

Words and the Mind

How Words Capture Human Experience

Edited by

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3 WORDS FOR PARTS OF THE BODY

Asifa Majid

The human body like any other object is perceived through our senses, but it is unique in that it alone is internally as well as externally apprehended. It serves as a special focus of attention. It is ritually dressed and adorned in a variety of ways in different cultures—from tattoos, piercings, and scarification to plastic surgery and make-up. It is widely regarded as the source for many of our concepts, particularly in relation to space, time, and emotions. Yet comparatively little attention is paid to the basic vocabulary for the body.

The body appears to be a discrete and independent semantic domain in memory. Neuropsychological studies show that in both production and comprehension, lexical-semantic knowledge of body parts can be relatively preserved (Coslett, Saffran, & Schwoebel, 2002; Shelton, Fouch, & Caramazza, 1998) or impaired (Dennis, 1976; Suzuki, Yamadori, & Fuji, 1997) in comparison to other semantic domains. Imaging studies also provide converging evidence that there are distinct cortical areas responsible for processing semantic knowledge of body parts, regardless of input modality (written, spoken) or language (for English-French bilinguals; see Le Clec'H et al., 2000). Shelton, Fouch, & Caramazza (1998; Caramazza & Shelton, 1998) have speculated that as a result of evolutionary pressures, body parts might be a specialized module neurally and functionally. According to their account, semantic representations are organized into domains because there have been specific adaptations to quickly

classify and respond to objects relevant for survival value. The body would be one of these domains because body parts play a key role in interacting with the environment—“hands for grasping, legs for movement, eyes for seeing, mouths for ingesting, etc.” (Shelton et al., 1998, p. 348). In addition to the evolutionary arguments, developmental evidence suggests that the body is special. Infants less than an hour old imitate facial movements (Meltzoff & Moore, 1983), and within a few weeks they can even imitate simple manual gestures (Meltzoff & Moore, 1977), suggesting an innate ability to perceive and interpret body parts.

The ontogenetic data and evolutionary arguments, along with evidence from perception that will be reviewed, suggest a fundamental categorization of the body into parts—i.e., into head, hands, arms, feet, legs, etc. The question addressed in this chapter is whether there are “basic” body parts that are recognized across cultures in how people talk about the body. Or to put it another way, how do people from different communities come to conceptualize the body in the languages they speak? Are the terms for parts of the body across the world’s languages the same or different? And are there constraints on naming; if so, what are these constraints?

The particular semantic component on which I focus is the reference of body part terms, that is, what is the exact extension of body part terms across languages; how similar or different are the categorization systems?

This is but one component of this semantic domain. According to Kemmerer and Tranel (2008), additional components include information about the spatial organization of body parts, their characteristic functions, and their typical cultural associations. Although we may expect differences between languages in characteristic functions or cultural associations of body parts, many have predicted universals in body part categorization. I argue in this chapter that there is considerably more variation in the naming of body parts than is acknowledged, but that this variation is constrained.

BODY PARTS IN PERCEPTION

A dominant view held by many psychologists, linguists, and anthropologists is that body part categories are “given” by visual perceptual discontinuities, and that words are merely labels for these predetermined parts (e.g., Andersen, 1978; Biederman, 1987; Brown, 1976; Lakoff, 1987). The mapping is taken to be straightforward and obvious. There is one salient partitioning of the body into parts and all a speaker has to do is to identify which of these parts is associated with which particular label in their own language.

In many current theories of object recognition, objects are represented by parts (Biederman, 1987; Hoffman & Richards, 1984; Marr, 1982). Theories differ in detail, such as whether objects are segmented according to general purpose geometric constraints (Hoffman & Richards, 1984; Singh, Seyranian, & Hoffman, 1999; Xu & Singh, 2002) or into volumetric parts corresponding to shape primitives (e.g., Biederman, 1987; Marr & Nishihara, 1978). Nonetheless, there is consensus on core points: namely, that objects are segmented at discontinuities, and that there is a nested hierarchy of partitions, with parts lower in the hierarchy being smaller than parts higher in the hierarchy (Hoffman & Richards, 1984; Marr, 1982; Marr & Nishihara, 1978; Palmer, 1977).

For the human body these theories come to the same segmentation. According to Marr (1982), for example, visual processing begins with an image that has an array of intensity

values, and after a number of processing stages this results in a three-dimensional model that is hierarchical in structure. The model for the human body consists of a number of generalized cylinders or cones. At the highest level of granularity the whole body can be represented as a single cylinder. At the next level the head, trunk, arms, and legs would each be represented by a separate cylinder. Then the arms and legs would further be subdivided into smaller cylinders, corresponding to upper-arm, lower-arm, upper-leg, and lower-leg, etc. (see Figure 3.1). In Biederman’s (1987) formulation, these parts would be referred to as *geons*, and the head would be represented as a sphere, rather than a cylinder.¹

Discussions about “natural” segments of the body have privileged vision over the other senses; however consideration of additional senses is highly pertinent to the issue of a perceptual partitioning of the body. As discussed in the introduction, the body is uniquely apprehended, being an object of internal perception through proprioception and somesthetic inputs, as well as an object of external perception through vision. Current psychological research takes it for granted that body parts named in language reflect the “true” and unique partitioning of the body (Schwoebel & Coslett, 2005; Sirigu, Grafman, Bressler, & Sunderland, 1991). But this may be too simplistic. There is now an emerging literature on how body parts are represented and organized

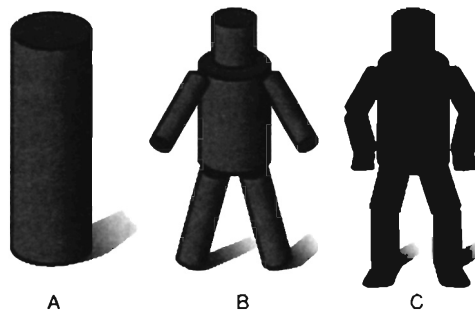


FIGURE 3.1. In visual perception the human body is represented by a three-dimensional hierarchical model (A–C) consisting of a series of cylinders.

in different perceptual modalities, as well as how these sensorial representations are pooled together to create an integrated and holistic representation of the body and its parts (de Vignemont, Majid, Jolla, & Haggard, 2009; de Vignemont, Tsakiris, & Haggard, 2005). Although there are some common principles in how partonomies are derived in different representational systems, there may not be one unique partitioning of the body into parts, but multiple partonomies subserving different functions.

