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### Actions Speak Louder than Words

John B. Gatewood

Unless you can use your Image to do something, you are like a man who collects maps but never takes a trip.

Miller, Galanter, and Pribram (1960:2)

Anthropological interest in cognitive systems has ramified to such an extent that some may be unclear about what cognitive anthropology is. Keesing (1974) circumscribes the subfield by contrasting it with structural and symbolic anthropology, all three being based on an ideational conception of culture. The Laboratory of Comparative Human Cognition (1978) takes a different tack and enumerates three areas of active research: testing for psychological salience, studying folk classifications, and modeling decision processes. Others, for example, Bock (1980) and Casson (1981), provide more complete surveys including both historical derivations and current areas of interest.

The most conspicuous absence in such listings of research interests is a genuine concern with *action*. Cognitive anthropology remains closely affiliated with linguistics, both in terms of the importation of formal models and in that lexicon and verbal reports constitute the principal data. With few exceptions, anthropologists have been slow to confront the problems posed in describing systems of action and in relating cognition to action. Most have been content to pursue their inquiries into the structure of static, atemporal, semantic relations.

The disregard of action in cognitive anthropology is symptomatic of the more fundamental lack of concern with the temporal dimension of knowledge. Because we tend to focus on human beings as *understanding-systems* to the exclusion of human beings as *acting-systems*, we lose sight of the fact that cognizing, thinking, and knowing take time just as much as do easily observable actions such as running.

winking, and fidgeting. Response time (latency) is a critical variable in physiologically oriented research (e.g. Goodglass 1980). Similarly, response time has been used, along with other measures, as an indicator of relative salience (e.g. Rosch et al. 1976, Lucy and Shweder 1979). But in these studies the focus is on the speed of passive assimilation and response to stimuli rather than on the sequencing, timing, and coordination of the ongoing flow of thought and action. Researchers in the area of nonverbal behavior (e.g. Condon and Ogston 1967; Condon 1979; Birdwhistell 1970; Kendon 1970, 1973; Chapple 1970) have developed techniques for studying the coordination of behavior in social interactions, but they do not attempt to chart the equally complex flow of thoughts and feelings that, presumably, transpire in concert with the overt behaviors. Who asks how long it takes to have an idea, think a thought, feel a feeling? Indeed, there are few counterexamples to Arbib's critique: "For many linguists and anthropologists, concepts are static entities to be isolated. Many anthropologists are not interested in cognitive processes, in other words in the dynamics, but in learning as much as possible of the cognitive categories enforced in a culture at any one time. A cognitive system is then not dynamic, but rather some sort of static world view, or picture, or map" (Arbib 1970:332).

The issue is how human knowledge is linked to, meshed with, part of human action. Because actions transpire—they are extended in time with characteristic sequencing and durations—a necessary first step toward resolving this issue is to be concerned with the temporal properties of knowledge structures as well as of actions. Failure in this regard engenders a rigid separation between competence-cognition-knowledge on the one hand and performance-action-behavior on the other (e.g. Chomsky 1957, 1965). This, in turn, gives rise to an image of human beings as passive interpreters of their lives, as severe split personalities whose knowledge only monitors their behavior, who spin endlessly in the vicious cycle of behave-interpret-behave-interpret. In this view the human being is reduced to an overintellectualized creature whose behavior arises of its own accord only to become grist for a disembodied and alienated mind. Knowledge is divorced from action. Cognitive psychology, too, has yet to deal with this matter: "A classic problem for most cognitive approaches has been that their constructs typically do not explain how thought is turned into action" (Fischer 1980:523).

In what follows I take an initial step toward relating knowledge and action in anthropological accounts: I describe in much-abbreviated fashion one person's cognitive organization of an action system. The description is not intended as a simulation model of cognitive/action

processes, and knowledge structures are not specified in the forms typical of artificial intelligence work (e.g. Axten and Fararo 1977, Rumelhart and Ortony 1977, Schank and Abelson 1977, Palmer 1978, Kieras 1981). Rather, I am concerned with how one person represented his job routine to himself—how he organized his work in order to know what to do next in a highly sequenced group activity—and how this organization developed concomitantly with his skill level. Clearly, this will not solve the problem of how knowledge underlies action, but it is a starting point insofar as the description preserves at least the sequential aspects of both cognitions and actions as well as sketching their ontogenetic development.

