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DISCOVERING WHAT WORDS CAN DO*

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Words allow the speaker to convey his intentions to an addressee, and they allow the addressee in turn to work out what the speaker meant. For children acquiring language, the puzzle is to find out how words work--what conventions govern their use and how they are organized for conveying meanings. From the very first, they have to tackle the mapping between thought and language and work out which categories of objects, relations, and events can be picked out by particular words, phrases, or utterances. To do this, children draw on what they already know about the rather small world around them and base their first hypotheses about meaning on objects and events in the here and now (Clark, 1977). While working on the mapping problem, children search for general organizing principles in language, picking on morphological and syntactic devices to express more complex meanings in a consistently clear way (Slobin, 1973, 1977). At the same time, they build up a more and more elaborate lexicon from which to draw in using language to convey what they want, know, think, and feel.

In the present paper, I shall be concerned primarily with how children work out words for talking about actions. Children appear, for various reasons, to build up their vocabulary more slowly for actions than for objects. I will argue that while most lexical domains for objects are structured in one way--horizontally--most domains of relational terms (including verbs for actions) are structured in another--vertically. I will then take up children's early words for actions, and argue that in looking for words to pick out actions, children come up with two rather different devices: general purpose terms and specific action terms. These allow them to talk both about a wide range of actions and about highly specific actions at a stage when they command few verbs.

Early Lexical Domains

Children do not build up their lexicon at random, choosing one word here and another there. What they talk about first is determined by general cognitive principles. And once they have acquired one or two words in a particular (conceptual) domain, they are likely to over-extend them to cover other categories within the domain. Later, they add further terms to the domain and restrict the terms acquired earlier. Children may do this immediately upon adoption of a new term, or take some time to work out the precise contrast between the new and old terms.

This pattern can be illustrated by considering the first lexical domains children build up. Vocabulary studies of 50 or more years ago show that young children talked then about the same things they do now (Clark, in press). They talk about food, with juice, milk, cookie, bread, and drink among their first words for this domain. They talk about certain items of clothing, notably hat, shoe, diaper, and coat. They talk about body parts, with eye, nose, mouth, and ear usually among the earliest terms acquired (Andersen, 1978). They talk about animals and often know dog, cat, bird, duck or hen, cow, horse, and sheep by age two (Nice, 1915). They talk about some toys, with ball, block, book, and doll used very early. They talk about a few household items and utensils, usually ones used in daily routines, e.g., spoon, cup, bottle, brush, key, clock, and light. And they also talk about a few people--their caretakers--with some version of dada and mama, and about themselves, usually as baby or by name. They also use a few "routines" like peekaboo, byebye, and uh oh, a general purpose deictic or two like that or see, and a few action-and-result descriptions like up, allgone, and broken. Their first 50 words fall mainly into these few domains (e.g., Nelson, 1973).

Most of the object categories named in children's early vocabularies are salient or attractive to them for various reasons: they move on their own, can move other objects, or can be manipulated by children. Notice that they name agents or movers--people and animals, and very soon vehicles like cars and trains as well. They also name a variety of smallish objects that are moveable or can be manipulated--toys, utensils, and certain items of clothing. In contrast, children this young hardly ever name places, instruments, or goals (e.g., Greenfield & Smith, 1976). The same domains are reflected in the special "baby talk" vocabulary found in many languages (see Ferguson, 1964, 1977).

Once children have started on domains like these, they can build up lexical domains or semantic fields along the same organizational lines as adults. However, not all lexical domains have the same internal structure. Those made up of names for categories of objects typically have what I shall call a predominantly horizontal structure (see Berlin, 1972; Berlin, Breedlove, & Raven, 1968, 1973). In such domains, most of the terms belong to a single generic or basic level of contrast. The maximum number of levels possible is usually five, from the highest superordinate (the unique beginner, e.g., plant, animal), to the next down--life forms (e.g., tree, bush), to generic names (e.g., oak, birch, pine), and then lower still, to specific names (white pine, jack pine), and then to varietal names (e.g., northern jack pine). Berlin and his colleagues have argued that the third level--the generic level--is the most basic and it always contains the largest number of contrasts. The remaining levels are frequently missing from the system, although there are usually a few terms one level up (life forms), and some one level down (specific names) in any particular domain. Psychologically, the generic level seems to represent that level of categorization at which it is easiest to keep categories distinct (see Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976). And terms from this level seem more likely to be used by parents talking to very young children (e.g., Brown, 1958). Horizontal domains, then,

consist of one major level--the generic or basic level--and have minimal hierarchical structure relating terms from different levels. This type of organization is characteristic of most taxonomies.

How do children build up such domains? They seem to organize them from the start into taxonomies with a horizontal structure, beginning with generic or basic level contrasts and only later adding a few super- or subordinate terms. Let me illustrate from the domain of animal terms. This domain is among the earliest for which children learn a few words, as attested in numerous diary and vocabulary studies. The course of acquisition seems to be the following:

(1) The very first stage may be to treat the first word as if it is a proper name. A word like dog, for example, might pick out only the family pet and thus from the adult point of view by under-extended (e.g., Lewis, 1951; Greenfield, 1973; Anglin, 1975; Reich, 1976).

(2) Following this, dog is extended to pick out other dogs as well. It may be hard to distinguish these first two steps in the acquisition of a word since non-use on any occasion might be due to factors other than under-extension.

