage in particular (Ponsonnet 2014a:346–350). Unsurprisingly, expressions that represent the eyes as burning map onto anger. In Arrernte, we find tropes involving shine and color, including green (plausibly related to blindness[30]) associated with fear; and white with surprise.[31]

The eyes set features relatively few expressions involving metaphorical properties that are somatically implausible, with merely 9 (13%), the lowest score after the throat set. Most metaphors relate to properties of resistance, typically associating soft eyes with compassion. In our data this occurs essentially with Yolngu languages, for instance in Djinang *mil biḻbaḻingi* 'eye(s) soft', 'kind, compassionate, hospitable'. Yolngu also has a less usual association of fat eyes with greed, possibly by analogy with expressions involving fat buttocks, which are common across the continent (Section 8).

6.2   The nose

In our sample, nose-based expressions occur in 16 languages and number 62 tokens. The distribution is spread out across the continent, albeit with a strong contribution from Kukatja in the Western Desert, featuring 28 expressions. Some of the words for 'nose' also mean 'face' (6.3). In terms of figurative profile, nose-based expressions share characteristics of eye-based expressions. Semantically, on the other hand, they align quite neatly with head- and forehead-based expressions, mostly denoting social emotions and attitudes, with strong prevalence of negative emotions.

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[29] Some combine both trends, for example where an expression means both 'open eyes' and 'stare' (Wik Mungkan *mee' pungk piimpanang*, 'angry'.
[30] Possibly describing the effect of cataracts.
[31] In Table 4 these are accounted for with somatic metonymies, not metaphors, because they are plausible properties of the eyes.

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Ponsonnet & Laginha, The role of the body in descriptions of emotions. To appear in *Pragmatics & Cognition*.

6.2.1 Semantics

Nose-based expressions are very clearly specialized for negative, other-oriented emotions, in particular being angry or sulky. Anger alone accounts for 19 expressions (a bit less than a third), although these occur in only 4 languages (a quarter), all concentrated in the Western Desert and Central Australia. In addition, there are also 14 expressions (~20%) denoting milder emotions such as being sulky, moody, or otherwise not well inclined. Such tokens have a much broader areal distribution than anger, occurring in 9 languages across all regions. Combined, negative other-oriented emotions are represented in more than half of all nose-based expressions and occur in more than two third of the languages.

There are also a number of nose-based expressions encoding attitudinal emotions of predominantly negative valence, such as being selfish, stubborn or greedy. Along with a few converse positive attitudinal emotions (e.g. generosity), these represent 15 expressions (about a quarter of the total). They occur in merely 3 languages, a skew attributable to the high prevalence of such tokens in Kukatja – where we find 11 nose-based expressions meaning 'selfish' (e.g. *mulya tarlki* 'nose'+'sharp', 'selfish, mean, egotistic, refuses to share').[32] Finally, shame – also eminently social – accounts for 4 expressions. In total, social emotions and attitudes account for 52 expressions, occurring in the vast majority of languages with nose-based expressions (nearly 85% of all expressions, in 14 out of 16 languages).

6.2.2 Figurative profile

Nose-based expressions share two major characteristics of visible body parts: generic tropes (good/bad nose) are not well represented amongst nose expressions – in fact they are entirely absent; and the set features a behavioral bridge. Nine expressions, broadly distributed in 7 languages across the continent, relate anger and sulking to movement/direction/position of the nose, including turning, high/raise or down(/flat). Such movements of the nose, implying movements of the head, are expected bodily responses when sulkingor otherwise ill-disposed. We find for example *elhe etyengele anteyane* lit. 'turn your nose up at something', 'dislike something' in Kaytetye, or *ngal-syi*, lit. 'have one's nose in the air', 'be aloof, frown' in Ngankikurungkurr.

Somatic tropes are also well represented (over 30%, in 40% of the languages) if we include tropes evoking shape and size, which are plausible properties of the nose. The most prevalent (10 expressions or ~15%[33]) maps negative social emotions and attitudes with large nose size (big, long), as in Kukatja *mulya tarltu* 'nose becomes big', 'selfish'. Size tropes may derive from swollen-nose somatic tropes, which are attested as well (e.g. Warlpiri *mulyu lirri-mi* lit. 'nose swell', 'dislike, be selfish, be disagreeable'), along with metonymies representing the nose as dirty, itchy or stiff. None of the somatic tropes in the nose set points to plausible bridging contexts.