The case comes from my three seasons of experience as a paid crew member on Alaskan salmon boats. The work of putting the seine (type of net) in the water, holding it open to entrap fish, and retrieving the gear is called "making a set." It requires the coordinated work of from five to eight crew members, and it takes about one hour. The operation is repeated from five to twelve times per working day, the exact number depending on various factors.

Because the phenomenon involves breaking down a process into events or episodes, the case resembles Agar's (1974, 1975) study of addicts' verbal segmentation of "getting a fix." In seining, however, very few temporal phases of the work are encoded in the collective jargon. As a result, my description is concerned largely with unlabeled cognitive categories and how they are related to the way people talk about seining. Each crew member constructs his own cognitive representation of his work (including its segmentation into episodes), and these personal constructs only partially correspond with those encoded in the collective representations of the work.

### **Ethnographic Background to Salmon Purse Seining**

Purse seining is a variety of net fishing. The top of the net has floats attached to keep it at the water's surface, and the bottom of the net is weighted. The seine can be closed at the bottom by pulling a free-running line that is threaded through rings attached to the weight line. Closing the seine is rather like closing an old-fashioned lady's purse by pulling its strings. In this way fish are trapped, not gilled.

In southeast Alaskan salmon seining the purse seines are 250 fathoms long (ca. 457.2 m) and about 90 feet deep (ca. 27.4 m). Because the seine is so heavy and difficult to manage in the strong tides, all major manipulations of it are done with mechanical aides. Chief among these are the two boats, which drag and hold open the seine. The

main boat is about 55 feet long (ca. 16.8 m), and the power skiff is about 16 feet (ca. 4.9 m). In addition to the boats themselves, seiners use a power winch to pull in the purse lines and a Puretic power block to hoist the seine onto the deck.

Crews range in size from five to eight, skipper included. Most boats have crews of six: one skipper, one cook, one skiff driver, and three deck hands. These are the relevant roles when making a set. At most other times the significant distinction is simply skipper versus crew member.

The salmon seine season lasts from roughly mid-July through September, and seining is tightly regulated by the Alaska Department of Fish and Game. Legal seining is specified in terms of both when and where. Each week during a season the ADF&G announces "openings," and the seine boats leave port for the open areas. An opening usually lasts from 36 hours to several days, and the boats stay out in the fishing areas this whole time, unloading their catches each evening to tender boats. During openings the work day may be as long as 20 hours (in accord with the long daylight hours of the latitude in summer). On the other hand, after the seine is mended on returning to port, seiners do no work whatsoever for a few days, until the next opening.

I refer the reader to Browning (1974), Langdon (1977), and Gatewood (1978, 1983a, 1984) for more general ethnographic information, including photographs and drawings of seining hardware. Here our concern is with the central operation of seining—making a set—and not with other aspects of the work. Below is a description providing the crudest outlines of what happens when seiners perform their main task. This is the sort of story I would tell an interested tourist or a mildly curious friend; that is, it is my *narrator's account*:

Well, to begin with, there are six people who do all the work. The skipper stays on the main boat and runs the show, the skiff man maneuvers the power skiff around, and the other guys are deck hands. When the skipper gives the order to cut loose, the skiff man and one of the deck hands take off in the skiff with one end of the seine. They go out and hold the net open so that the fish swim into it. It is a long net, about a quarter-mile or so. When the skipper thinks it is time, he tells the skiff to bring its end of the seine back to the main boat. Now, the seine is in a big circle with both ends tied to the main boat. Two guys start pursing up the bottom of the seine by wrapping a line which is run through rings attached to the bottom of the seine around the drums of a power winch on the boat. This closes the bottom of the seine so that the fish cannot swim out. While they are "pursing," as it is called, two others guys

are running around doing assorted things to keep the seine from getting tangled. The one fellow who went for a ride in the skiff is back on deck by now. When the pursing is finished, we hoist up the bottom of the seine and drop it on the deck. Now, the fish cannot get out. All that is left to do is haul in the seine until there is just a little (or big!) bag of fish in the water, then hoist the fish up and drop them on deck. Then, we pitch the fish into the hold, clean up, and get ready for the next set.