The skin, for example, is a continuous undifferentiated sheet, but the primary somatosensory cortex has receptive fields that generally follow neuroanatomical divisions, such as finger and arm. Nonetheless, these categorical divisions are the result of our cumulative experiences and are highly malleable. They can become blurred under certain types of tactile experience. Braille readers, for example, who move multiple adjacent fingers simultaneously to read dot patterns raised on a surface show “smearing” of the neural representation of their digits. When asked to identify *which* finger is being touched in a psychophysical task, they make many more confusion errors between fingers, consistent with the topographical disarrangement of the cortex (Sterr et al., 1998a,b). These results are not due to a loss of sensitivity as demonstrated by the fact that the same people have lower tactile thresholds (i.e., higher sensitivity) than controls when asked to indicate merely *when* they have been touched (Sterr et al., 1998a,b). Similar results of cortical reorganization and digit mislocalization have been found for normal participants who have had finger and thumb simultaneously stimulated for an hour a day over a 4-week period (Braun, Schweizer, Elbert, Birbaumer, & Taub, 2000).

Action provides another basis for body part segmentation. Intentional action imposes a functional, as opposed to a spatial, organization to body parts. If I raise my arm, my hand follows. But if you tap me on my arm, this does not tell me anything about the sensation in my hand. So the tactile partonomy and motor partonomy appear to give rise to different representations of body parts. For example, tactile perception exhibits a categorical boundary effect. When two tactile stimuli

are applied to a single body part (hand or arm), those points are perceived to be closer together than when the two points are presented across body parts (one point on the hand and the other on the arm). However, if participants are made to move their hands (by flexing and extending the wrist joint), the category boundary effect is attenuated. The distance between the hand and arm is perceived to be closer than when the parts were static (de Vignemont et al., 2009). Overall, then, action appears to unify discrete parts.

Different partonomies, thus, exist for different representational systems—visual, somatosensory, motor—each of which is more or less differentiated and more or less malleable. Nevertheless, in all the systems, joints appear to be landmarks for segmentation of the body. As Bermudez (1998, p. 156) argues: “Individual body parts are paradigmatically defined in terms of hinges. The forearm, for example, is the volume between the elbow and the wrist . . . Using hinges provides a nonarbitrary way of segmenting the body that accords pretty closely with how we classify body parts in everyday thought and speech.” Or as Bloom (2000, p. 109) says: “objects are parsed into natural parts through a sensitivity to discontinuities in surface contour . . . A finger, for instance, is an excellent part because unpleasant as it is to think about—it is seen as having a potential separateness from the rest of the body, in that it can be cleanly severed.” Vision provides a more nuanced, hierarchical structure, but in general the senses appear to be aligned in their default segmentational strategies.

So what can we predict about how languages label these perceptual parts? Figure 3.1 provides a good basis to lay out the possibility space for how languages name the body and its parts. Beginning with level A, the classic review articles on nomenclature for the body by Brown (1976) and Andersen (1978) propose that the geon on this level, i.e., the BODY, will be universally labeled.

The next level—level B—is often taken as the “basic level” as illustrated in this quote from Tversky (1989, pp. 993–994): “an extraterrestrial being, with a cognitive system similar to ours, may, in trying to comprehend Homo Sapiens, decompose a human first into head,

trunk, arms, and legs.” The notion of a basic level for parts (as opposed to kinds) is problematic, but has a certain utility here in order to test hypotheses about naming patterns cross-linguistically. For example, Andersen (1978) has claimed that all languages will label HEAD, TRUNK, ARM (and HAND), and LEG (and FOOT) (see also Brown 1976 and Wierzbicka, 2007). The content in parentheses is informative here, since it already suggests a variation in naming across languages—that “There is not always exact correspondence across languages for the reference of a given term” (Andersen, 1978, p. 351). At the next level, level C, we can ask whether languages name the UPPER-ARM, LOWER-ARM, HAND, UPPER-LEG, LOWER-LEG, and FOOT with distinct terms. According to the most simplistic hypothesis every visually segmented body part would be named in language. This could be read from claims such as made by Hoffman and Richards (1984): “It is probably no accident that the parts defined by minima are often easily assigned verbal labels” (p. 82).

In the next section, I will illustrate how languages differ in which parts they single out for naming. Nevertheless, naming of body parts is not unconstrained by the segmentations provided by perception, a point to which we will come back in the final section.

VARIATION OF BODY PART CATEGORIES ACROSS LANGUAGES

Before examining how well words across the world’s languages map onto perceptually derived parts of the body, some thought needs to be given as to what sorts of linguistic units we wish to consider. At the heart of the problem is the fact that the same referential entity can be expressed in language in different ways. Within a single language choice of expression can convey a different perspective, for example, the family dog could felicitously be referred to as “*Rover, the family pet, our dog, Tim’s pup, the rubbish-bin, the destroyer of shoes, or even the vacuum-cleaner*” (Clark, 1997, p. 2); however not all of these expressions are on par; rather some seem to be more fundamental or “basic.”