(3) If the term acquired is one of the first for the animal domain, the next stage is usually one of considerable over-extension where children use a term like dog or cat to pick out all sorts of other animals as well (see Clark, 1973a, 1974). The word dog, often among the first animal words to be acquired, may be over-extended to cats, cows, sheep, bear, deer, and horses.[1] The limits on any over-extension probably depend on children's exposure to and interest in things that might conceivably be picked out with this word. Most over-extensions appear to be based on their perception of similarities between the original referent and new instances. They seem to rely on similarity of shape, movement, size, sound, texture, and taste, in roughly descending order of frequency. Although children may use shape, for instance, for a particular set of over-extensions, they may also switch from shape to texture, or vice versa on some occasions. This suggests that children do not rely on a single property but rather on a cluster of properties, one or more of which is sufficient for children to apply a word (see Rosch & Mervis, 1975; Bowerman, 1976, 1978b).

(4) The narrowing down of an initial over-extension follows with the addition of new words to the domain. Where dog had picked out a variety of four-legged, mammal-shaped entities, the addition of cat subtracts out most cats. The addition of cow or horse subtracts out larger mammals (e.g., Shvachkin, 1948). Each term, as it is added, seems to get assigned to a specific portion of the domain. While terms acquired later may be over-extended for a while too, their over-extension rarely intrudes onto domains that are already

taken (see Pavlovitch, 1920; Leopold, 1948). In other words, the terms within a domain are treated from the start as if they contrast with each other as well as with the rest of the child's lexicon.

The over-extension of the first animal terms and their subsequent narrowing down provide strong evidence for a principled approach to acquiring words. Children over-extend their first terms and rely on nonlinguistic information in doing so. Once they learn more words for the domain, the new words almost immediately take over parts of the domain, restricting the earlier over-extension.[2] This pattern of acquisition is schematized in Figure 1, where underlined words are over-extended and the adult categories covered by the over-extension are listed in parentheses.[3]

Figure 1: Acquiring animal terms

bow-wow (dogs, cows, sheep, horses, cats)				
bow-wow (dogs, sheep, horses, cats)				moo
bow-wow (dogs, sheep, cats)			gee-gee	moo
bow-wow/doggie (dogs, cats)		baa	gee-gee/ horsie	moo
doggie	kitty	baa-lamb	gee-gee/ horsie	moo

(5) What happens after children have acquired their first few generic level terms and have mostly stopped over-extending them? Notice that all the terms in Figure 1 belong to the same level, and all are hyponyms of animal. Do children continue to add further hyponyms, with added contrasts between domesticated and wild or zoo animals, and between animal (= mammal), bird, fish, and insect? When do they acquire terms superordinate or subordinate to the basic level? According to Rosch and her colleagues, categories are less coherent as one moves up a level in a taxonomy, and harder to keep apart as one moves down a level. The terms for such categories, therefore, may take longer to acquire.

Let me illustrate with data from Smith (1973). By 2;2, Smith's son used some 14 animal terms--doggie, miaow (cat), mouse, tiger, zebra; bird, cock, duck; snake; ant, bee, beetle, butterfly, and ladybird. He continued to acquire words in this domain and by 2;6 had added 22 more: cow, donkey, hedgehog, horse, pig, rat, sheep; crocodile, deer, elephant, fox, lion, monkey, panther, reindeer, yak; hen, owl; caterpillar, spider, fish, and frog. He did not

acquire the superordinate animal until age 3;4, by which time he had 31 animal terms at the generic level. (Here I am counting only mammals, leaving aside birds, insects, and water-dwellers.) In contrast to animal, this child had acquired bird, along with two potential subordinates at the basic level--cock and duck--by 2;2. In the next few months, he added further basic level terms like hen, owl, swan, goose, mynah bird, robin, starling, vulture, and thrush. And although he also named a variety of insects, by 3;11 he still did not have any superordinate for them.

The general pattern is similar in other diaries for other taxonomic domains. The first terms children acquire are basic level terms. Then they add in a few superordinate and subordinate terms, in no particular order. Some superordinates, like bird, appear relatively early, while others, like animal or insect, appear many months later. But is a term like bird really a superordinate at this stage? In a number of diaries, early uses of bird appear to contrast directly with other early terms like hen and duck, as if children were categorizing birds according to the medium they are found in--air (bird), earth (hen), and water (duck).[4] This, of course, raises a problem: How can we tell if adult superordinate, subordinate, or even basic level terms have the same status for young children as they do for adults? Since basic level categories are the easiest to form and the most distinct from one another, most of the terms children acquire early in any taxonomy will probably be attached to basic level categories. One complication, though, is that the basic level may vary with the cultural importance it has in any particular domain (see Clark & Clark, 1977; Mervis, in press). The studies available currently provide no simple answer to exactly when children begin to use superordinates and subordinates as adults do.

The terms for plants, colors, metals, furniture, vehicles, and so on, have a predominently horizontal organization too. The majority of the terms in each domain contrast in meaning at a particular level--the level of basic categories (see Smith, 1978; Smith, Shoben, & Rips, 1974; Rosch et al., 1976). The vertical structure of these domains--the relations from subordinate to basic to superordinate--are relatively simple. Children seem to learn many terms at the basic level first and only later add the occasional superordinate or subordinate to the domain. The order in which they acquire individual lexical items and add terms from higher and lower levels varies considerably from child to child and domain to domain (e.g., Bartlett, 1978). What is important about lexical domains like these is that most of the terms contrast at the basic or generic level. This kind of lexical patterning is typical of most nouns--of terms that name categories of objects.