The description above is infused with my current functional comprehension of the collective work. The focus of such a narrator's account is what happens to the seine as the crew collectively manipulates it in the water. This is *not* the way a seiner organizes his job routine while doing the work. The narrator's account stems from a reflective, functional manner of thinking and is from the posture of an informed observer. When doing one's job routine, it is quite unnecessary to know why one pulls up a line and ties it around a cleat, for example, only that it must be done at a particular time. Presumably, someone at some time understood the why of each job. My point is that any given seiner need not understand his work in terms of functional rationales. One does one's jobs because the skipper or an experienced deck hand has told him to do so. Even with my academically fostered propensity to ask functional questions, I did not understand why I did several jobs until my second and even third season. The problem when working is not communicating the collective effort via word-pictures complete with rationales but, rather, knowing what to do next. The narrator's perspective, once developed, may assist in the formation of a worker's cognitive organization of his job routine, but it is not identical with the personal construction. It is with and through such personal constructions that seining is accomplished.

### **The Cognitive Organization of Purse Seining**

When first exposed to purse seining, one finds it difficult to see the big picture, the larger pattern that all the various little things people are doing carry along. This is true from the vantage point of a spectator, and it is painfully true for a "rookie" (novice seiner) who is trying to participate in the bewildering array of tasks. The initial conception of the work is quite different from what eventually develops as the work becomes more familiar.

Prior to commencing work, the prospective rookie has heard most of the seining jargon referring to phases of making a set, he has probably heard several narrator's accounts of what to expect, and he is familiar with the visual appearance of the boats and their hardware.

However, he is only slightly more knowledgeable than the reader is now.

The evening before my first opening our skipper finally gathered us together on deck and formally announced the job assignments for the season. In close paraphrase his speech was something like: "Well, let's see. Darrell, you and Richard will do the pursing up this year. You two [Sk'eg and John] do the other things. Sk'eg, you're the skiff man with Frank. Richard, you'll do the web again; John, you do corks; Sk'eg the leads; and Darrell, you do what you did last year." This terse, jargony speech was the first and last time that jobs were assigned by authoritative decree. If you cannot figure out what seining is like from the skipper's assignments, then you know how I felt that night, because it did not mean much to me either. I had expected some sort of lecture on the operation of making a set. Instead, I got a semicoded message and the obvious prophecy, "You'll see tomorrow."

The next morning we were the second boat in our vicinity to make a set. We waited in line while the boat ahead of us held open its set, and I eagerly watched what its crew members were doing. When their skiff headed back to its boat, we began maneuvering. Richard released the skiff on the skipper's command, and Frank whirled the skiff around and headed for the shoreline with his end of our seine.

While we held our seine open, I received more detailed descriptions of what would happen in the first few minutes after our skiff returned. I was supposed to help Richard start one of the purse lines going around the stern-side winch drum. I was to stand holding the boat tow line and wait for Richard to lower it after Frank had steered the skiff out of the set. I should then unfasten the double block from the boat tow line and pull it down to the deck and fasten it to the cleat so it would not swing freely in the air. Then, Richard would untie the boat tow line from the winch niggerheads, and I must very quickly push the line over to the stern-side davit pulley, put it in, and shut the pulley's clasp. Once the boat tow line was through the davit pulley, Richard could begin pursing it up.

Of course, their instructions that morning were very different from this written account of them. They did not bother naming parts of the hardware, nor did they explain the purpose of each task I was assigned. Rather, they just told me to do several things in a linguistic form similar to: "Put that [point] through there [point]." All I got from their instructions was a vague advance warning that things were going to get very hectic and very busy. I concentrated on my responsibilities: getting the yellow line above my head (the boat tow line) freed from the double block and through the davit pulley (that

one right →). If I did that, other folks would take care of everything else.

The skiff returned, and everything progressed according to the plan. I put the yellow line through the davit pulley and shut the clasp. Then, as the adrenalin was pumping through my body, things got very strange very quickly. What were those other things I was supposed to be doing?

About this time I abandoned my arrogant hopes of being a participant-observer. I had all I could handle trying to participate. Skipper began yelling succinct, entirely ambiguous orders like, "Pull up that line!" Sk'eg (also a rookie) and I both jumped toward the general direction of Skipper's pointing and commenced fondling lines until one of us hit upon the correct one. Then we tugged away at it. Just when we were feeling we must be doing a good thing, Skipper yelled another equally clear instruction, and we let go our line to jump for the second one. This brought a rapid verbal evaluation of our overall mental capacities. Eventually Sk'eg and I divided and conquered—each to his own line—and Skipper's agitation began to dissipate.