For example, in Tarascan (spoken in Mexico) one common way to talk about body parts is through a set of suffixes. These provide information regarding the spatial relationship between objects and can be used to describe the location of an experience. For example, the verb root *p’ame* ‘feel pain, ache’ can be combined with different body part suffixes to express where the pain is felt, *p’ame-cha-ni* ‘to feel pain in the throat’, *p’ame-k’u-rha-ni* ‘to feel pain in the hand(s)’, *p’ame-a-rha-ni* ‘to feel pain in the stomach’, *p’ame-ndi-ni* ‘to feel pain in the ear(s)’, *p’ame-t’a-rha-ni* ‘to feel pain in the leg(s)’, *p’ame-ɲarhi-ni* ‘to feel pain in the face or eyes’, etc. (Friedrich, 1971; Mendoza, 2007). Tarascan is not unique in having such a set of body part morphemes. Body part verb suffixes appear in Totonac (Levy, 1999), and there are verb prefixes in North American languages for doing things ‘by hand’, ‘by foot’, etc.

One interesting thing about these body part suffixes is that they can have unusual referents. For example, the nose and forehead are conflated under a single suffix, *-ni* in Tarascan, which leads Andersen (1978) to claim that in this language the term for nose includes the forehead. But Tarascan also has a distinct noun that refers to the nose and another for forehead (Lathrop, 2007). In fact, there appears to be a dual semantic system for body part categorization in Tarascan and the other languages above: one that is expressed in nouns and another more schematic one that is expressed in grammaticalized morphemes. For a complete perspective of how languages categorize body parts, it would be important to consider these non-nouns also. For now, though, we ask the simpler question of how nouns in different languages categorize body parts, with the goal of examining whether they partition the body in the same way across languages. Literally descriptive expressions, such as the *right foot* or *the back of the knee*, in which the meaning of the whole is a direct combination of the meaning of the parts, will be excluded from consideration. Rather, the focus will be on expressions that are conventionalized. This would include complex expressions that are decomposable, but in which the

whole meaning is not descriptive. For example, *underarm* in English is decomposable into *under* plus *arm*, but the meaning of this phrase is not predictable, as can be seen by the fact that it means *ARMPIT* in English but the cognate *onderarm* in Dutch means *FOREARM*.

Having established what words we will be comparing, the question then, is whether all languages have a term to refer to the parts at every level of the part hierarchy in Figure 3.1? Recall that Andersen (1978), Brown (1976), and others propose that (1) all languages will label level A, the *BODY*, (2) all languages should label *HEAD*, *TRUNK*, *ARM*, and *LEG* in level B because these are “basic” parts, and (3) *UPPER-ARM*, *LOWER-ARM*, *HAND*, *UPPER-LEG*, *LOWER-LEG*, and *FOOT* should receive distinct labels since they are parts defined by minima.

To be able to determine whether languages have terms for the body parts listed above, detailed descriptions of body part naming systems from geographically, genealogically, and typologically distinct languages are required. By ensuring a broad and diverse language sample, we can be more confident that any generalizations discovered hold beyond the particular languages studied. Detailed descriptions are required because consulting a dictionary or word list from a grammar will often not provide enough information to establish the exact meaning of a term. For these reasons, a concerted effort was made to provide detailed descriptions of body part

terminology at the Language and Cognition group, Max Planck Institute for Psycholinguistics (Majid, Enfield, & van Staden, 2006). A team of field researchers used a standardized battery of linguistic tests to collect information about body part terminologies in a broad sample of languages (see Table 3.1). The languages studied were mostly from small-scale “traditional” societies (with the exception of Punjabi and American Sign Language). Researchers were experts on the languages: they were either speakers of the languages described themselves or had conducted long-term linguistic and ethnographic work on the language communities. There are two main advantages of this method of data collection: (1) because the same battery of tests is used in different languages, maximal comparability is ensured, and (2) because language experts conduct the study in different settings, language-specific nuances are more likely to be detected and can therefore be respected in the comparative endeavor.

In the following sections, I will draw primarily on these languages and consider each of the above proposed claims of body part naming in turn.

Proposal 1: All Languages Will Label the Body

This is not a universal. There are languages that do not have a term for *BODY*, the leftmost cylinder in Figure 3.1, on the highest level of the perceptual hierarchy. That is, there is not a

TABLE 3.1. Contributions to Special Issue of *Language Sciences* Parts of the Body: Cross-Linguistic Categorization^a

Language	Country Spoken	Researcher
Jahai	Malaysia	Niclas Burenhult
Lao	Laos	N. J. Enfield
Kuuk Thaayorre	Australia	Alice R. Gaby
Yéli Dnye	Papua New Guinea	Stephen C. Levinson
Punjabi	Pakistan, India	Asifa Majid
Tiriyó	Brazil/Surinam	Sergio Meira
American Sign Language	United States	Jennie E. Pyers
Lavukaleve	Solomon Islands	Angela Terrill
Tidore	Indonesia	Miriam van Staden
Savosavo	Solomon Islands	Claudia Wegener

^aMajid et al. (2006).

term that refers to the uniquely physical appearance—as opposed to the social dimension—of a person. This is the case in Tidore, a Papuan language spoken on the island of Tidore in the North Moluccas. In Tidore, the term *mansia*, which could be used to refer to level A, has a wider scope, meaning ‘person’ or ‘human being’ (van Staden, 2006). This appears to be a common pattern, and has been reported for Tiriyó, spoken in the northern Amazonia (Meira, 2006) and Kuuk Thaayorre, spoken on the west coast of Cape York, Australia (Gaby, 2006; see also Wilkins, 1996; Evans & Wilkins, 2001).