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[32] The other two languages are in Cape York and Victoria, hence there is no regional exclusivity.

[33] But Kukatja alone accounts for 8 of them.

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The proportion of metaphors is as low as in the eyes set (8 tokens or 13%, in a quarter of the languages). By contrast with most other body parts, resistance metaphors are marginal, with only two instantiations.

6.3   The face

We found 47 expressions involving the face, distributed across 7 languages, with two languages accounting for 29 (Kukatja in the Western Desert) and 13 tokens (Yolngu Matha in Arnhem Land) respectively. In Arnhem Land, the occurrence of face-based expressions in two other languages (Dalabon and Wubuy/Nunggubuyu) suggests a regional pattern. Beyond this, there are only marginal attestations in Cape York and Central Australia.

Although the face seems to associate quite naturally with emotions, there are compelling reasons to think that most of the face-based expressions in our data are shift-driven. In most languages featuring them, words for 'face' also denotes other body parts: the nose, forehead, or eyes. Only three languages feature expressions involving words that solely mean 'face', and they total just 4 expressions.

In most languages, the 'face' meaning seems to be historically posterior. In Kaytetye, the word for 'face' also means 'eyes', and the semantic as well as figurative profile of the expressions clearly relate to the eyes set (6.1). In Kukatja, the word for 'face' is *mulya*, which has a number of cognates meaning only 'nose' in neighboring languages, suggesting that 'nose' is the older meaning. Accordingly, many of the Kukatja face-based expressions evoke large size, which applies more naturally to the nose than the face and is indeed common in the nose set. The Yolngu word *buku* also means 'cliff', which suggests a long-standing association with the forehead; as well as 'will, mind', which suggests a prior association with the head (Ponsonnet 2009). Amongst other Yolngu languages, we find forehead-based expressions in Djinang, with a word that does not mean 'face'; by contrast, there are no face-based expressions with words that mean 'face' but not 'forehead. Yolngu face-based tropes feature resistance, which is prevalent in the head/forehead sets (7.2 and 7.3). It thus seems that the bulk of face-based emotional expressions in our data derive from eye-, nose- or forehead-based expressions, where the meanings of the words have shifted to 'face' – which places the face amongst body parts where semantic shift plays a prevalent role (Section 5).

7.   Visible body parts with intellectual bridges

The three other visible body parts with significant representation in our data – the ear, head and forehead – mostly connect with emotion by virtue of their association with intellection rather than via behavioral bridges. In terms of the distribution of tropes, intellectual body parts are more dispersed than other profiles. The ear essentially has its own pattern. The head and the forehead, on the other hand, are more akin to each other, but the forehead also shares some properties with the nose (6.2.2).. Here we discuss the ear set first (7.1), then the head (7.2) and the forehead (7.3), which are closer to each other than to the ear set.

7.1 The ear

Our sample contains a total of 42 ear-based expressions denoting emotions, across 15 languages with broad distribution across the continent.[34] They are particularly common in Cape York, whilst quite rare in Arnhem Land and Central Australia. Reflecting the intellectual functions attributed to the ear in many Australian languages (Evans & Wilkins 2000), the emotions denoted by ear-based expressions are those closely associated with the intellect. Among these, we identified two main foci: compliance, which is associated with understanding; and obsession, which correlates with excessive attention. In terms of tropes, ear-based emotional expressions are mediated by figurative representations of intellection, yet the types of tropes remain consistent with non-intellectual body parts.

7.1.1 Semantics and intellectual bridges

In many languages across the continent, hearing and understanding are associated not only with each other, but also, jointly, with obedience (Evans & Wilkins 2000). For this reason, in our data ear-based expressions chiefly describe attitudinal emotions related to compliance and agreeableness. This includes, for instance, being attentive, obedient and well-behaved; or on the contrary, stubborn and reluctant to share (which amongst Australian groups tends to be construed as a deficit in social thoughtfulness), as in Kuku Yalanji *milka-dudu* 'ear blunt', 'deaf, stubborn'. This cluster of attitudinal emotions accounts for 19 expressions out of 42 (i.e. almost half of them), in 12 languages (more than 80%).