The set continued even though Sk'eg and I were part of the action. He and I were very eager but very ignorant. Our work required constant monitoring by Skipper (which is why he was upset with us), but we finished that first set and made about five more that day. The following day we made six sets, and the first opening was over.

During the two days of my first opening I developed a distinctive mode of organizing my work. After the first set everything from shutting the davit pulley's clasp to the beginning of "hauling gear" (bringing the seine over the Puretic power block and making cork, web, and lead piles) was just a blur. I was unable to remember clearly what I had done or when. However, by the end of the first day, i.e. six sets, I began to see my work (a) as a routine, and (b) as a single-leveled array of separate "little tasks," each of which had to be mastered in and of itself.

This initial organization seems to be typical of rookies. In this stage of development rookies are often oblivious to what other crew members are doing, and they are completely absorbed in their own thoughts, work, and anxieties. Provided the rookie has the beginnings of a good seining ethos, his inner turmoil can be seen on his confused but eager face. My own worries were whether I could remember everything I had somehow gotten done the previous set, whether I could remember when to do what, and whether the jobs I had done the previous set were expectable parts of my evolving routine or peculiar to the contingencies of that set. I also knew that my position on the boat was

in the balance: if I did not gain control of my work within the next couple of openings, I would be fired.

Before too long (roughly on the order of eight to sixteen sets), the rookie who is going to make it as a seiner manages to get his responsibilities under control. He can tie lines around cleats and rigging pins quickly. He knows where the busy and congested spaces are. He knows not to stop the operation just because some jellyfish is burning on his face. And he knows what he is responsible for doing and when he should do it. Typically, this understanding involves a simple memorization after the fashion, "First I do job<sub>1</sub>, then I do job<sub>2</sub>, then I do job<sub>3</sub>, . . . , then I am finished." In other words, this first level of understanding is in the form of a *string of beads*.

The string-of-beads organization, though quite simple, is itself rather miraculous because job responsibilities and the division of labor are evolving during the same time. For example, if I had been provided with a detailed list of "my jobs," I am confident I could have memorized it thoroughly before making my first set. But no such list is provided. Furthermore, there are no dress rehearsals or practice runs in advance of the real event.

Despite the mass of confusion (from the rookie's vantage point), a normal human being seems capable of coping with the flux and transforming it into routines, and this is in addition to mastering each task. However, if a rookie with only a few sets' experience were asked merely to recite his job routine, he would not be able to answer with any degree of certainty. Mental rehearsals can hasten this form of mastery, and, indeed, Sk'eg and I verbally practiced our respective routines all the way back to port after our first opening. The language of such rehearsing, whether spoken out loud or inwardly, tends to follow Vygotsky's (1962) general observations: there is a very high ratio of verbs, in the present tense. Yet not all of one's actions are represented verbally, outwardly or inwardly. Rather, one experiences visual imagery and muscular tensions appropriate to certain actions, but can only grope for words to express these inner thought-feeling flows. Such was the case as Sk'eg and I tried to articulate our job routines to each other, and I have the same problem every time I try to write about seining, though the more often I write, the easier it becomes, because I have built up a stable repertoire of labels, names, and expressions.

In addition to mentally rehearsing my routine, I stumbled upon a simple trick which made remembering what to do next much easier, though still in the string-of-beads organization. I spatialized the temporal relations of my job routine. Instead of trying to remember which job followed which job, I transformed the problem and mem-

orized which spaces I occupied in what order. This was particularly appropriate because my routine required that I make a simple circuit around the boat's perimeter. I got this flash of insight during my second opening, and it dramatically improved my temporal awareness and mastery. This spatial mnemonic for temporal relations was most significant during the first half of my rookie season. After that I began to think of my work in yet different ways, and though I persisted in recognizing my dance around the boat, its mnemonic function declined.

I do not know if other seiners develop spatial mnemonics similar to the one I devised. Be that as it may, they commonly develop some sort of string-of-beads organization, and they continue thinking this way until they become confident of their accuracy. After 20 to 30 sets a rookie can recite his routine easily and fluidly (if in awkward language forms) as well as perform it gracefully. But by this time two things have also happened: (a) he has developed additional ways of representing his work to himself, and (b) he is not likely to think of himself as a rookie any longer.

