

ON THE SEMANTIC CLASSIFICATION OF THE HUMAN BODY BY
ENGLISH SPEAKING CHILDREN AND TSWANA SPEAKING ADULTS

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An intriguing issue in the study of language universals has its starting point in the semantic categories children formulate as they acquire the meanings of lexical items. In particular, these categories are of interest in so far as they may reflect more general principles of cognitive classification underlying linguistic categories. Our goal then is to identify a principle governing the semantic extension of a category at a particular stage of psycholinguistic development. Once identified, we can search for a reflex of this principle in the internal structure of an adult category governing the same or a similar domain and in the semantic category structure of this domain is unrelated languages.

Consistent with this approach, a first step will be taken toward examining a single domain, namely that of clothing and apparel. The point of departure will be previously published findings regarding English speaking children's understanding of the superordinate category clothes. Subsequently, the classification of clothes and body apparel by English speaking adults and then by speakers of Tswana, a Southeastern Bantu language, will be examined. It will be suggested, tentatively, that the classification scheme underlying this domain reflects a perceptual classification of the human body into two major spatial areas.

Before proceeding, a few preliminaries require clarification. First, it might be assumed that since the particulars of clothes and body apparel vary from culture to culture, little opportunity for observing general patterns of classification exist in this domain. To an extent this may be true. However, clothing items and body apparel invariably are placed and worn on the human body, and on different parts of the body. It is the human body, not particular clothing and apparel items, that provide a spatial reality common to all cultures. Building on this assumption, the domain of clothing, with respect to its relationship to the human body, seems a viable research domain.

Further reason for investigating the domain of clothing and apparel stems from the study of human body parts. Discussion of the principles

of semantic classification to which the human body space is subject has been limited to body part terms, paronyms as they are called by Brown (1976). Anderson (1978) has relied on much of this discussion, in particular the relations of polysemy among body part terms, to infer principles of classification pertinent to the human body.

As a frame of reference for discussion, Anderson (1978) follows the so-called natural dimensions developed in Clark (1973). These dimensions result in spatially contiguous semantic categories, such as left and right side of the saggital plane of the body and the upper and lower part of the vertical plane of the body. These dimensions, in addition, appear to have favored directions whereby the saliency of the upper part of the body is linguistically marked with respect to the lower body. For instance, it is not uncommon to find a polysemous term referring to FINGERS AND TOES and, at the same time, to find the term morphologically unmarked when referring to FINGERS. Anderson holds that patterns such as this argue for the saliency of the upper body over the lower body. Anderson also argues that this saliency is reflected in the acquisition of language. For example, she found that children list parts of the body by starting with terms for the upper body rather than terms for the lower body. Also, children apparently learn names for particular body parts in an order that purportedly reflects a saliency of the upper body. It is interesting to note, however, that children learn names for the peripheral parts of the body, head, feet and arms, before they learn names for the torso. Extrapolating from the Anderson discussion, one might expect to find the so-called natural categories reflected in the domain of clothing and body apparel in English and other languages. In fact, it appears that such a viewpoint, though mistaken, underlies past analyses of this domain in Tswana. Before discussion of this point, let us consider English speaking children's understanding of the clothing domain.

An early investigation of English speaking children's understanding of the clothing and apparel domain is found in Saltz, Soller and Sigel (1972). Saltz et al. investigated the development of English speaking children's understanding of six superordinate categories, one of which was clothes. Categories of this nature were investigated in order to explore children's conceptual development, in particular their tendency for category underextension. In general, underextension refers to the child's tendency to restrict a term to only a subset of the exemplars accepted in the normal range of adult usage. For example, doggie might be restricted to a dog in the home, thus excluding the neighbor's dog. In order to assess understanding of these superordinate categories, a sorting task involving pictured exemplars from each of the six categories was undertaken. There were 72 pictures total, 12 from the category clothes.

Also, the pictured exemplars were chosen to reflect the range of each category. Children from kindergarten, third and sixth grade participated, 24 from each grade. For each child, the procedure included: presentation of a superordinate category, presentation of all 72 pictured exemplars and selection of those pictures judged to depict instances of the category.