The second dominant cluster relates to obsession, which connects metonymically with intellectual functions via excessive attention. This is illustrated in Warlpiri with *langa wiil-karri-mi* 'ear stick out', 'keep thinking, keep worrying about, be obsessed with'. Apart from obsession this cluster includes concern, as in the Warlpiri example; longing, which is a form of obsession; being homesick, which is a form of longing; etc. This set numbers 13 expressions (30%) in 5 i.e. a third of the languages, with relatively even distribution across the continent.

A small number of ear-based expressions also denote confusion and hesitation, which are evidently intellectual, as in Noongar *tuaanq piärq-piärqan-* 'ear sore', 'to confuse somebody'. And finally, some ear-based expressions denote composure, plausibly the opposite of confusion; and fear, relating to concern as well as confusion.

7.1.2 Figurative profile

The tropes instantiated by ear-based emotional expressions offer no direct pragmatic bridge to emotions. Instead, they map primarily to intellectual states and processes, which in turn represent emotions via INTELLECTUAL STATE FOR ASSOCIATED EMOTIONAL STATE metonymies. For example, Gamilaraay features a generic trope *gaba binaal* 'good ear', 'good mannered, peaceful'. This is underpinned by the association between good ear and intelligence, and the pragmatic association between good behavior, good manners, and tempered moods or peacefulness (intelligent people act appropriately).

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[34] Ear-based expressions with purely intellectual meanings such as 'think', 'understand', 'be stupid' etc. are not included.

Generic tropes and experiencer metonymies are relatively rare in the ear set, the latter displaying the lowest proportion in our 25+ sets (just over 10%, in a quarter of the languages). Body-part-for-intellection metonymies are well represented, but only map onto emotions indirectly, as in Jingulu *langa-jij-a*, lit. 'earless', 'deaf, disagreeable', where the lack of ear stands primarily for lack of intelligence.

Somatic tropes represent about 20% of the set (i.e. 8 expressions, in 5 languages). Three expressions associate blocked or closed ears with intellectual deficiency, a likely bridging scenario given the close association between hearing and understanding: one whose ears are obstructed can neither hear nor understand.[35] Other somatic metaphors are scattered, including for instance cold, inert, sticking out.

In general, deficiency of the ears tends to convey negative emotions, via deficiency of the intellect, since sound intellect associates with positive attitudinal emotions around compliance (as in Gamilaraay above). However, the opposite also occurs, for instance in Kuku Yalanji, where *milka-wulay* 'ear die', means 'become unconscious' or 'forget', a negative intellectual process; as well as 'forgive', a rather emotional process. This echoes the metonymic association of (excessive) attention to negative emotions like obsession, where lesser intellectual acuity could be perceived as emotionally beneficial. Such negative connotations of intellectual focus are also illustrated where words meaning 'think' extend to mean 'worry', as is attested in some Australian languages (Ponsonnet 2018b:118–120).

Interestingly, ear-based expressions display the same sort of metaphors linking to intellection as found with emotions for other body parts. This includes resistance, which maps onto negative emotions such as anger or stubbornness, as well as destruction/alteration, as in Warlpiri *langa-kari-langa-kari-jarri-mi*, partly opaque but suggesting 'alter one's ear', with the meaning 'think, wonder, worry' (see Laughren & Ponsonnet, this volume).

7.2 The head

Eighteen languages within our sample contain head-based expressions denoting emotions, amounting to 59 expressions.[36] In some languages, terms for 'head' are reported to also mean 'crown of head' (Ponsonnet 2012, Amery this volume), but no other polysemies are mentioned. Head-based emotional expressions are spread across the continent, with higher concentrations in Arnhem Land. They are not attested in the Kimberley or in the Victoria River region in the Northern Territory, and are relatively marginal in Central Australia and the Western Desert.