During my own period of rapid learning I had the feeling that two levels of understanding were slowly coming together. On the one hand, the jargon a rookie has heard since his arrival (e.g. making a set, pursing, hauling gear) is beginning to be more than mere words. The jargon has served to loosely organize seining even before he started working, but now the expressions have deeper meanings. On the other hand, little things, unnamed chunks of activity, have riveted the rookie's attention away from the big picture crudely provided in the jargon, and these little things have surprised, confused, and frustrated him until he finally masters each one. The large-scale overview of seining given expression in the collective representations does not mean very much to the beginner, and the small-scale fragments of the process dominate one's thinking but provide no comprehension despite their vividness. Both visions concern the same process, both have merit, but initially they remain two distinct and seemingly unrelated perspectives.

With experience, the two organizations mesh and interpenetrate. When this is achieved—however it happens—the rookie is not only able to *do* his work and *recite* his routine but also imagines that he has begun to *comprehend* seining. The tunnel vision characteristic of the beginner, lost in the details of his own responsibilities, gives way to a broadened view of the operation as a whole. Now, in addition to telling tourists what seining is all about (a narrator's account), the partially experienced seiner can relate his job routine with all its little tasks to that same story. This new form of organization is reflected

in the subjective experience, in an increased ability to decipher another person's work on a different boat, and in increased awareness of what fellow crew members do at different times during a set.

The nature of this relation between job routine and the operation as a whole is not, as many readers may suspect, a matter of understanding the purpose of one's work. Functional comprehension develops piecemeal and usually long after the seiner has constructed the sort of cognitive organization sketched above. As mentioned previously, I did not discover the purpose of some jobs until my third season, yet I was regarded by my skipper and fellows as a skilled co-worker. The beginning of seining comprehension is a matter not of functional understanding but, rather, of establishing temporal correspondences between the elements of one's routine and the major functional phases of making a set. Such temporal linkages do not in themselves reveal the purpose of any given little task, however, because the functional phases indicated in a narrator's account are accomplished by ensembles of little tasks performed by perhaps several crew members. In other words, narrators' accounts describe seining at a much higher scale than what constitutes the immediate reality for someone working on deck.

Relating the little tasks of one's job routine to the functional phases of a narrator's account is not unidirectional in effect. If the association provides comprehension of the little tasks, it also enriches the meaning of the jargon and narrator's account. I once listened patiently to a person who had never been seining tell a tourist what happens when making a set. His account differed in no significant way from the story I would have told, yet I submit that he did not know what he was talking about. To him, it was "loose talk" (Gatewood 1983b), just words strung together in a colorful manner. He had never experienced a sampling of the little tasks that are so vivid and dominating to even partially experienced seiners. After a couple of openings a rookie not only can talk a good set but he knows what it means to make a set. As he relates the specifics of his job routine to the operation as a whole, the jargon takes on deeper meaning. With experience, hauling gear, for example, becomes more than just a colorful addition to one's vocabulary and acquires all sorts of connotations. These connotations resonate through muscles that flex and contract in new ways. Thinking about hauling gear conjures moods of complex inner tensions. And these matters are distinct from simple linguistic mastery of the expression. When these kinds of feelings, these inner flowings, become patterned and regular through repeated activation, the seiner thinks of hauling gear in a more than linguistic framework. Now it is a

temporal segment, an expression pregnant with meaning, a natural phase of seining. Its meaning is lodged in muscles as well as words.

Every seiner I questioned, with one exception, had developed a segmentation of the process of making a set. The single exception proves the rule in that he was also regarded as the most inept seiner imaginable. The generality of segmentation is interesting in itself and begs explanation. Why should seiners develop intermediate levels of organization between the little tasks and the process as a whole? Why should their initial, string-of-beads organization be superseded and reorganized in accord with some higher-order temporal segmentation.

One answer to these questions can be formulated by viewing the segmentations as the solution to a cognitive problem. In this view the problem for a seiner doing his job routine can be framed as knowing what to do next. Indeed, this is a felt problem during the first part of the rookie season. Segmentations solve this problem because it is easier to remember an ordering if the elements being ordered are hierarchically organized rather than single-leveled. This can be deduced with the algebra of permutations (see, for example, the case of the two watchmakers in Simon 1973). And, in point of fact, seiners find it easier to remember their job sequence once making a set has become internally represented as consisting of distinct temporal segments rather than a simple linear order of little tasks. However, once such segments have been constructed, the original problem is no longer felt as the same problem. It is not that remembering is easier but that, within the bounds of a segment, one does not have to remember consciously at all. Nonetheless, segments solve the original cognitive problem, whether in the same terms or by transforming the problem itself. Hence, the difficulty of knowing what to do next can be regarded as a functional motivation for the construction of segmentations. Of course, this motivation does not determine *which* segmentation; rather, it lies behind any and all segmentations.