The results obtained by Saltz et al. (1972) indicated that the youngest children fragmented superordinate categories. Fragmentation was not generally evident among the two groups of older children, however, since they picked out the appropriate range of exemplars required by each category. What is of value for present purposes is the content analysis of the pictures sorted by the children. In this regard, Saltz et al. (1972:1198) note that the youngest children classified under the category clothes exemplars that were "textiles worn between the shoulders and the knee." Clothing and apparel worn on the extremities, head, arms and feet, alone were not included under the category clothes for the kindergarten children. Though Saltz et al. do not list response scores for each of the pictured exemplars involved in their study, some percentage scores are provided. The percentage of subjects, from the oldest and youngest age groups investigated, who classified a pictured exemplar under the category clothes are presented in Table I.

TABLE I. The percentage of subjects from the kindergarten and sixth grade groups in Saltz et al. (1972) who sorted pictures of particular items of clothing under the category clothes.

| | <u>dress</u> | <u>shirt</u> | <u>sweater</u> | <u>gloves</u> | <u>hat</u> | <u>shoes</u> |
|--------------|--------------|--------------|----------------|---------------|------------|--------------|
| KINDERGARTEN | 93 | 54 | 58 | 37 | | |
| SIXTH GRADE | 93 | 92 | 83 | 79 | | |

From the data in Table I we can infer that the youngest children were operating with two covert semantic categories: one category encompassing clothing and apparel worn on the trunk or torso and the other encompassing items worn on the extremities, where extremities refers to head, feet and hands. Interpreted in this fashion, it seems that two major spatial locations on the human body were respected by the children.

Children's underextension of the superordinate category clothes is also taken up Anglin (1977). He raises what seems a fundamental

issue with respect to children's underextended word meanings. In essence, he wants to determine on what grounds only particular exemplars within the extension of a superordinate category are included in the child's underextended meaning. That is, is there a principle governing the child's selection of exemplars as being within the extension of his category. Anglin posits two possible determining factors.

First, some exemplars may be included by the child because they are in some sense central to the category. With this, Anglin (1977) assumes that the extension of a semantic category can be defined in terms of an internal structure consisting of typical instances, specifying a core or central meaning, and shading off into peripheral instances. Research attempting to explicate the notion of internal structure has been conducted extensively by Rosch (1974, 1975, 1978). This research suggests that English speaking adults find it meaningful to rate exemplars of a category as to their degree of centrality to the meaning of a category and, more important, they agree as to the choice of exemplars considered most central. Following this line of thought, Anglin suggests that children's underextended word meanings initially may consist of exemplars judged to be central to the meaning of a category. Such an hypothesis must certainly be constrained, however, since Anglin notes that children frequently fail to include human beings in the category animal whereas adults seem to rate humans as central.

A second possible factor according to Anglin (1977) may be the child's lack of familiarity with the entire range of exemplars included within the extension of the corresponding adult category. Unfamiliar exemplars, accordingly, might be excluded by the child from the extension of a word due to his lack of experience. Familiar objects, on the other hand, may also encourage underextension. The child in this case may possess a specific name or label for a familiar object and either not realize an object can belong to two categories at the same time or be unwilling to attribute two different labels to a single object.

In order to tease apart the role of centrality and familiarity in children's underextended word meanings, Anglin (1977) also conducted a sorting task. A total of four superordinate categories were investigated, one of which was clothes. Twenty children between the ages of 2.10 and 6.6 as well as ten adults participated in the investigation. These subjects sorted pictured exemplars of clothing items determined to vary on values of centrality and familiarity.

The determination of the centrality and familiarity values of the pictured exemplars was obtained from adult ratings gathered by Anglin. Adults were asked to rate each pictured exemplar as to its distance from typical instances of the category and as to its general familiarity. Both the centrality and familiarity ratings for the category exemplars were made on a 7 point scale. The mean ratings for each exemplar are presented in Table II. What is of initial interest with respect to Table II is that the items with relatively high centrality, above 4.9, are items of clothing worn primarily on the trunk of the body. Cross cutting the scores based on centrality are the scores based on familiarity, e.g., kimono has a high centrality rating but a low familiarity rating. Perhaps one difficulty with Anglin's assessment of familiarity is that it is based on adult judgments and these may bear little relationship to item familiarity for children.