In many languages around the world, the head and the brain are construed as loci of intellectual functions (Sharifian et al. 2008). This is well attested in Australia (Ponsonnet 2009; Gaby & Bradley 2019;

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[35] 'Closed/blocked ears' expressions were treated as metonymies rather than accessibility metaphors, because the ears can indeed be physically blocked, hence this is a plausible somatic description.

[36] Excluding expressions with purely intellectual meaning.

Draft only
Ponsonnet & Laginha, The role of the body in descriptions of emotions. To appear in *Pragmatics & Cognition*.

see also Evans & Wilkins 2001), particularly in Arnhem Land where we find the highest incidence of head-based emotional expressions. As with the ear, the head-emotion association relies on the cultural link between intelligence and social adequacy. Further, head-based expressions clearly specialize for other-oriented and social emotions such as anger and shame, as well as attitudinal emotions. In terms of tropes, the most remarkable characteristic of the head set is the prevalence of representations of the head as hard, leading to resistance metaphors.

7.2.1 Semantics and intellectual bridges

Head-based expressions mainly denote emotions that are characteristically social, and almost exclusively negative. Apart from isolated expressions with unspecified semantics ('feel good' or 'be good' in Arnhem Land, unattested elsewhere), and some rare cases of attitudes related to composure (also in Arnhem Land), head-based expressions do not map onto positive emotions. The same profile is observed with the forehead (7.3), which also has intellectual connotations. The nose too, which does not associate with intellection, exhibits strong specialization for social and negative emotions (6.2). The motivations of this correlation between social focus and negativity is a question for future research.

Attitudinal emotions conditioned by sound intellect, such as being compliant/obedient or stubborn, responsible, selfish, socially and emotionally inappropriate/distant, are the most frequent denotations in the head set, altogether accounting for 19 expressions (30%). This aspect of the semantics of head-based expressions is shared with ear-based expressions (7.1). Apart from intelligence, other intellectual characteristics associated with emotions in the head set include, for instance, madness and imagination. In several languages in our sample, words for 'mad' also mean 'deaf'[37], 'foolish', 'irresponsible', and 'furiously angry'. Such words often combine with the head, e.g. in Pitjantjatjara *kata rama* 'head mad', 'irresponsible, furious'. In Gupapuyngu, *liya-marrtji* 'head goes/walks' means 'be homesick', probably related to travelling back home via the intellectual function of imagination.

Shame is also well attested, with 11 expressions (nearly 20%) in more than a third of the languages. Shame, in particular in its typically Australian version which encompasses fear of others and respect (Hiatt 1978; Harkins 1996; Ponsonnet 2018b), is an eminently social emotion often considered to operate as a regulator of behavior (Deonna, Rodogno & Teroni 2011). It is conditioned by social awareness, an intellectual function, thus bridging to the head. Finally, anger totals 10 expressions (more than 15%) in 7 languages, with higher frequency in Central Australia. Amongst Australian Indigenous communities, anger is socially-grounded: many words for anger also mean 'trouble' and 'conflict', anchoring the emotion in interpersonal interactions (Ponsonnet 2016:236–238). Overall, whilst a small number of other emotions such as sadness, concern, sorrow and brooding are attested, head-based expressions are clearly socially-oriented.

7.2.2 Figurative profile

Generic and experiencer metonymies display standard frequency in the head set (respectively 15% and 20%), yet there are no instances of the head experiencing *responses* to emotions. That is, we find expressions like *mira-yer-* 'head shy, ashamed', also meaning 'shy, ashamed' in Ngalakgan; but no

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[37] 'Deaf' is often colexified with 'unintelligent', see 7.1.

Draft only
Ponsonnet & Laginha, The role of the body in descriptions of emotions. To appear in *Pragmatics & Cognition*.

expression reading literally as 'head cries' for instance. Perhaps surprisingly, we found no head-based somatic or behavioral bridges. Somatic metonymies match those found with other body parts: for instance 'hot head' for anger (attested with the belly, heart and throat), 'itchy head' as in Yolngu Matha *l̠iya-d̠e'yun* 'head itchy', 'dislike, reject' (attested with the abdomen, forehead, eyes, nose). Head-based behavioral metonymies (e.g. turning, shaking head…) do not occur in our data, although they are well attested with other visible body parts such as the eyes and nose (Section 6), as well as the forehead (7.3).