Quite a different pattern of lexical organization is found among relational terms. These domains consist of terms that name a relation, often an action, involving one or more entities. They usually have little horizontal structure and no basic level of

contrast among terms. Instead, they are organized around a variety of vertical contrasts. Consider, for example, the terms have, give, lend, exchange, and sell. Have simply links a possessor and an object possessed. Give in addition describes transfer of an object to a new possessor. Lend adds the further condition that the giving is temporary such that the object must eventually revert to the original possessor. Exchange makes the giving reciprocal, and sell adds to the reciprocity the condition that the object possessed is exchanged for money. These verbs become increasingly complex with each additional restriction, and they are in fact acquired in that order, from simplest to most complex (Gentner, 1975). The addition of complexity with more and more conditions of use is typical of lexical domains with vertical organization. Within such domains the terms contrast with each other on one or more dimensions, depending on the components or predicates shared and not shared by any pair of terms.

One vertically structured domain that has received considerable attention is dimensional adjectives. Bierwisch (1967) pointed out that adjectives like big and small can apply to one-, two-, or three-dimensional objects (n-Space), e.g., the big line, the big field, the big box. Adjective pairs like tall-short and high-low are more constrained in that they pick out only one dimension (1-Space), the vertical one (+Vertical). Tall-short refers to extension along the vertical, and high-low refers to position. Other dimensional pairs like long-short pick out non-vertical dimensions (1-Space, -Vertical). Furthermore, pairs like wide-narrow, thick-thin, and deep-shallow apply to the secondary rather than primary dimensions of an object (1-Space, -Vertical, +Secondary). Each set of conditions or constraints on the use of a dimensional adjective adds to its complexity (see also H. Clark, 1973). The simplest pair, the one with fewest conditions on its use, is big-small, followed by the three primary dimension pairs, tall-short and high-low (+Vertical), and long-short (-Vertical). Among the nonvertical terms, though, long-short appears simpler than wide-narrow, thick-thin, or deep-shallow, because it picks out a primary dimension. This order of relative complexity has been used to predict children's order of acquisition.

In production, children use big frequently and rarely produce any other dimensional terms. Wales and Campbell (1970), using a task that elicited a variety of dimensional terms, found that three- and four-year-olds used big twice as often as all other dimensional adjectives combined. Only a few of the older children tested used tall, high, or long.[5] This suggests that big and possibly its opposite, small, are the first dimensional adjectives acquired. Vocabulary lists from younger children support this view.

How are the other adjective pairs ordered? To find out, I gave children either a single adjective like long or low or one embedded in a phrase like the tall man or the wide road, and asked them to respond with its opposite (Clark, 1972).[6] The results showed that children first mastered big-small, tall-short, and

long-short, followed by high-low, then thick-thin, and then wide-narrow and deep-shallow. This ordering is very close to the one predicted by relative complexity (see also Brewer & Stone, 1975; Bartlett, 1976).

Other vertical-structure domains that have been studied include spatial terms, temporal terms, deictic terms, and kinship terms. With spatial terms, children appear to use nonlinguistic strategies, building on their general knowledge, for relating one object to another in space (e.g., Clark, 1973b, 1977; Wilcox & Palermo, 1974/5; Cook, 1978). Their comprehension and production follow similar lines. Children start out with in and on and gradually add more complex terms like over, above, beside, and in front of (see also Johnston & Slobin, 1977). Studies of temporal terms have shown the same pattern of acquisition depending on complexity. At first, children produce terms that relate an event to some time (now, then, today); then they relate one event to another event (before, after); and only after that do they use terms that relate more than one event to a time (while, at the same time as) (e.g., Clark, 1970, 1971; Ferreiro, 1971; Keller-Cohen, 1975). Deictic terms like you, here, that, and come also seem to be acquired from simplest to most complex. Children start with person deixis (pronouns like I and you), go on to place and demonstrative deixis (here, there, this, and that), and only later acquire deictic verbs like come and go (e.g., Clark, 1978a). Lastly, kinship terms show a similar pattern of acquisition. Simpler terms, like father and mother, are mastered before more complex ones, like grandfather and grandmother, and these in turn are mastered before uncle and aunt (e.g., Haviland & Clark, 1974).

In each of these domains, the terms take several years at least to master. For example, while some deictic words are acquired by age two or three, the more complex deictic terms like bring are not fully mastered until the age of eight or nine, or even later. The same is true of kinship terms where the time lag in acquiring the most complex terms is even longer. A long lag between first uses of a term and its full acquisition is typical in the acquisition of vertically structured domains.