TABLE II. Ratings of Centrality and Familiarity of pictured exemplars of clothing items made by adults and the percentage of children who picked out each as an instance of the superordinate category clothes.

| | <u>Centrality</u> | <u>Familiarity</u> | <u>Percentage</u> |
|------------------|-------------------|--------------------|-------------------|
| shirt | 6.8 | 7.0 | 85 |
| pants | 6.6 | 6.8 | 85 |
| dress | 6.6 | 6.3 | 80 |
| kimono | 4.9 | 3.2 | 75 |
| coptic tunic | 5.1 | 3.1 | 80 |
| 1587 suit | 5.2 | 3.5 | 80 |
| high heel | 4.2 | 6.5 | 25 |
| scarf | 3.8 | 6.3 | 50 |
| skates | 3.4 | 6.3 | 25 |
| lace collar | 2.2 | 2.2 | 20 |
| 1715 wooden shoe | 2.4 | 2.3 | 30 |
| Venetian hat | 2.5 | 2.9 | 20 |

Anglin's (1977) experimental findings in general indicated that centrality, rather than familiarity, predicted the range of exemplars included within the children's underextended word meanings. The sorting behavior of the children in Anglin is consistent with that found by Saltz et al. (1972). Exemplars judged as central to the meaning of the category clothes by adults were consistently chosen

instances of this category by 75% or more of the children. This response pattern occurred for the most part regardless of exemplar familiarity value. Similarly, pictured exemplars judged to be non-central or peripheral by the adults were never chosen by more than 30% of the children, except for one exemplar, scarf, chosen by 50% of the children. Exemplars judged central to the meaning of the category clothes by adults thus were chosen by children as exemplars of this category independent of their familiarity. Table II presents the percentage of subjects who included the different pictured exemplars under the superordinate category clothes. We thus see once again that English speaking children, even those younger than 5 years, limit the category clothes to items worn on the trunk or torso of the body. In addition, the items chosen by the children tend to be those judged as central to the meaning of the category clothes by adults.

In addition to the sorting task, Anglin (1977) obtained from the same children a label for each of the pictured exemplars. This was done in order to determine whether failure to select a pictured exemplar was due to a perceptual error (failure to process the picture) or a conceptual error. Overall only two pictures, those depicting a lace collar and a Venetian hat, were attributed labels from outside the category clothes. These exemplars, significantly, were not generally picked by the children as instances. The remaining pictured exemplars were attributed a label from within the category clothes, though sometimes not the correct one, e.g., coat for shirt.

Further confidence can be assigned to the overall direction of the adult ratings of centrality. Rosch (1975) obtained centrality ratings from 209 adult subjects regarding six different superordinate categories, the category clothes being among them. In order to obtain these ratings for clothes, Rosch presented subjects with 55 words which were hyponyms of the category clothes, pants and hat for example. Each word was rated on a 7 point scale in an attempt to measure the extent an exemplar of that word was representative of the meaning of clothes. Though the results do not allow a precise division between items worn on the trunk versus those worn on the extremities, it is evident that items worn on the trunk are considered more representative of the meaning of the category clothes. Of the 55 words given to subjects, those receiving the 15 highest ratings (i.e., those judged most central) refer to items worn on the trunk: pants, shirt, dress, skirt, blouse, suit, slacks, jacket, coat, sweater, sweatshirt, underpants, sports jacket, jumper, panties. Furthermore, only three of the words receiving the thirty highest ratings referred to items worn

on the extremities as opposed to the trunk of the human body. Thus, there appear to be two converging lines of evidence regarding classification of the domain of clothing in English. First, children under-extend the meaning of the category clothes, limiting it to items worn on the trunk of the body and excluding items worn on the extremities. Second, adults tend to judge items on the trunk, as opposed to items worn on the extremities, as more central to the meaning of the superordinate category clothes.

The question we wish to raise now is whether this classification scheme might in some sense reflect a natural classification of the human body or whether it might better be seen as a singular system of classification peculiar to English speaking children and adults.

Bowerman (1978b) has raised the issue of a potential relationship between the principles of classification children rely on in semantic category development and the manifestation of similar principles in different natural languages. In particular though, she has framed the issue in terms of children's overextended word meanings, meanings which encompass exemplars not included by adults. The issue centers on the frequency with which children's overextended word meanings reflect principles of classification not explicitly recognized in English but, at the same time, recognized in the semantic patterns of other languages. To the extent these frequencies correlate, one can argue for predispositions to classify the environment in particular ways that are a part of the cognitive make-up of human beings, be they children or adults, speaking different languages. If there were no such predispositions, one would be hard-pressed to account for the cross-language and cross-age correlations.

A useful illustration of this issue is found in Clark (1976). Clark has argued that a close relationship exists between the semantic principles resulting in children's overextended word meanings in early language development and the verbal and nominal classifier systems found in a number of language families. Basically, a classifier is a word or morpheme that serves to assign entities to a common semantic category based on a shared property or properties. For instance, in a language using classifiers, it is not sufficient to say the equivalent of "six balls", one must say "six round-thingsballs." Clark found that classifier systems usually assign entities to categories on the basis of their properties of shape, relative size or movement. Similarly, in examining children's overextended word meanings, she found that shape and size frequently appeared to be the properties by which entities were categorized. It seems clear, however, that reliance solely on children's overextended word meanings is not required for further investigation of classificatory predispositions.