Segmentations are not simply replications of the collective representations. A given segment is not merely a linguistic expression with expanded meaning, common to all seiners. Rather, each seiner constructs his own version of the natural phases of a set. Figure 1 illustrates the segmentations of three crew members who worked together. The labels of the segments are their own phrasings. Capitalized labels indicate expressions that are also common jargon. An expression in quotation marks signifies that the seiner's label for the segment derives from the jargon although he did not do the work so specified. For example, John used "pursing" as a segment label even though he did not purse, and Darrell used "hauling gear" but did not do this work himself.

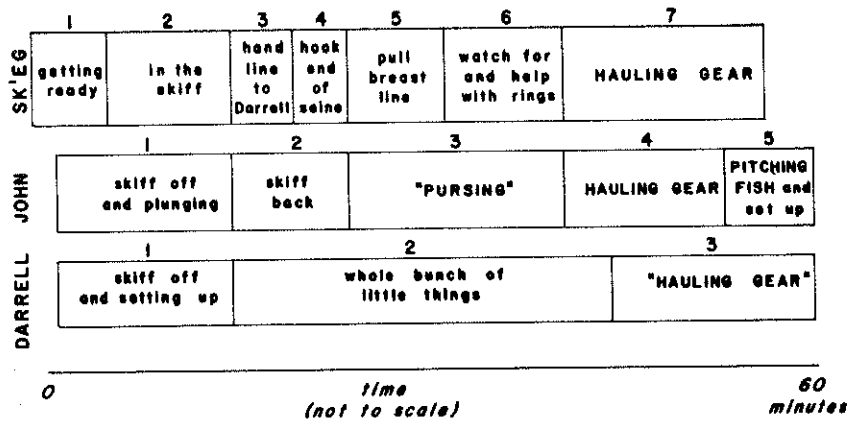


Figure 1. Varying Segmentations of "Making a Set" by Three Members of the Same Crew

The diversity depicted in Figure 1 runs counter to two rather widely held views in anthropology: (a) that cognitive sharing is a prerequisite for successful social interaction and even more so for cooperative activities, and (b) that cognitive organization is simply internalized collective representations. Why would seiners working on the same boat, having to coordinate their individual work efforts with one another, develop different representations of the natural phases of seining? We have already seen a functional motivation for constructing *some* segmentation, but why would segments differ even in their temporal boundaries from one crew member to another?

Especially during one's first season there is a strong element of faith on the part of the rookie that the system is good and not itself the source of fouling. When fouling does occur, the good rookie blames himself and not the tradition. This strong sentiment is most often expressed as the belief that so long as each person does his work, everything will go right. Of course, this presumes that the division of labor has covered all necessary work and that the boat's equipment holds together. The point is that a crew member's faith in the seining tradition frees him to wear blinders, to fixate on just his own responsibilities. This attitude partially accounts for the variation in segmentations because it has the effect of isolating one's own work from that of the crew as a whole. Thus, although one's work must articulate at many points with others', the cognitive organization of one's work is a private concern. So long as a seiner gets his work

done properly and in time, how he organizes his routine does not concern anyone else.

Two factors—faith in the seining tradition and the functional advantage of multileveled cognitive organization—make it appropriate and wise, respectively, for a crew member to segment *his job routine* into phases. What remains to be explained is why seiners construct the segments they do and why each feels his is the natural way of breaking the whole process into episodes.

Normally, if a classification is natural, one would expect others to share it. Yet, as already noted, there is variation in what is perceived as natural, even among people working closely together in a collective activity. To understand how the various segmentations can all appear to be the natural way of carving seining, i.e. at its joints, one must realize also that: (a) no one talks about these things in naturally occurring situations; rather, they are brought into the public sphere only by questioning; (b) no one would argue the correctness of his own version over other versions; and (c) each segmentation is natural in terms of the organization of a single crew member's routine, and it only partially pertains to and derives from that routine's relations to the collective work. As job routines vary, so do the segmentations. Figure 1 illustrates this point: Darrell, Sk'eg, and John did different things while making a set, and their segmentations, their personal representations, reflect these differences (see Gatewood 1978:134-50 for detailed descriptions of the various job routines). The same point is supported another way by comparing one person's segmentations from different seasons when he had different routines.