These reported counterexamples have been challenged by Wierzbicka (2007; cf. Goddard, 2001), who claim that in these languages, the term for ‘person’ is polysemous, with one sense referring to the physical body and another sense to the person. If we accept this argument, then the universal of naming of the body could be upheld and Proposal (1) would remain intact. Since this is a crucial point, let us consider the argument more closely.

Both Wierzbicka and Goddard suggest that if the same word has distinct interpretations in different syntactic constructions then that word must have distinct senses stored in the mental lexicon. But distinct interpretations can be generated on the fly (i.e., pragmatically generated), rather than stored as separate lexicalized entries. For the languages cited, there could be a general meaning corresponding roughly to ‘person’, with ‘body’ being understood within a specific situation. Ordinarily, however, a general interpretation would be sufficient for communication—for example, Evans and Wilkins (2001) describe how Arrente-English bilingual speakers translated a notice on diabetes, which in English read “all these things are bad for the body,” to “thing this all bad *tyerrtye* (= ‘person/body’).” There is no need to specify further—a general interpretation is sufficient—since what is good/bad for the body is good/bad for the person. They conclude that “the distinction between the ‘body’ sense and the ‘person’ sense of Arrente *tyerrtye* becomes blurred (and is inconsequential for adequate comprehension)” (Evans & Wilkins, 2001, p. 502). Or to take an example

from a different domain: When I use the word *bird* any member of the category could be meant (it is a general term), but a specific member might be inferred in the right context (e.g., *I saw a bird stick its head in the sand* = ostrich). This does not mean that the meaning of *bird* is polysemous. In the same way, we could say that *tyerrtye* is not polysemous.

Wierzbicka and Goddard argue that a polysemous interpretation is necessary unless a unitary definition—which can account for the range of the word’s usages—can be provided. Critically, they require that the unitary definition should be a paraphrase in natural language.² This is the cornerstone of the Natural Semantic Metalanguage (NSM) approach, according to which all word meanings can be defined by a set of simpler words—“primes”—that are innate, universal, and themselves not definable (Wierzbicka 1972, 1996; Goddard, Chapter 4, this volume). This insistence on a single definition in natural language comes only from practitioners of NSM; it is not a generally accepted requirement. Meaning as reduction to simpler components is not widely accepted in the cognitive and linguistic sciences today; rather many take an “embodiment” or “simulation” viewpoint instead (e.g., Barsalou, 1999; see Kemmerer, Chapter 14, this volume). The fact is that in ordinary usage of language it may not be necessary to have a distinctly lexicalized expression for BODY, as the above example from Arrente demonstrates.

In Tidore there is no indigenous word for BODY but speakers can use the Indonesian loan word *badan* ‘body’ to specify the purely physical component. Whereas many would take the borrowing as evidence for an existing lexical gap in the language, Goddard (2001, p.15) argues that “some languages have borrowed terms for semantic primes, presumably replacing the earlier indigenous words.” So, the argument goes, Tidore did have a term for body but just replaced it with a new word from Indonesian. It is hard to see why a single body part term would be borrowed (if there was no gap), particularly since other body part terms are indigenous (cf. Hale, 1994).

The crux of Wierzbicka and Goddard's objections to abandoning Proposal 1 is that within NSM no distinction is drawn between semantic and conceptual representations. The BODY is viewed as a conceptual universal and to deny that a language has a word meaning 'body' is to deny that the language community has the concept BODY. But this conclusion follows only if we conflate linguistic meaning with nonlinguistic representations; we can deny that there is a specific word with the semantics 'body' without denying that a person could entertain that concept. Speakers of languages such as Tidore, Tiriyo, and Kuuk Thaayorre do not have words for the body, but that does not entail that they do not have the concept BODY.

Proposal 2: All Languages Will Label the "Basic" Parts HEAD, TRUNK, ARM, and LEG

After the BODY, the next level of the hierarchy in Figure 3.1 has the major subdivisions of the body. This level may conceivably be thought of as the "basic" level, or the level with the most salient parts (Tversky, 1989). Do languages label each of these generalized cones? On one version of this hypothesis, there would be separate words for each of the cones present. No theorist predicts this, of course, since symmetrical parts are not expected to be lexicalized distinctly. Nevertheless, distinct words for the HEAD, TRUNK, ARMS, and LEGS may be expected to exist in every language of the world, but do not.

Jahai, an Aslian language of Malaysia (Burenhult, 2006), does not have a term for the head. The closest contender is the term *kuy*, which in every day discourse refers to the top part of the head, not the whole generalized cone. We may wonder if this is just an idiosyncratic lexical gap in this language, but the lack of a term for head seems to be consistently absent in many other Aslian languages, including Semelai, Mah Meri, and Ceq Wong (N. Kruspe, personal communication).

Jahai *kuy* (and its cognates in the languages above) is the closest equivalent to head because if someone is beheaded this would be the term

that would be used to refer to the disembodied head. But this usage is most probably a case of metonymic extension since all other evidence confirms the word has a much narrower sense than HEAD. When speakers of Jahai, Semelai, and the other Aslian languages are asked to color in the head on a line drawing of a body they color only that part of the head that is covered with hair. Corpus evidence also supports a narrower sense for the head term. For example, when a Mah Meri speaker says *baci? koy*³ 'look.through head' it means to look through someone's hair for lice or dandruff and *tac koy* 'cut head' means to cut someone's hair, **not** behead someone.⁴

Moving to the next "basic" part—the TRUNK—it appears that this body part is not highly salient for naming purposes. Many languages, such as Jahai, Tiriyo, Tidore, Punjabi, and Savosavo (a Papuan language spoken on the Solomon Islands), lack a distinct term for the trunk. Commonly—across languages—the same term is used for torso as for the whole body, as is the case in Yéli Dnye, for example. It is much rarer to find a distinct term for the torso alone, although it does happen (e.g., Kuuk Thaayorre *remngk*). A closer look at the exact meaning of the trunk terms reveals further fine-grained differences between languages. For example, when speakers of Yéli Dnye are asked to construct a partonomy of the body, under the 'trunk' sense of *pâá* they include chest, belly, and buttocks (Levinson, 2006). English speakers, on the other hand, do not consider the buttocks to be part of the torso but part of the legs instead.