Children's underextended word meanings also seem to provide potential fertile ground. Specifically, the results obtained by Saltz et al. (1972) and Anglin (1977) provide an instance of English speaking children's underextended meaning for the category clothes.

We will now turn attention to a system of semantic classification manifested by a set of verb roots in Tswana, a Southeastern Bantu language. More generally, this system of classification appears evident in other languages of the Sotho Branch of Southern Bantu, Pedi and Southern Sotho. The following data, however, were collected from a Tswana informant. The Tswana verb roots under discussion capture activities and states related to the "putting on" and "wearing" of clothing and other apparel on the human body. Tswana has three verb roots which, following Friederich (1969), might be called "covertly classificatory verbs." That is, a speaker must make decisions about some property of the referent of the associated grammatical object in order to choose the appropriate verb. In Tswana though, it is not actually a property of the object referent itself that is significant. Rather, classificatory significance rests on the spatial location on the human body where the referent will be placed.

The exact spatial locations on the human body governed by each of these verb roots is given little systematic attention in the two primary reference sources on Tswana: Cole (1955) and Brown (1924). Cole and Brown give the impression that each verb root governs one of three spatial locations on the body: upper body, lower body and head and feet. Cole, in An Introduction to Tswana Grammar (1955:207), states the following regarding the referential extension of these verb roots:

Note that -apara indicates the wearing of or putting on of clothes on the upper part of the body; -tšwala on the lower body, and -rwala on the head or feet.

Though these definitions do appear to indicate the general locations on the body governed by each verb root, some parts of the body, hand and arms for example, are not mentioned. We might assume that they are part of the upper body and therefore governed by the verb -apara. It is also implied that articles of clothing such as pants, which are worn on the lower body, are governed by -tšwala. This is not explicitly stated however. In order to gain a firmer grasp of this domain, a more systematic analysis of the spatial locations on the human body governed by each verb root was undertaken. To this end, a list of articles of clothing and body apparel distributed across the human body space was compiled. For each of these items a Tswana command

construction equivalent, generally, to the English "Put on the X" (where X is some article of clothing) was constructed by my informant.

The results of this somewhat more systematic analysis are found in Table III (See Table III, next page). From this table we can determine the range of clothing and apparel exemplars (assuming they are placed on their normal part of the body) governed by each verb root. The spatial locations governed by each verb seem evident. It seems, first of all, that the verb root -àpàrà combines with items normally worn on the trunk, i.e., pants, shirt, sweater, etc. The verb root -rwálà, on the other hand, combines with items normally worn on the head, feet and in addition, hand or arms, i.e., gloves, hat, shoes, etc. The verb -tšwálà, in contrast to its apparent role in Cole (1955) and Brown (1924), combines only with the item loincloth. (The use of -tšwálà appears limited furthermore to those circumstances where the speaker wishes to call attention to the immodest dress of someone.) Essentially then there are two verb roots in Tswana from which a classification of the human body space can be inferred. Moreover, it is important to emphasize that it is not the items of clothing and apparel themselves which determine appropriate usage, but the spatial location of these items on the body. For example, putting a folded sweater on one's head requires -rwálà not -àpàrà. A further note worth emphasizing is that this pattern of classification is maintained when the Reversive Extension, meaning "take off", is adjoined to the verb root. Given these findings from Tswana, one finds a classification of the human body space into two semantic categories, trunk and extremities, which parallels a pattern of classification exhibited by English speaking children and adults.

Before proceeding further, we might take note of an intriguing aspect of the data from Tswana and from the English speaking children. First the item scarf, in contrast to other non-central items, was picked by 50% of the children as an instance of the category clothes. A potential explanation for this result stems from the different locations on the body where a scarf may be worn. With respect to this explanation, consider the two Tswana words for scarf, túkú and tsálè, in Table III. It can be seen that a scarf when put on the head, requires the verb root -rwálà; but when put on the shoulders, it requires the root -àpàrà. It seems plausible, therefore, that the English speaking children's responses reflected this ambiguity of location.

At this point we might ask why these two basic spatial locations on the body have become salient. Lyons (1977) has discussed the notion salience. On the one hand, the classification found among the English and Tswana speaking populations may reflect biological salience.