Tropes that depict the head as resistant, i.e. 'hard head' (or 'strong head'), are the single most frequent trope in the head set, with 12 expressions (20%) across practically two thirds of the languages.[38] In most instances, these tropes map onto negative social attitudes such as stubbornness, non-compliance etc., as illustrated in Martu Wangka: *kata yapu* 'head hard', 'obstinate, arrogant'. Comparable tropes are well attested in other languages, including English. While they do not offer a plausible pragmatic bridge, such tropes make sense as the head stands metonymically for the intellect: a strong/hard intellect suggests intransigence, hence stubbornness and non-compliance. Head-based expressions also feature proper resistance metaphors, where the head is described as 'tight', for instance. There are also metaphors of destruction (e.g. Dalabon *kodj-dadj(mu)* 'head cut', 'become upset and interrupt interactions') and mobility (e.g. Yolngu Matha, *l̠iya-garrpin* 'head bind, tie, block', 'have a headache, worry').

7.3 The forehead

Forehead-based expressions number 29 across 8 languages, with Yolngu languages alone accounting for 17. They are also attested in the Western Desert, and there are instances in south Western Australia, South Australia and Cape York. In our data, the forehead-emotion association is absent in Central Australia.

Several of the words for 'forehead' in our sample, including in Yolngu languages, also mean 'face' or 'side of face', but not 'head'. In spite of a degree of resemblance, the respective profiles of head- and forehead-expressions do not strictly match.[39] These sets share the same semantic foci, being predominantly social and negative in valence – though this is slightly less marked with the forehead. Regarding figurative profile, at least in Yolngu languages where the forehead is productive, forehead-based expressions combine properties observed with the head and other, non-intellectual visible body parts (eyes and nose, Section 6). With the head, the forehead shares an association with the intellect and corresponding bridges; with non-intellectual visible body parts, it shares behavioral pragmatic associations, for instance those based on postures.

7.3.1 Semantics

Forehead-based expressions resemble head-based ones in invoking few positive emotions: these feature in just 3 expressions, all referring to mildly positive social attitudes such as compliance, patience etc.

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[38] We treated them as metonymies, since a human head can plausibly be described as hard (but they do not constitute somatic bridges).

[39] Most of the differences surface in the data for Yolngu languages, due to the smaller attestation of forehead-based expressions in other languages.

Draft only
Ponsonnet & Laginha, The role of the body in descriptions of emotions. To appear in *Pragmatics & Cognition*.

Attitudinal emotions such as stubbornness, selfishness, (lack of) consideration, social distance, account for 13 expressions (~45%), occurring across 7 languages out of 8. Four expressions denote anger (~15%, same proportion as in the head set), solely in Western Desert languages. In contrast to head-based expressions, shame is absent in the forehead set. We also find a higher proportion of (often negative) miscellaneous emotions such as shock, sadness or jealousy. The proportion of social emotions and attitudes in the forehead set lies just under 60%, whilst their head counterparts reach 85%.

7.3.2 Figurative profile

Figuratively, forehead-based expressions combine features observed in the head set, as well as features of non-intellectual visible body parts, especially the nose (Section 6). Like the eyes and nose, the forehead set features a smaller proportion of generic and body-part-for-emotion tropes. Whilst there is no convincing somatic bridge, a couple of expressions suggest behavioral bridges. For instance, in Djinang, we find *bumir ṯinydjigi* 'forehead turn head away, ignore', 'be jealous', associated with dislike. Comparable behavioral tropes are attested amongst nose-based expressions (6.2).

At the same time, forehead-based somatic tropes and metaphors resemble head-based ones. We find 9 expressions that describe the forehead as hard (more than 30%), a property highly prevalent in the head set as well. With the forehead, these map mostly onto negative emotions, as in Martu Wangka *ngalya nantirrpa* 'forehead hard', 'stubborn'. Another trope shared with the head depicts absence of affection as an itchy forehead, in Yolngu Matha: *buku-ḏe'yun* 'forehead itchy', 'dislike, avoid (taboo)'. The range of metaphors attested with the forehead is practically the same as with the head.