So vertical domains differ from horizontal domains in several ways. In vertical domains, complexity of meaning predicts order of acquisition, while in horizontal domains, where there is no clear difference in complexity among terms at the basic level, there is considerable variation in order of acquisition. Vertical domains contain terms that may contrast with each other on a single component or condition for application, while terms in horizontal domains tend to contrast on many dimensions at once. In the latter, no single property is necessary or sufficient to distinguish one category from another (Rosch & Mervis, 1975). Vertical domains may have some horizontal structure, where small groups of terms contrast at the same level (presumably with roughly the same complexity), but they lack the basic level of contrast around which taxonomies are organized. Taxonomies, horizontal domains, may have a little

vertical structure in the relations between subordinate and basic level terms or between basic level and superordinate terms, but terms at these upper and lower levels are often "missing" (see Berlin, 1972; Berlin et al., 1973).

Talking About Actions

It has long been noted that children acquire a vocabulary for actions much more slowly than they do a vocabulary for objects. As a result, their action words make up little of their lexicon in the early stages of acquisition (e.g., McCarthy, 1954). Like the other vertically structured domains, words for actions take longer to acquire. Why? One reason is that the terms vary in complexity, and, as noted earlier, the more complex such terms are, the longer they take children to acquire. A second reason is that action categories may be harder to grasp and analyze than object categories. This point will be taken up first.

Categories of actions--those named by verbs--seem to differ from categories of objects--those named by nouns. First, actions are transitory. Once completed, they are no longer "there" for inspection or analysis. They have to be grasped as they occur. In contrast, even though objects move and change their orientation in space, they retain a constant form and set of attributes that can be examined from many perspectives and are thus available (whenever present) for prolonged scrutiny and analysis. Second, actions have a less clearly definable range than categories of objects. Consider the activities we commonly label with the verb open, as in opening a door (turning the handle), opening a jam jar (twisting jar and lid in opposite directions), opening a box (raising the lid), opening a bottle (pulling out the cork), opening a briefcase (unlatching and raising the flap, or unzipping), or opening a wallet. Such a range is typical. That presumably makes it hard to identify a particular group of actions as members of the same category. Third, actions have vague boundaries. Imagine watching a videotape with instructions to mark the beginnings and ends of specific actions. When does the action of opening a door begin? As you step close enough to reach it, as you stretch out your hand to handle, as you grasp the handle? And where does it end? As you finish turning the handle, as you push or pull the door open, as you drop your hand? Both the range and boundaries of the activities included make action categories less coherent than categories of objects (see Clark & Clark, 1978).

How, then, do young children talk about actions? The focus here will be on the earliest stages of acquisition, up to about age three. I shall begin by examining some very early word uses and then take up findings of my own on the linguistic devices young children rely on to pick out actions.

Early words for actions or results. Young children use very few words that can unambiguously be identified as terms for actions. The earliest condidates in languages like English or German are

often verb particles that, for adults, indicate either direction of motion or location, e.g., up, away, off (see Stern & Stern, 1928; Leopold, 1949; Farwell, 1976, 1978; Gruendel, 1977). One reason many investigators have hesitated to call such words terms for actions, however, is that it is impossible to tell whether children are talking about the action alone, the action-and-result, or simply the result. Up, for instance, could be picking out the action of lifting or lowering the child, the action-and-result (lifting or lowering to a new position), or the result alone (the child's new position).[7] Other words show the same ambiguity, e.g., open, gone, broken.

Children's uses of such terms also suggest that they organize and categorize situations (and actions) in much the same way they do objects. They apply their early action-result words to a wide range of situations, many of them not included within the adult category. Guillaume (1927), for example, observed one child who used our (from ouvrir, to open) first for opening his father's door, then for peeling some fruit, then for opening a box, and then for unlacing his shoes (see also Griffiths & Atkinson, 1978; Farwell, 1978). While these uses strongly resemble children's over-extensions of nouns, they may also indicate children's early difficulty in identifying the range and boundary for any category of action. These situation-based over-extensions are rare, mainly because children use few words for actions or results compared to the number they use for objects.

As they get older, they produce more and more action-result terms, and once they mention both actions and objects affected by actions in the same utterances, it becomes possible to identify the actions children talk about and the devices they use for doing so. My data suggest that they rely on two main devices. First, they use a few simple terms--general purpose verbs--that they apply freely to a large number of different actions. This is predictable from what is already known about vertically structured domains. Second, they create verbs from nouns--specific action verbs--for talking about particular actions involving the object named. This second device, which is relied on less often, seems to result from children's using knowledge they already have about categories of objects--their predominant features or roles as moveables, places, agents, recipients, goals, and so on.

General purpose verbs. The commonest general purpose verbs in young children's speech are do, go, make, get, put, and take. The diary literature on English reports that these verbs are often among the first to be used. Their equivalents also appear very early in other languages, in Finnish (Bowerman, 1973), French (Grégoire, 1937), German (Stern & Stern, 1928), Japanese (Sanches, 1978), and Korean (Park, 1977), to give just a few examples. In the English records, if we discount verb-like uses of particles like up and down, the first verb reported is often go or do. Grant (1915), for instance, noted that go was the first verb for his daughter aged 1;1. By 1;6, she also used do plus five other verbs

(come, eat, want, ring, stick), and in the next month added get plus five more verbs (kiss, read, tickle, tuck, visit). For Pelsma's daughter (1910), the first verb was also go (at 1;0). By 2;0, she had acquired the other general purpose verbs as well--do, make, get, put, and take--and had some 67 other verbs in her repertoire.[8] Bohn (1914) reported that his daughter used both do and go from 1;5 on, and that by 1;8, she used do very frequently. For example, when preparing to do some action, she would say R [name] will do, then do it and say R did do. By 1;6, she added get, usually with up, and by 1;7 more general uses of get, plus take and put. She also used about 40 other verbs by this stage.[9] Bateman (1914) reported similar figures: go and see were his child's first verbs, at age 1;0. And by 2;4, he used do, go, get, put, and take, plus about 65 others.[10] Boyd (1914) made similar observations. Do, go, and get were among his child's first verbs at 1;5, and her first three-word utterance, according to Boyd, was Isa [name] do it. These observations accord with my own data on early verb use. At around 2;0 to 2;6, children used do, go and make very frequently. They also used get, put, and take, but less often. Particular children sometimes favored one or two of these verbs over the others and relied heavily on them for some months.