TABLE III. Command constructions in Tswana referring to the "putting on" or "wearing" of various articles of clothing. Each construction assumes that the referent of the object is placed in its normal position on the body.

| | |
|---------------------|--------------------------------------|
| Rwálá hùtsé | Put on the hat |
| Rwálá màtlhó | Put on the glasses |
| Rwálá lènyénà | Put on the earring |
| Rwálá ñtshí | Put on the eyelash |
| Rwálá tükú | Put on the scarf (on head) |
| Rwálá díbhàgá | Put on the necklace (beads) |
| Rwálá kèlàfò | Put on the gloves |
| Rwálá réng | Put on the ring |
| Rwálá léšèkà | Put on the bracelet |
| Rwálá sétlhàkó | Put on the shoe |
| Rwálá réng yá lónàð | Put on the toe-ring |
| Rwálá ñpéétshànè | Put on the sandal |
| Rwálá kàúsi | Put on the sock |
| Ápárá jášè | Put on the overcoat |
| Ápárá mòsésè | Put on the dress |
| Ápárá hémpé | Put on the shirt |
| Ápárá bétšè | Put on the undershirt |
| Ápárá sèkétè | Put on the skirt |
| Ápárá bdrókgwè | Put on the pants |
| Ápárá bákl | Put on the jacket |
| Ápárá bóðlísí | Put on the bra |
| Ápárá tsálè | Put on the scarf (on the shoulders) |
| Tšwálá tshégà | Put on the loincloth |
| Ítshásé lfpstíkl | Put on lipstick (smear the lipstick) |
| Bšfá tšè | Put on the necktie (tie the necktie) |
| Bšfá lèbánté | Put on the belt (tie the belt) |

Underlying this notion is the assumption that the phenomenal world is not perceived as an undifferentiated continuum, due to biologically determined focal types around which semantic categories form. In the domain of color, for example, Berlin and Kay (1969) and Rosch (1974) have presented evidence that there are focal points in the color spectrum about which semantic color categories cluster. Similarly, there seem to be focal types in the domain of shape which are reflected in pre-dispositions to classify the world in particular ways (Clark and Clark, 1977).

A second type of salience discussed by Lyons (1977) is cultural salience. Cultural salience reflects those semantic categories which

have a particular value in a culture. The classification system discussed here with respect to English and Tswana (and the Sotho Group in general) may thus reflect particular cultural values which happen to coincide or which coincide due to separate historical events.

Another possibility is that the data found in Tswana and English reflect a learned system of classification. One possibility is that the trunk becomes a perceptually salient area due to its relative size with respect to the remainder of the body and, therefore, gives rise to a classification of the human body space into two semantic categories. Additionally, the classification system seen here may result from the manner in which we interact with our body. Still a third possibility is that the classification pattern is determined by the generally larger size of the clothing items worn on the trunk. Obviously additional evidence pertaining to the classification of the clothing and apparel domain from still additional languages, and from the acquisition of other languages, is needed in order to determine the breadth and strength of the classification system found here. In this regard, there may be additional types of linguistic data that bear on the system of human body classification discussed here. McClure (1975), for example, examined polysemy relations among particular body part terms and postulated that a given term referred to a whole and its most salient part. For instance, the word for BODY in the languages she examined also referred to the TRUNK or TORSO area. With a sufficiently broad investigation one could specify the status of the system of classification discussed here, relative to extant systems of classification of the human body space found in natural languages. In doing so, one might be able to articulate a hierarchy of potential systems of classification available to a child learning semantic categories dealing with the human body.

One final note concerns the sorting methodology used by Saltz et al. (1972) and Anglin (1977). In recent years the ability of various experimental procedures to provide an accurate timetable of the development of hierarchical semantic relations, superordinate-subordinate relations, among lexical items has been questioned. Various tasks such as word association, word definition and sorting have been interpreted as indicating late, 5-7 years, hierarchical development (McNeill, 1970; Anglin, 1970). Mansfield (1977), Bowerman (1978b) and Huttenlocher and Lui (1979) have argued that the processing demands of these tasks essentially mask semantic development that has occurred at a much earlier period. Certainly their remarks do call attention to the processing demands inherent in these tasks. The findings from the present investigation, however, suggest that a sorting methodology whose explicit aim is to investigate the range of a semantic category is of potential value. In particular, such a methodology may

provide insight into the occurrence of classificatory predispositions that potentially constrain the child's attempt to develop hierarchical relationship in particular domains of the lexicon.

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