Terms for LEGS and ARMS likewise show considerable variation across languages. Lavukaleve (another Papuan language of the Solomon Islands) has one general term for ARMS and LEGS, thus categorizing together spatially discontinuous parts (Terrill, 2006). This term is somewhat reminiscent of English *limb*, but unlike English there is no other specific word to refer to the arm or leg, respectively.⁵ Lavukaleve contradicts previous claims that the arm and leg are always given distinct terms (Andersen, 1978; Brown, 1976).

At the other extreme, Jahai has a very fine-grained categorization of the limbs. It also

lacks terms for ARMS and LEGS at the “basic” level of the hierarchy. There are no superordinate terms, as found in Lavukaleve, but also no distinct terms for ARMS and LEGS separately. Jahai has a much more fine-grain categorization system for the limbs, as will be discussed in the next section.

For languages that do have terms for ARM and LEG, one issue that remains to be determined is whether these words refer to the whole geon in level B of Figure 3.1, or whether they have a more restricted range. The issue is whether HAND and FOOT are included in the referential range of ARM and LEG: Does *arm* in English end at the wrist and *leg* at the ankle, or do they extend to include the extremities? We’ll come back to this issue in a later section.

To summarize, it appears that there is not a universal “basic level” for body parts that includes HEAD, TRUNK, ARMS, and LEGS. The closest equivalents to these terms can have differing extensional ranges, and the first level of categorization of the body can be more general, for example, collapsing the distinction between ARMS and LEGS or more specific, as in the Jahai system. The next section examines whether all parts defined by minima are named across languages.

Proposal 3: Parts Defined by Minima, e.g., UPPER-ARM, LOWER-ARM, HAND, UPPER-LEG, LOWER-LEG, and FOOT, Will Be Named in Languages

As just mentioned, there are languages, such as Jahai, that name the limbs at a fine level of granularity with separate terms for UPPER-ARM, LOWER-ARM, HAND, UPPER-LEG, LOWER-LEG, and FOOT. Recall that Jahai lacks a term for HEAD and TRUNK too. The language system favors naming at a finer level across the board for body parts (Burenhult, 2006). Granularity of naming is not always consistent within a language, however. In Hopi, for example, there are discrete terms for UPPER-LEG (*qa:si*), LOWER-LEG (*hókya*), and FOOT (*kúkú*), as in Jahai, but HAND-ARM receives a single label (*má:ʔa*), with no further elaboration (Swanson & Witkowski, 1977). Similarly, in Yéli Dnye there are more distinctions made for the lower body than the upper body.⁶ But

different again from Jahai and Hopi, while the UPPER-LEG is singled out for naming, the LOWER LEG and FOOT distinction is collapsed under a single term.

Perhaps the most salient discontinuities to be recognized at this level of granularity are those distinguishing HAND and FOOT. The discontinuities are as salient for their functional significance as for their perceptual distinctness: hands for manipulating objects; feet for walking. Two-thirds of the world’s languages have a distinct word for HAND. But the remaining one-third does not make this distinction, collapsing HAND and ARM OR HAND and LOWER ARM (Brown, 2005; Witkowski & Brown, 1985). Where HAND and ARM are not distinguished, the proper analysis may be that the whole upper limb geon in level B is named, but the HAND geon in level C is not distinctly labeled. Or to put it another way, the HAND geon in level C is not singled out as a distinct part in linguistic categorization. This is the case in Savosavo (Wegener, 2006). The word *kakau* is general over hand-arm. If someone says that they broke the *kakau* or that their *kakau* is dirty it could refer to any part of the geon in level B (see also Liston, 1972, on Serbo-Croatian).

As with body/person, Wierzbicka (2007) has argued that words such as *kakau* are polysemous between ‘arm’ and ‘hand’; there are two distinct senses. Her argument is that since hand is a crucial concept required to explicate many other word meanings, such as *slap*, *stroke*, and *tear*, it must be universally lexicalized. In fact, to perform any of these actions requires not just the hand but the whole hand-arm.⁷ Although English speakers associate such verbs with the hand (Maouene, Hidaka, & Smith, 2008), in motor terms the hand-arm is a single coordinated entity that achieves the action. Logically, then, there is no reason why the unified hand-arm could not be used to explicate “manual” actions. Or, where required, more specific parts could be recruited: *slap* could be done with the palm and *tear* and *stroke* with the fingers, etc. To be able to distinguish these accounts requires careful investigation and experimentation.