General purpose verbs have three main characteristics: they are used for talking about a large variety of actions, they are very frequent, and they depend for their interpretation on the context.

(1) General purpose verbs are used for talking about many different kinds of actions. Particular general purpose verbs, though, tended to contrast with each other despite some overlaps in meaning. Our preliminary analyses of do, go, and make showed the following pattern of use:[11]

Do has as its commonest meaning something that might be glossed as "perform an action" and it generally co-occurs with an agent noun phrase (except, on occasion, when the child-speaker is the agent). It is also used for the typical action performed on or by a particular object, or for the typical noise produced by an object.

Go seems to have a general meaning of "move," and is often combined with a locative noun or particle (in the box, there, up) or with the name of the instrument involved in the motion (in the car). It is also used for the typical action performed on or by an object, or for its typical noise. These uses overlap with similar uses of do.

Make has as its general meaning in most contexts "construct" or "produce," with the goal of the action usually being named too (e.g., a boat in Make (=draw) a boat). In some situations, it is used with a more directly causative sense that might be glossed as "cause some state to come into being or be produced" (e.g., Make it up (=cause it to be up)).

Get and take in the earlier stages are used in combination

with certain verb particles (get up, take off) in rather restricted contexts. Take off might start out being used only with clothes (see also Bowerman, 1978a). Both verbs, though, occurred in some situations with a meaning that could be glossed as "obtain." Put is usually used in conjunction with a locative noun or particle and seems to have the general meaning of "cause to be or go in some place."

Many uses of these verbs are replaced, as children get older, by more specific terms. Do may be replaced on occasion by build, cut, run, unwind, climb, stretch, etc., go by run, drive, fly, walk, stand, etc., and make by build, draw, cut out, write, and so on. General purpose verbs, of course, continue to be used but become proportionately less frequent as children acquire more words for specific categories of actions.

(2) General purpose verbs are used very frequently compared to other verbs in children's speech at around age 2;0 to 2;6. This has been shown, for example, by Bloom, Miller, and Hood (1975) and Bloom and Lahey (1978) in their tabulations of the verbs used by four children whose mean length of utterance at the time was 2.5. Bloom and her colleagues counted all the verbs they called "actions" and "locative actions." Their results are shown in Table 1, although I have included only those action verbs that occurred more than 50 times in their sample, and locative action verbs that occurred more than 25 times.

Table 1: Relative Frequencies of Action and Locative Action Verbs

Action		Locative Action	
get	252	go	417
do	169	put	287
make	132	sit	129
read	86	fit	65
play	85	take	48
find	69	fall	30
eat	60	go byebye	28
fix	59	away	26
draw	52	come	25
hold	50	get	25

It is very clear from these data that general purpose verbs lead the field at this stage. Go, put, get, do, and make (plus sit) are far more frequent than any other verbs.

(3) Just because general purpose verbs can be used for many kinds of action, they depend critically for their interpretation on the context in which they are uttered. Let me give a few examples, without context, from one child aged 2;2:

a. I do it again.
b. You do [ə] that!
c. Uh oh. I did.
d. The clown do!
e. Make a dog!
f. I make a doggie.
g. 'N turn [ə] go up.
h. 'N go like that.

In each case, it is impossible to tell what actions this child was trying to pick out. With the context, the meanings become clear:

a'. I do it again. [child knocks over some blocks]
b'. You do [ə] that! [telling observer to build a tower of blocks]
c'. Uh oh. I did. [child turned off tape-recorder, by mistake]
d'. The clown do! [telling observer to work a toy clown]
e'. Make a dog! [telling observer to draw a dog next]
f'. I make a doggie. [child cutting a dog-shape out of play-doh]
g'. 'N turn [ə] go up. [child turning a puzzle-piece right way up]
h'. 'N go like that. [child dropping puzzle-pieces on floor]

The context, therefore, plays an integral role in the child's utterances at this stage. Without it, what the child says about actions is largely uninterpretable.

Children's reliance on general purpose verbs for talking about many different actions seems analogous to their earlier reliance on deictic terms like look, that, or see for talking about many different objects. In both instances, children use certain "general" words in context to indicate categories for which they lack more precise terms. From a communicative point of view, general purpose verbs are a valuable device: they allow children to communicate about actions even though they have only a few words for them (Clark, 1978b).

Specific action verbs. Children also, at times, use specific action verbs. These pick out a specific action by naming an object involved in that action. That is, children use denominal verbs.