8. Others

The above sections reported on the 12 body parts for which we found at least 25 associated expressions in our sample, but as highlighted in the introduction, there are many more: nearly 30 in total. A handful of these are marginally represented, featuring less than 5 expressions, and with somewhat scattered metaphors. This is the case for instance with the waist, breast, neck, teeth, and bones. Other small sets seem to link to larger sets, for instance saliva relates to the throat, the brain to the head, and the lungs to the heart, chest or abdomen sets. We found a dozen expressions featuring words for other parts of the face or head – glossed as 'cheek', 'temple', 'side of the head' or 'side of the face'. These correspond well with the head in terms of semantic as well as figurative profile.

Some body parts with lesser representation nevertheless exhibited fairly distinctive semantic foci and/or figurative patterns. Many are visible body parts with clear behavioral bridges. Hand-based expressions, for instance, number 19 in 11 languages distributed across the continent. Many of these expressions denote either attitudinal emotions related to sharing (generosity or greed), mostly in Cape York, as well as laziness, mostly in the Western Desert. These are interpretable under BODY PART FOR BEHAVIOR INVOLVING BODY PART metonymies, namely HAND FOR SHARING and HAND FOR WORKING.

The next most frequent was the mouth, occurring in 14 emotional expressions across 8 languages scattered across the continent. Semantically, mouth-based expressions are split between social emotions and attitudes (e.g. being compliant, assertive, bossy; shame) on the one hand, and desire/want on the other hand. This split corresponds to two clear behavioral bridges. One of them associates the mouth with social attitudes via speech, as in Wik Mungkan *thaa'-thayan* 'mouth strong' maps onto self-assertiveness. Another bridge associates the mouth with desire via eating, as in Arabana and Wangkangurru *marna-tjalpara-* 'mouth get worn out', 'to get sick or tired of something (e.g. certain kind of food)'.

Back-based expressions (numbering 6) also display a strong behavioral bridge, illustrated in Dalabon by *dolku-ngabbun* 'back give', 'be in bad terms with' as well as 'turn back on'. In Dalabon and Kaytetye, back-based expressions also denote fear, which relates to anticipating danger located behind one's back in the bush; and to shame, which is culturally associated with avoidance rules that forbid some people to face each other (Turpin 2002:295). Hair-based emotional expressions number 12 in 6 languages, with a clear semantic focus on fear and awkwardness, extending to shame (social fear) and surprise. Here the bridge is somatic, namely having goosebumps, as in Kaytetye: *arrelyarrenke* 'hair stand on end', 'get goosebumps, have bad premonition, have a feeling that someone is behind you'. We also found 10 emotional expressions with a word meaning 'buttocks': 6 related to greed and 4 to fear. The origin of these associations is less clear.

About 30 emotional expressions involve a word for 'systemic' parts of the body such as the skin or the flesh. Skin-based expressions are only attested in central and central-northern parts of the continent (Western Desert, Central Australia and Arnhem Land), with 14 tokens in total. They often denote negative other-oriented emotions such as anger or sulking (e.g. Djinang *galngi diy'diy*, 'body'+'itchy', 'bad tempered'); as well as social emotions such as shame. A couple of skin-based expressions also relate to desire and jealousy, sometimes depicting the skin as itchy, as in Yolngu Matha *galŋa-ḏe'yun* 'skin'+'itchy', 'resent, be jealous'. Another 14 emotional expressions feature words glossed as 'body', often polysemous with other broad meanings such as 'appearance' or 'flesh'. There are also polysemies between 'body' and other body parts such as 'trunk' or 'back'. Perhaps due to these polysemies, the semantics of body-based expressions is very diverse.

9. Recapitulation and conclusions

This article presented the first typological synthesis of the figurative role of body parts in descriptions of emotions at a continental scale, based on a balanced sample of 67 Australian languages. We collected ~800 individual body-based emotional expressions, attested in 53 languages out of 67, and involving about 30 individual body parts. The belly dominates, accounting for around a third of the ~800 tokens. Around a dozen body parts exhibit significant productivity, including the heart, throat, liver, chest, abdomen, eyes, nose, face, ear, head and forehead. Meanwhile, some of the 30 attested body parts only occur in a handful of tokens.