There are further subtle differences within languages that do distinguish HAND and ARM in

precisely which perceptual geon is selected. Punjabi and Dutch speakers both have distinct terms for hand and arm (and foot and leg), but exhibit divergent intuitions about the relationship between these parts. Punjabi speakers are clear that the hand is not part of the arm and the foot is not included in the leg, but Dutch speakers are not so sure about this. Some Dutch speakers include the hand within the scope of the arm term whereas others exclude it (and likewise with the leg-foot). A similar situation exists in English. According to some tests hand appears to be included in the meaning of arm—one can say that *the hand is part of arm* or *an arm has a hand*. But according to other tests hand is not integral to the meaning of arm, as illustrated by the following example: A: *Did you find the arm?* B: *Yes, but the hand was missing.* B: *Yes, but the forearm was missing* (Cruse, 1986).⁸

PRINCIPLES OF BODY PART CATEGORIZATION ACROSS LANGUAGES

Although the same visual paratomy (i.e., the full set of “geons”) in Figure 3.1 is perceptually available to speakers of different languages, not all of them—or even some subset—is universally singled out for the purposes of linguistic categorization. Lavukaleve and Jahai, for example, represent two very different solutions for how to refer to the arms and legs; in the former language only a general word exists to refer to the limbs, whereas in Jahai there are no “basic” terms. Instead UPPER-ARM, LOWER-ARM, HAND, UPPER-LEG, LOWER-LEG, and FOOT are all distinctly labeled. English has distinct terms for ARM and LEG versus HAND and FOOT, whereas Savosavo has only general words for ARM-HAND and LEG-FOOT. Speakers of Yéli Dnye have a distinct word for UPPER-LEG and another word for LOWER-LEG-FOOT. And so on. Naming at each one of the levels of the hierarchy seems to be an independent choice, as can be seen from Figure 3.2. Whereas Lavukaleve names at the “superordinate” level and Jahai at the “subordinate” level, speakers of Punjabi have conventionalized expressions at all levels.

Universals in body part naming are not to be found in the precise parts that are labeled then. But perhaps discontinuities provide constraints in how body part words can refer to the world. Rather than geons waiting to be labeled by body part words, perhaps words select possible extensions and the word’s potential reference is delimited by the boundaries in the perceptual field. This would mean that body part terms may vary in the precise extension they have, but they should never defy the discontinuities provided by perception. This proposal is not an obvious fact. van Staden (2006), for example, argues that in Tidore the ‘leg’ term in Tidore, *yohu*, begins at the foot but ends three-quarters of the way up the thigh, where there is no perceptual discontinuity in the body image. Despite the lack of a natural boundary, there may be some other perceptually salient feature at play here. Perhaps Tidore speakers wear shorts or skirts that end at the mid-thigh and the clothing thus creates an artificial perceptual boundary. Alas this is not the case. Tidore speakers wear sarongs that come down at least to the knee. van Staden suggests that the boundary of *yohu* is not a physical one but a social or moral one—the boundary of *yohu* marks the beginning of the taboo genital area. So it is an empirical question as to what extent perceptual boundaries constrain the reference of body part words across languages.

Given that joints play such a fundamental role in our visual, tactile, and motor representations of the body, the possibility that they may not in our semantic representation of the body is striking. To investigate this possibility further and find the precise mapping of body part words onto the body, my colleagues and I used a very simple method to establish the extension of body part terms in different languages. We asked a number of speakers from a wide array of languages to color in a selection of body part terms from their own language (van Staden & Majid, 2006). Figure 3.3 shows the outcome of the coloring-in task when speakers of Dutch, Japanese, and Indonesian were asked to color in the arm.

It is important to know that the three languages differ in their naming patterns for the

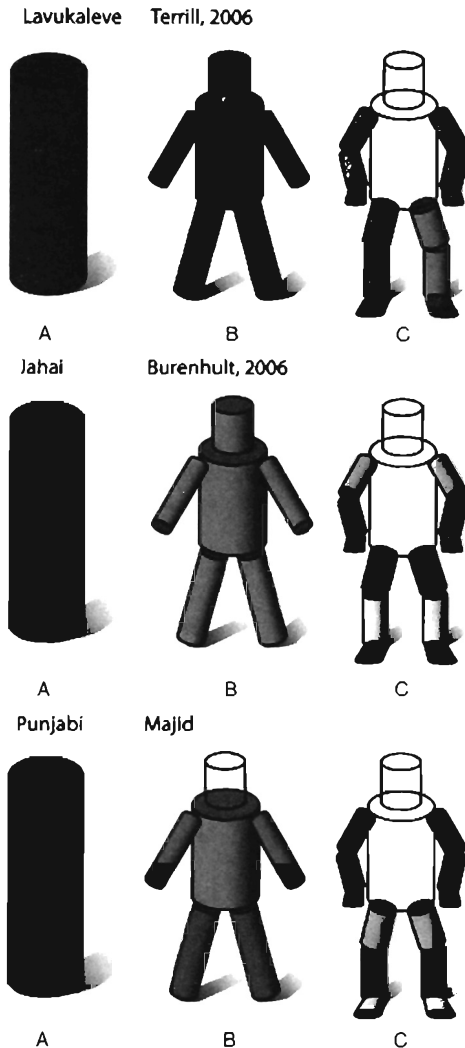


FIGURE 3.2. Grayscale rendition of Color Plate 1 illustrating three different languages and how they name parts of the body (A–C). See Color Plate 1 for interpretation. A gray geon means that there is no conventionalized means for talking about that body part. So, for example, in Jahai there is no word for HEAD, TRUNK, ARM, or LEG. Within a language, geons with the same color are referred to with the same word. Thus Lavukaleve speakers use *tau* to refer to ARM and LEG. Note that while Lavukaleve names body parts at level B, Jahai names at level C, and Punjabi names at all levels suggesting that naming of geons at each level of the hierarchy is an independent choice.

limbs. Dutch, like English, has distinct words for HAND, ARM, FOOT, and LEG. Japanese distinguishes HAND from ARM but has a single term covering FOOT–LEG. Indonesian is less differentiating again and has a single term for HAND–ARM and another for FOOT–LEG. For all of these body parts, speakers colored in parts largely

respecting the perceptual discontinuities provided by the joints. Most Indonesian speakers colored in from the fingertips to the shoulder joint; some colored in only the hand to the wrist, suggesting that hand is the primary meaning of *tangan* for them. Japanese speakers showed more variability in their coloring in.