Denominal verbs in adult speech can be classified according to the role the object named plays in the action being denoted (Clark & Clark, 1978). For instance, adults use instrument verbs formed from the name of the instrument involved in the action, as in She kayaked down the Stanislaus River or He blendered the soup. Children also use instrument verbs, as shown by one two-year-old's comment about weighing some cheese: You have to scale it first (S, 2;4). Adults also use locatum verbs formed from the name of the object being placed somewhere, as in Jan pilled the cat or Bill rotten-egged the speaker. Children form locatum verbs too, as in another two-year-old's: Mummy trousers me (D, 2;3). Adults use location verbs formed from the name of the place involved in the action, as in Ed hived the bees or They warehoused the aliens in

downtown Los Angeles. Children also use the names of some locations in this way, as in a four-year-old's mock threat to her sister: I'm going to funnel you/Ff ff ff/You're all in there (C, 4;6). Adults also use agent verbs, formed from the names of the agent of an action, as in He quarterbacked for the Cards, and goal verbs, formed from the name of the goal, as in She matchsticked the potatoes. Children use agent and goal verbs occasionally too, as in one child's When is she coming to governess us? (B, no age given) or a five-year-old's request not to have her hair done up in "dog ears," Don't dogear me today (C, 5;6).

Children also use verbs that are harder to classify. The meaning of these verbs might be glossed as "do whatever X was/is/would be doing on this occasion," i.e., the characteristic activity of X where X is the parent noun for the denominal verb. One child, for example, when the stove-timer went off, said: The buzzer is buzzering (E, 2;3), and another, asking for the rocker he was in to be rocked, said: Rocker me, mommy (J, 2;6). Such verbs are much rarer in adult speech, and the few instances we found tended to be metaphorical, as in The market submarined. For adults, we grouped such characteristic activity verbs under miscellaneous, but for children they clearly form a more prominent class.

The commonest specific action verbs in children's speech come from nouns that name instruments, locata, and characteristic activities. Verbs from nouns that name locations, agents, or goals are rare. Some children appear to use no location verbs, and very few use agent verbs. Further examples of the verb types that have been observed are given in Tables 2-5 below.12 Table 2 contains instrument verbs, formed from nouns that denote instruments, one of the commoner types in the data.

Table 2: Instrument Verbs

a) S (2;4 reaching for pocket calculator): I can button it.

b) S (2;11, telling his father that his mother had nursed his baby sister): Mommy nippled Anna.

c) S (3;0,21, watching a man opening a door with a key): He's keying the door.

d) S (3;2, pretending to shoot his mother with a stick): I'm going to gun you.

e) S (3;2, asking if the pants his mother is mending are ready): Is it all needled?

f) C (4;6, in the car): I seat-belted myself.

g) C (5;7, reaching for a pad of paper with some pliers): I want to plier these.

Table 3 contains examples of locatum verbs, formed from nouns that denote moveable objects, another common type in the data:

Table 3: Locatum Verbs

a) Jo (2;6, asking teacher to toss a pillow at him during a nursery school pillow fight): Pillow me!

b) E (3;4, talking about a band-aid put on her foot earlier): It was band-aided.

c) C (3;11, putting crackers in her soup): I'm crackering my soup.

d) C (4;2, talking about a rag for washing the car): But I need it watered and soaped.

e) C (4;5, putting first a bead and then a rubberband into the pladoh she's kneading): I think I'll bead it. I think I'll rubberband it.

f) C (4;6, holding a doll to her chest): Do you want to see how I milk Vicky?

Table 4 contains characteristic activity verbs, whose parent nouns denote the object whose activity is being talked about. As mentioned earlier, this class seems to be quite common in children's speech. A number of the examples given here might be subcategorized as "weather verbs."

Table 4: Characteristic Activity Verbs

a) R (3;0, talking about a bell he wants rung): Make it bell.

b) E (3;2, talking about another child she's seen lighting a match): I saw Julie match up a match.

c) S (3;2, looking at a drooping flag that suddenly spread out in a gust of wind): It flagged.

d) S (3;2, noticing a picture in a book of trees leaning in the wind): It winded.

e) H (3;6, talking about a storm): It's weather out there too. Why is it weathering? Is that weather?

f) C (3;11, making crayon-dots all over the picture she'd just drawn): It's snowflaking so hard that you can't see this person.

g) C (4;0, talking about pictures in a book she's making): Right now it's storming. Here it's storming too.

Lastly, Table 5 contains a few examples of the rarer location, agent, and goal verbs.

Table 5: Location, Agent, and Goal Verbs

Location	a)	C (5;5, asking her mother to stop her sister from putting popcorn "beads" on her thread): Mom, will you keep Eva from threading on mine?
	b)	K (7;0, asking her mother to wrap a towel round her as she got out of the bath): Towel me, mommy.
Agent	c)	E (2;8, after roaring, with "claws" outstretched, at a towel hanging in the bathroom): I monstered that towel.
	d)	A (5;1, talking about someone dancing in a ballet): She's ballerining.
Goal	e)	S (3;1, watching a cement truck with its back revolving): That truck is cementing.

Example 5-b is classified as a location verb rather than an instrument verb because the child on this occasion wanted not to be dried, but to have the towel put around her.