Systematic analysis of the tropes instantiated in these body-based expressions revealed a number of profiles within which the 12 most attested body parts can be grouped, depending on the nature of their figurative link with emotions. Some body parts feature prevalent somatic bridges, i.e. tropes that collapse an emotion and a somatic response to this emotion (e.g. heartbeat for fear). This applies to two internal organs, the belly and heart; as well as to the throat. Another set of body parts are associated with emotions via behavioral bridges, i.e. tropes that collapse an emotion and a typical behavioral response to this emotion (e.g. staring for desire). This is the case with visible parts of the head, namely the eyes and nose. A third set of body parts is primarily associated with intellection, and are linked to emotions via an intellectual bridge. For instance, in Australian languages the ear is often treated as the seat of understanding and attention. In the emotional domain, we find ear-based expressions denoting obsession, for instance, which can be construed as excessive attention . Finally, there is fourth category of body parts where none of these types of bridges is prevalent. With these, the body-part words involved in emotional expressions are often polysemous with other body parts for which we do find prevalent bridges. It is likely that in at least some languages, these body parts became associated with emotion via expressions featuring another body part, when the word denoting this latter body part shifted in meaning. For instance, in some languages words for 'belly' are known to have shifted to mean 'liver', so that emotional belly-based expressions became liver-based.

Table 5 summarizes the semantic focus of each body part – i.e. which emotions the expressions denote. These foci tend to co-vary with the type and nature of the bridge that links them to emotions. Body parts with prevalent somatic bridges focus on other-oriented emotions. The belly covers other-oriented emotions in general and anger in particular; the heart specializes for love and fear; the throat for desire/love and anger. The semantic focus of visible body parts is motivated by the bridges that link them to emotions. The eyes are associated with desire, surprise and fear; the nose with negative feelings for others, typically being distant or sulking. As for the ear, its semantic focus is on compliance and obsession, whilst the head and forehead focus on social and attitudinal emotions (obedience, selfishness etc.), including a strong representation of shame amongst head-based expressions. The nose, head and forehead are all eminently social, and also share a strong bias towards negative emotions.

Profile	Body part	Emotions
Internal organs with prevalent somatic bridges	Belly	Generic emotions (feel good/bad). Other-oriented emotions: anger, love, compassion, grief… Fear, desire, jealousy. Many other marginal occurrences.
	Heart	Love, fear. Anger.
	Throat	Desire and love (dominant in Central Australia). Anger (dominant in Western Desert).
Abdominal body parts sensitive	Liver	Compares with the belly. Empathetic: compassion, grief. Violent other-oriented: anger and jealousy.

	Abdomen	Combines the semantic foci of belly and heart.
		Anger and other negative other-oriented emotions (belly).
		Fear and related emotions (heart).
		Desire, love, and other empathetic emotions (heart and belly).
	Chest	Combines the semantic foci of belly and heart.
		Anger, fear, love.
Visible body parts with behavioral bridges	Eyes	Desire, jealousy or love.
		Surprise and fear.
		Secondary: anger, shame and respect, as well as compassion.
	Nose	Resembles head and forehead.
		Primarily negative, mostly social.
		Other-oriented emotions: being angry, sulky...
		Social dispositions: selfish, stubborn, greedy…
Visible body parts with intellectual bridges	Ear	Attitudinal emotions: compliance, agreeableness; stubborn, ungenerous…
		Obsession and related emotions.
	Head	Resembles nose and forehead.
		Primarily negative, mostly social.
		Negative social dispositions: (non)compliant, stubborn, irresponsible, selfish, socially distant…
	Forehead	Resembles head and nose.
		Primarily negative, mostly social.
		Mostly negative social dispositions: (non)compliant, stubborn, selfish, inconsiderate, socially distant.
		Other negative: shock, sadness or jealousy.

Table 5. Semantic foci per body part. The most prevalent foci are listed first.