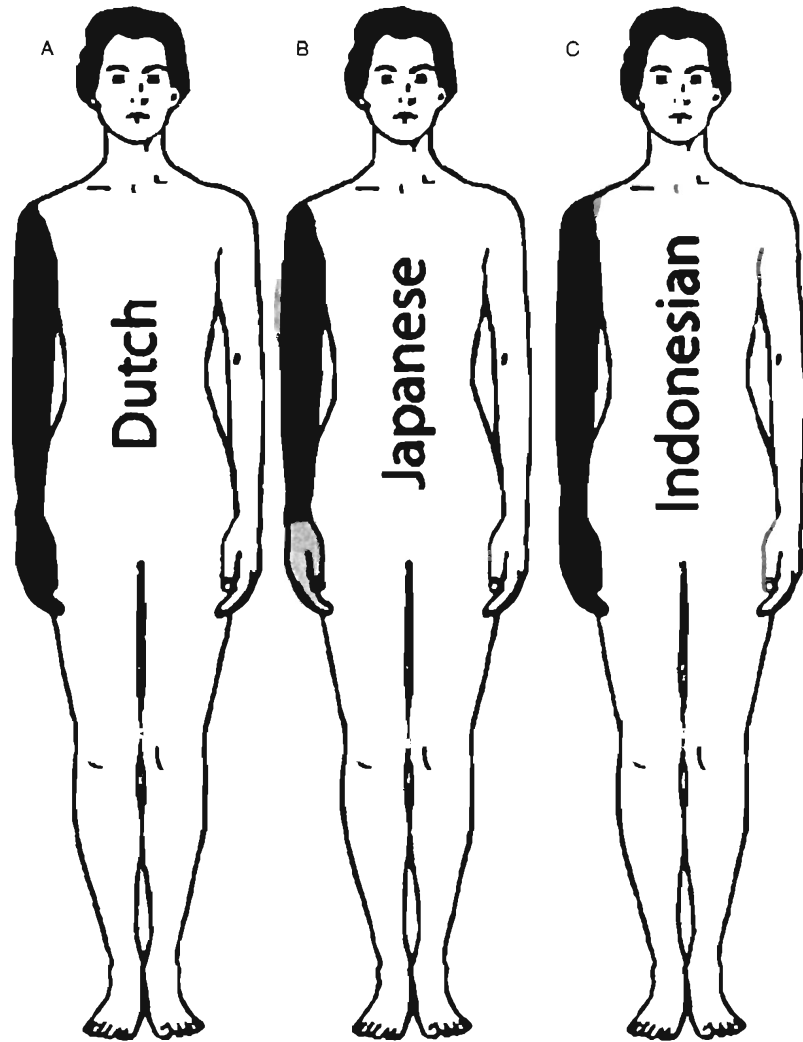


FIGURE 3.3. Grayscale rendition of Color Plate 2. See Color Plate 2 for interpretation. Eight Dutch, Japanese, and Indonesian speakers were asked to color in parts of the body. Their responses were then layered into a single image so that points of consensus could be viewed. The darker the image, the more speakers colored in that part of the body; the lighter the image, the fewer who included that part. These are the results when Dutch speakers were asked to color in the *arm*, Japanese speakers the *ude*, and Indonesian speakers the *tangan*.

Remember, Japanese distinguished *HAND* from *ARM* with distinct terms. In their coloring in, only one speaker included the *HAND* in the extension of *ude*, the term for *ARM*. Most colored from wrist to shoulder, one or two colored from elbow to shoulder, and one or two others showed no clear adherence to the joints as landmarks. Dutch speakers showed a split pattern in their

coloring: half colored from fingertips to the shoulder and half from the wrist to the shoulder. So even though Dutch has a distinct term for *HAND*, many speakers think that the *HAND* is included in the reference of *arm*. The notable result from this is that despite variations in how many lexical distinctions are made in the language, speakers still respect the boundaries provided by the joints.

The composite pictures in Figure 3.3 graphically illustrate how participants respect boundaries at joints. These figures were created by superimposing all the pictures colored-in to the translation-equivalent of arm by speakers of the three languages. Remember that Dutch and Japanese have distinct terms for arm and hand, whereas Indonesian has a single hand–arm term. Regardless of this difference, speakers from all three languages colored up to the shoulder joint and down to either the wrist or the fingertips.

These results support the claim that joints constitute delimitation points for the extension of body part terms. Regularities in body part naming come not from which geons are selected for reference. Instead granularity and depth of naming of body parts differ across languages, with perception helping to provide constraints on the precise reference of the terms.

CONCLUSIONS

Faced with the variable mapping of language onto the body, it could be concluded that body part categories expressed in language are not formed on a perceptual basis. But this does not do justice to the mappings we observe. The variability that we see in the mappings of words to world is constrained by perception. Even though the precise segments selected by different languages vary—limb versus upper arm, lower arm, etc—the terms pick out constrained spaces. Visual discontinuities (and other perceptual cues) can help in categorizing body parts. At the same time, the cross-linguistic variability we see in the meaning of body part terms suggests that different parts of the body are open to interpretation, making the system of meaning associated with body part terms partially arbitrary. Individuals have to learn the linguistic conventions of their community to determine which of these discontinuities are relevant for the language they are learning. The externalized words, or signs, of a language help provide a way of coordinating

individual representations so that of the myriad different solutions they could adopt, speakers within a community can come to a common solution for referring to the body (Belpaeme & Steels, 2005). Thus members of each language community must learn a system that in part is grounded in perception and in part is a function of local interpretation.