Specific action verbs are like general purpose verbs in one respect: they require that the listener know the context of the utterance. Without context, the precise action being talked about cannot be understood. We can, of course, rely on general knowledge about the predominant features of objects to infer what the speaker might have meant, but such inferences can often be wrong. For example, from S's use of button in I can button it (Table 2-a), without context, one would probably infer that S was talking about fastening some article of clothing. Even if the listener knows button is used for turning on the calculator, he is still not home free because S used this verb both for turning on the calculator and for turning it and other machines off. The same point could be made about C's use of rubberband in I think I'll rubberband it (Table 3-e). This is an instance where what we know about the predominant features and usual role of rubberbands is not enough. Although a rubberband is usually used as an instrument for holding things together, C treated it here as a locatum, an object to knead into her pladoh.

Many other instances of such verb use demonstrate the essential role of context. Consider paper and blade in I don't think I'll have it because it papers me and It can blade your finger if you do it real fast (both from C, aged 4;0). The adult denominal verb means "put paper on" or "cover with paper." C, however, used paper as a verb in rejecting a piece of paper that she had cut herself on, and her intended sense for paper was "cut" (i.e., do what the paper did to me on that other occasion). Her use of blade is analogous: she used it in talking about winding up and then letting go the propeller of a toy plane: the verb blade picked out the cutting action the propeller could effect on one's finger once it was turning. Context is also required for verbs like flag and cement, as in S's It flagged (Table 4-c) and That truck is cementing (Table 5-e). An even more dramatic illustration of this, perhaps, comes from two other verbs S used, rug and lawn. He used rug in talking about his father's vacuuming the carpet out in the hall: Daddy's rugging down the hall. A little later, when S went to help, he said several times: I'm helping rug (2;8,15). His use of lawn was similar and occurred soon afterwards. While outside in the front yard playing with a toy lawn mower, S was overheard saying to another small child: I'm lawning (2;9). Knowing about rugs and lawns is not enough. The speaker and listener have to have mutual knowledge of the context to arrive at the intended interpretation of such innovations (Clark & Clark, 1978).

If children create such verbs to pick out specific actions, they could well use the same verb on different occasions for different actions. The following uses of broom illustrate this. First, S, aged 2;7, had just hit his baby sister with a toy broom and when his mother asked him what he'd done, he replied: I broomed her. On another occasion, S (aged 2;11) used broom in asking his mother not to sweep his room: Don't broom my mess. Broom could presumably have an indefinitely large number of senses, one for each situation in which a broom might in some way be involved, e.g., flying on a broomstick, cleaning, hitting, playing ride-a-cock horse, building a teepee, etc. (Clark & Clark, 1978). Another example of this has already been mentioned, S's use of button (Table 2-a). For several months, S used this verb sometimes with a positive sense (for tuning things on) and at other times with a negative one (turning things off).

Such combinations of positive and negative senses are not infrequent. The OED lists a number of such pairs among denominal verbs (Clark & Clark, 1978). And children come up with both positive and negative senses for locatum verbs. A positive sense for dust, for example, was produced by E, aged 3;4, when she decided not to wear her new nightgown outside in the patio because It will dust. Queried about dust by her mother, she said: Mine will get dust on it. In contrast, her older sister C used ice with a negative sense when scraping ice off the car: I'm icing the car. Queried about the verb, she explained: It means I'm getting the ice off (aged 4;6). Sand was used in a similar way by a slightly older

child, N, aged 7;0. On getting ready to go home from the beach, he protested: I haven't sanded myself yet. On this occasion, sand clearly meant "remove sand from."

Specific action verbs may be formed from sets of related nouns when each object category denoted involves a characteristic activity. If children use the name of one object for one specific action, they should be able to use other names from the same domain for other contrasting actions. Consider the following examples. At 2;11, S began using motor as a verb, saying It motors in as he pushed his toy motorcycle, car, and motorhome into his toy garage. (S probably formed motor from the compound motorcycle or motorhome, since his parents were certain they never used it as a verb, regarding it as out-of-date, 1920-ish.) A few days later, he used bicycle as a verb, e.g., They were bicycling. And a couple of weeks later, watching a truck go by, he came out with: It's trucking. Another domain S treated the same way was musical instruments. He began with cello. His father had been playing the cello, and when S was asked about it, he said his father sometimes let him do it. O: Do what? -- S: Celloing (2;11). The next week, S began to use other names of musical instruments as verbs too. Looking at a toy clown, for example, S noted: The clown is trumpeting. These observations show that children can draw on what they know about object category names to build small taxonomies of verbs for specific actions.

Specific action verbs, therefore, like general purpose verbs, provide children early on with a device for talking about actions. Both types appear to be what have been called contextuals: They have a potentially indefinite number of possible senses, rely for their interpretation on the context, and require cooperation between speaker and listener for the intended interpretation (Clark & Clark, 1978). Children, of course, are not as cooperative as adults and so may not make sure their listeners share the necessary background knowledge or see enough of the context for the intended interpretation. But when queried, even quite young children will make themselves clearer. Another thing children have eventually to learn is that some verbs are normally pre-empted by other verbs with the same meaning. For example, gun will be pre-empted by shoot, broom by sweep, car by drive, and airplane by fly, but it may take children some years to learn these constraints (Clark & Clark, 1978).