As illustrated in Figure 2, my segmentation of making a set the

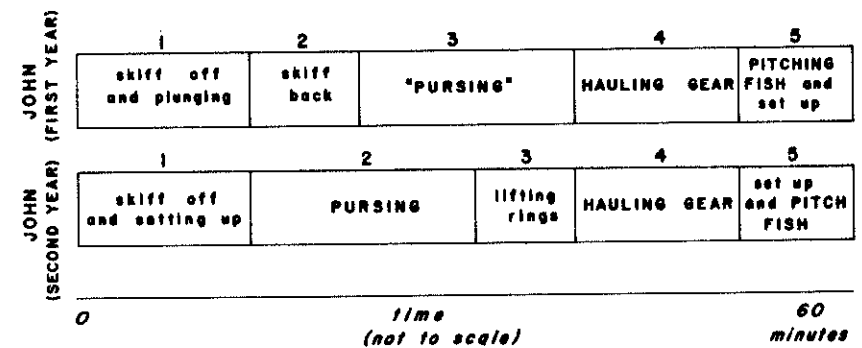


Figure 2. Varying Segmentations of "Making a Set" by the Same Crew Member from Two Consecutive Seining Seasons on the Same Boat



second year was rather different from that of the first year. Because I was deck boss the second season, my first segment was dominated by the responsibility to make sure everything was prepared for the skiff's return rather than by the task of plunging. Also, since I was pursing on the inside drum of the power winch, I felt that pursing began almost immediately on the skiff's arrival and that pursing was the dominant job of that time period. By contrast, in my first season I had many little jobs associated with the skiff's return (getting the boat tow line through the davit pulley, etc.), and pursing was merely a heuristic for the third time segment, after the skiff had gotten clear of the set. The other differences shown in Figure 2 are similarly related to differences in my job responsibilities one year compared to the next.

The diversity in segmentations is thus understandable as deriving from differences in job routines. Each crew member has his own job routine, and this is reflected in his segmentation of it. The question arises whether two people having the same routine would thereby also have the same segmentation. In other words, is there a one-to-one correspondence between job routine and segmentation? My data are insufficient to answer this, but my feeling is that the relation is many-many. As Spiro (1951:37-41) argues at a general level each person enters a situation with a perhaps unique history, and that history is vital to understanding the person's response. Therefore, merely having the same job routine—in itself an unlikely happenstance—would not necessarily predict having the same segmentation.

Segmentations function to organize all the little tasks each seiner does and thereby facilitate knowing what to do next. They are not directly reflected in a seiner's narrative account of what happens while making a set. Such an account (for example, the one offered previously) reveals the collective representations of seining—how seiners represent seining to one another—but not necessarily the personal representations. Personal representations organize actions, not narratives.

Despite the difference between personal and collective, some segments take at least their labels, if not their precise temporal boundaries, from the collective jargon. Furthermore, the process of constructing segmentations involves an interaction between the collective representations and the specifics of one's routine. Hence, I suggest that seiners construct their segmentations as some kind of resolution between two quite distinct modes of cognitive organization. These two modes are:

1. *Socially standardized but vague jargon.* The collective representations of the work (encoded in the jargon and processually revealed

in narrators' accounts) are learned first. They are ontogenetically prior to familiarity with the actual work of seining. They serve to organize the process as a whole into functional phases according to how the crew, as a collectivity, manipulates the seine. These collective representations are public and verbal. They are the terms in which seiners represent seining to each other. But such representations lack concreteness. They impose analytical distinctions and create temporal phases that are clearly understandable but not experientially vivid action segments.

2. *Specifics of a given job routine.* These are variable, both from crew member to crew member and from year to year for the same person. The components of job routines are initially felt as little tasks, discrete and coherent action units, which are organized in simple linear sequence. These little tasks may or may not be labeled (in either external or internal speech), but it is in terms of these that seining is actually done. Despite their vividness and subjective definiteness as chunks of action, they do not provide any sense of the process as a whole.