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Notes

1. This conforms rather nicely to Wierzbicka's (2007) analysis of head, according to which ROUND is an important component of the meaning of *head*.
2. The criterion is stronger than this; the unitary meaning should be explicated in "an independently justified set of semantic primes" (Wierzbicka, 2007, p. 30).
3. This is cognate to the Jahai *kuy*.
4. Thanks to Nicole Kruspe for kindly providing these examples.
5. If necessary, phrasal expressions can be used to specify whether the arm or the leg is intended—*tau furi me* (literally 'lower/west limb') and *tau vego me* (literally 'upper/east limb'). (East-up and west-down are commonly conflated in the languages of the Solomon Islands.) But in common discourse, the general term *tau* is used without further specification.
6. These languages form counterexamples to the proposed universal by Andersen (1978) that languages make more distinctions for the upper body than the lower body.
7. See de Vignemont et al. (2009) for evidence that action unifies body parts.
8. Another example from Cruse (1986) serves to further illustrate this point. *There were burns on his fingers* entails *There were burns on his hand*. However, *there were burns on his hands* does not entail *There were burns on his arms*.

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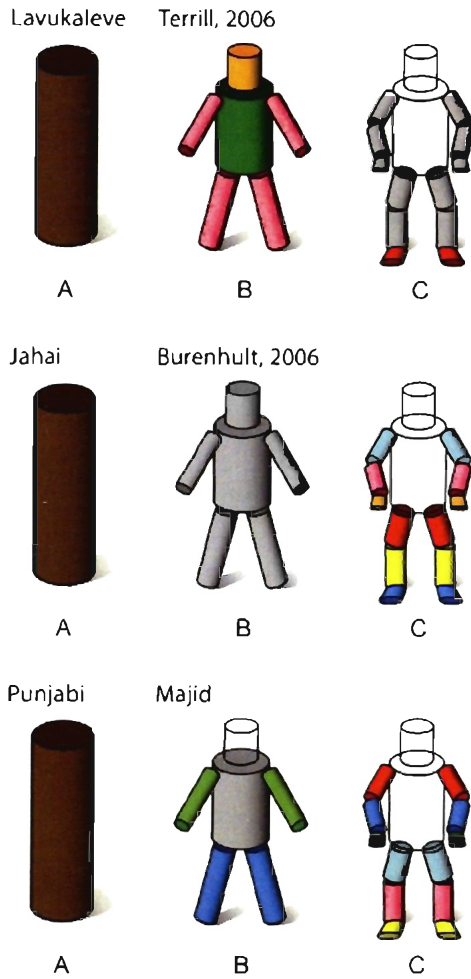


PLATE 1. Three different languages and how they name parts of the body (A–C). A gray geon means that there is no conventionalized means for talking about that body part. So, for example, in Jahai there is no word for HEAD, TRUNK, ARM, or LEG. Within a language, geons with the same color are referred to with the same word. Thus Lavukaleve speakers use *tau* to refer to ARM and LEG. Note that while Lavukaleve names body parts at level B, Jahai names at level C, and Punjabi names at all levels suggesting that naming of geons at each level of the hierarchy is an independent choice. (See Figure 3.2)

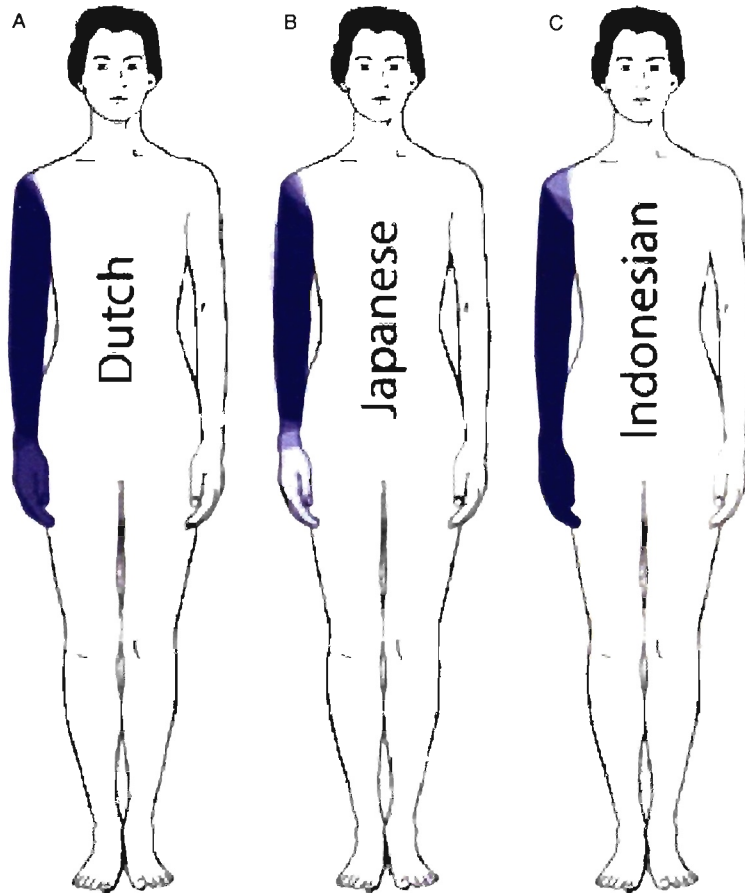


PLATE 2. Eight Dutch, Japanese, and Indonesian speakers were asked to color in parts of the body. Their responses were then layered into a single image so that points of consensus could be viewed. The darker the image, the more speakers colored in that part of the body; the lighter the image, the fewer who included that part. These are the results when Dutch speakers were asked to color in the *arm*, Japanese speakers the *ude*, and Indonesian speakers the *tangan*. (See Figure 3.3)