In terms of tropes, experiencer and somatic metonymies are the only ones with significant attestation in all body part sets. Metaphors are also widespread, yet remain very marginal in the throat set. Metaphors of destruction and resistance are the most common types, attested with all body parts but the throat. Beyond these general observations, a significant result of this study is that the types of tropes instantiated by a body part, and their distribution, correlates to some extent with the type of bridge prevalent for this body part. As shown in Table 6, the belly and the heart, which are the two abdominal body parts with prevalent somatic bridges, display practically identical distributions. Abdomen- and chest-based expressions, a proportion of which probably derive from belly- and heart-based expressions, also exhibit comparable figures. The liver, which is probably more strictly derived from belly-based expressions, further departs from the belly and heart pattern, possibly due to historical depth of the liver/emotion association. The throat, which displays strong somatic bridges but is not an abdominal organ, shows unique distribution. As for visible body parts, those anchored in behavioral bridges – the eyes and nose – pattern together. 'Intellectual' body parts are

somewhat more dispersed. The ear mostly presents its own pattern; the head and forehead share some resemblances, but the forehead blends properties of body parts with behavioral bridges.

		belly	heart	throat	liver	abdo	chest	eyes	nose	ear	head	forehead
TOTALS	Expr	275	85	41	29	72	34	70	62	42	59	29
	Lgg	26	12	12	8	6	7	18	16	15	18	8
Generic metonymies	Expr	16%	18%	7%	7%	9%	9%	4%	Ø	7%	15%	Ø
Experiencer meton.	Expr	30%-	30%	20%	30%	40%	30%	25%-	15%	12%	20%	30%
Body part for emotion	Expr	7%	8%	55%	Ø	1%	9%	7%	13%	25%	5%	3%
Somatic metonymies	Expr	13%	14%	25%	10%	7%	15%	17%	30%+	19%	25%	35%
somatic bridge(s)		✓	✓	✓			✓					
Behavioral meton.	Expr	Ø	Ø	Ø	Ø	Ø	3%	17%	11%	Ø	Ø	17%
behavioral bridge(s)							✓	✓	✓			✓
Metaphors:	Expr	35%	35%	2%+	40%	25%	30%+	13%	13%	24%	15%	25%
destruction		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
alteration		✓	✓			✓				✓		
resistance		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
accessibility		✓	✓		✓	✓	✓					✓
movement		✓	✓		✓	✓	✓				✓	✓
position/posture			✓				✓	✓				
color		✓	✓		✓	✓						
perception		✓	✓	✓	✓	✓		✓				
patientive		✓	✓			✓						
agentive		✓			✓	✓	✓	✓	✓		✓	✓

Table 6. Trope distribution for all body parts with more than 25 expressions in our sample.

Since Lakoff's foundational writings in the 1980s, and even earlier, linguists and non-linguists have been tempted to use figurative language as a window into speakers' collective representations of the world. What does the present study tell us of the relation between figurative language and culture? Unsurprisingly, the account is nuanced. We have argued that the association between body part and emotion can sometimes be driven by semantic shift in body part words. In such a scenario, body-based expressions probably do not reflect speakers' representations at all. At the same time, many figurative expressions do reflect a pragmatic inference – from somatic, behavioral or intellectual to emotional – that speakers have, at some point in history, paid enough attention to that they have built it into their language. Of course, we must keep in mind that these pragmatic associations may no longer be 'active' or relevant to speakers in synchrony. Yet, the patterns found in our data at the scale of a continent highlights that speakers of distant Australian languages have consistently tuned in to the same aspects of reality. Some of these choices, such as the association of anger with heat, are regarded as universal. Others, such as the evocations of a dry throat for desire, may be motivated by arid environments. But for many of the aspects of reality that our data reveal to be in focus – such as the link between thinking, obsessing and worrying, or the role of visual attraction in love and desire – it is a question for future typological research whether their higher frequency amongst speakers of Australian languages constitutes them as cultural traits. They may in fact be prevalent in many other languages across the world. We hope that this article will encourage further typology and comparative research on body-based metaphors in other continents and language families, in order to find out which of these phenomena derive from specific cultural traits, and which reflect universal properties of the human brain and communicative abilities.

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