Summary

During the early stages of language acquisition, children rely on several linguistic devices for talking about actions. They produce terms like break, cut, run, pull, push, bring, and kick quite early. However, inspection of the contexts in which these verbs are used and careful tests of what children understand by them suggest that they produce many adult forms long before they understand the adult meanings.13 In this paper, therefore, I have focussed on two other devices children rely on. First, they make extensive use of general purpose verbs like do and go where they depend on the

context of each utterance to make clear what particular action they are talking about. In this way, children can use a single device to pick out an enormous number of different types of actions. Second, children make use of specific action verbs. They create these by forming a verb from the name of an object involved in the action in question. These denominal uses also depend on the context for their interpretation. By exploiting these two devices, children manage to talk about many different categories of actions at a time when they know comparatively little about adult terms for actions.

I have also made some suggestions about why children might need to rely on such devices. First, categories of actions may be more difficult to analyze than categories of objects. Action categories are transitory in nature and less coherent than object categories on two counts. The range of activities included within a particular category is hard to specify, and the boundaries for a particular category are hard to set. This is characteristic of many, if not most, action categories.14

Second, the terms for action categories form lexical domains with a predominantly vertical structure. Each term contrasts with its neighbors in a different way, depending on the components they have in common, and the components one or the other lacks. These domains, typical of relational terms like verbs, take longer to master than object taxonomies where the lexical structure is predominantly horizontal. In the latter domains, the majority of terms contrast at the same level (the basic or generic level). Vertical domains may be harder to acquire than horizontal ones because in vertical ones children have to separate out precisely which components or conditions of application are pertinent to a given contrast in meaning. Horizontal domains, however, name categories that are identified by multiple features, and the presence or absence of the particular feature is not critical.15 This, perhaps, makes children analyze relational categories in more detail before they can understand or produce the adult terms for them appropriately. Talking about actions is difficult and discovering what words can do takes time.

Notes

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(1) A caveat: Dog at this stage could be acting as a superordinate for the domain and thus equivalent in use to the adult animal (e.g., see Guillaume, 1927).

(2) Although children often over-extend words in production, they don't always do so in comprehension. Instead, they often seem

to understand a word as applying only to the adult category named (e.g., Moore, 1896; Stern, 1924; Huttenlocher, 1974; Thomson & Chapman, 1977). Thomson and Chapman's data suggest that children may go through several stages, first over-extending a term in both comprehension and production, then restricting it in comprehension while continuing to over-extend it in production, probably for communicative reasons (see Clark & Clark, 1977; Clark, 1978b).

(3) Examples of other studies documenting this narrowing down of the animal domain are Hall (1896-7), Chamberlain and Chamberlain (1904, 1905), Pelsma (1910), Boyd (1914), and Stern and Stern (1928).

(4) Their fourth term, no doubt, ought to be phoenix.

(5) With the exception of wee (opposite of big), these children used virtually no negative dimensional adjectives in this task.

(6) This task required both comprehension (taking in the term used by the experimenter) and production (coming up with its opposite).

(7) The grammatical category of the term used is a poor guide at this stage of acquisition. Instead, one has to rely on meticulous observations of how the child uses each word--and even that may not be enough to distinguish actions and results (see further Stern & Stern, 1928; Guillaume, 1927; Kenyeres, 1927; Farwell, 1978).

(8) In alphabetical order: ask, bite, break, brush, build, bump, burn, button, darn, dip, dress, drink, drop, eat, fan, feed, feel, fix, fly, give, hurry, hurt, itch [scratch], jump, kick, kiss, let, look, lift, lose, may, open, paint, pinch, pound, pull, push, rake, ride, ring, roll, saw, scratch, see, sew, sing, sit, sleep, smell, sneeze, tack, talk, tell, tickle, tie, tip, try, turn, unbutton, unlocken [unlocked], walk, wash, wear, wet, whip, wipe, wrap. This child's verbs comprised about a quarter of her vocabulary at age 2;0.

(9) At 1;5--kick, break, chew, pick, squeeze, knock, open, throw, ride, tear, hurt, blow, bow, caught; at 1;6--bite, cut, broke, smell, dust, gave, drop, lay, shut, hang, look, see, sit; and by 1;7--hook, pull, tie, lock, rock, typewrite, smoke, dance, pat, shave, lace, stick, read, tuck, cry, fall, fell, know.

(10) At 2;4--bite, break, brush, build, button, dance, draw, dress, drink, drop, fall, feel, fit, fix, gulp, gargle, hand, hear, help, hit, hug, hurry, hurt, jump, keep, kick, kiss, knock, lay, laugh, lean, let, lie [recline], like, lock, look, move, must, open, pat, pick, play, rain, rake, reach, rock, run, say, see, sew, sit, shall, shut, sleep, smell, spank, spill, splash, stand, step, sweep, talk, tear, thank, tickle, tip, try, turn, wake, walk, want, wash, would.

(11) More detailed analyses of these data are currently in preparation.

(12) The data from C and E were supplied by Melissa Bowerman. The other data are my own, plus a few examples from the acquisition literature (O'Shea, 1907 (B); Grant, 1915 (R); Huxley, 1970 (D); Kuczaj, 1978 (A, H)).

(13) See Bowerman (1976) for discussion of kick, Clark and Garnica (1974) for bring, and Long (1975) for some verbs of motion.

(14) It may well turn out that boundaries between categories of actions vary more from language to language than boundaries between categories of objects.

(15) See Rosch and Mervis (1975) and Rosch et al. (1976).

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