Resolving these two modes is not simply a matter of mapping the set of little tasks into the functional phases of a narrator's account. If it were, then each crew member's segmentation would have the same number of segments and the boundaries of segments would be mutually aligned because seiners give remarkably comparable renditions in their narrative accounts of what happens when seining. However the resolution occurs, it happens during the rookie season. In subsequent seasons there is a tendency to modify prior segmentations directly rather than to repeat the constructive process anew. For example, when I started my second season, I did not begin at the beginning: I was not a rookie again. Instead, I assimilated my new job routine with existing segments and accommodated discrepancies as necessary. Figure 2 illustrates this in an oblique way: the temporal boundaries between Segments 1 and 2, 3 and 4, and 4 and 5 remained constant from the first year to the second despite substantive changes in the segments themselves.

To this point, I have spoken of segments only as categories of time and action. But they have properties above and beyond those deriving from the whole-part relation vis-à-vis the little tasks they organize. Focusing on temporal boundaries is the easiest way to demonstrate diversity and highlight their categorical qualities. However, segments are differentiated from one another substantively as well. They cohere as *psychological* units in the following ways:

1. *A segment has temporal continuity.* A segment does not occur, subside, and recur in the same set. Although there may be affinities



between portions of different segments, a segment is a temporally continuous episode within the process of making a set.

2. *A segment has a characteristic emotional tone or ethos.* The characteristic emotional tone is a regular part of a segment's performance. It is also active, though less intensely, when reliving the segment in memory. Part of the awareness of a segment comes from its specific, fairly regular mixture of emotions. (In saying a segment has a characteristic ethos, I refer to its psychological manifestation within the individual and not to the tone of crew interactions during that period of time.)

3. *A segment has a characteristic unified action mode.* A unified action mode, once fully developed, constitutes a fluid fabric in time. The person is aware of "getting ready" to enter into such a mode and is aware of "emerging" from it. But when engaged in its characteristic activities, he will be unconscious of it. The little tasks within a segment flow smoothly into one another and only rarely require conscious effort to remember what follows. By contrast, at the boundaries of segments, one typically has to think about where he is in the set and reorient psychologically to the upcoming, next segment. The little tasks within a segment are felt to be in some significant sense the same kind of work.

There are intermediate and different kinds of cognitive structures ranging in scope between the segment and the little tasks. Some of these are described elsewhere (Gatewood 1978:470-75). Here I have concentrated on distinguishing segments as a level of cognitive structuring and on tracing their developmental sequence and consequences. A segment is a coherent, not necessarily shared, psychologically felt unit of behavior that functions to organize small-scale actions. The organizing function is accomplished in at least several ways. First, segments categorize little tasks in time. This relation of part to whole and the concomitant hierarchical organization make knowing what to do next while seining much easier. Second, segments relate little tasks to large-scale and often causal understandings of the seining operation. So long as the little tasks remain in their initial string-of-beads organization, they have little, if any, subjective significance as purposive events. With the development of a segmentation, however, the causal significance of each little task is easier to discern, both in terms of its special and isolated function and in its effect in combination with other jobs. Third, segments facilitate comprehension of the temporal interrelations among different job routines on the same boat and thereby improve crew coordination.

## Conclusions

From the foregoing, several points emerge that extend beyond the confines of Alaskan salmon seining. Seining is a convenient example in which I can document interindividual variation in cognitive organization despite a common core of collective representations. In similar fashion, though from less grandiose circumstances, most of my actions are cognitively organized by unlabeled and largely unreflected upon categories of behavior that are not necessarily shared with other participants in my culture. When I ride a bicycle, brush my teeth, smoke a pipe, or play pool, I do not think these actions in words; rather, I do them in terms of unconscious action sequences. By reflecting upon these actions, I am able to recognize the existence of psychological events and episodes that would otherwise go unnoticed. Further, I am capable of formulating linguistic expressions to designate these hitherto unconscious flows of thought and action. But both the recognition and the labeling are capabilities independent of the actions themselves.

A focus on standardized linguistic behavior does not necessarily capture the pertinent cognitive phenomena underlying actions unless one assumes: (a) that language encodes all that is important in action, and/or (b) that collective representations are the basis of each person's cognitive organization—that there is cognitive sharing owing to a common ontogenetic development from language to action segmentation. My experience with and account of seining belies both of the suppositions. Not all cognitive categories are linguistically encoded.

In seining, I was provided with a crude cognitive map of making a set before the work commenced. Then I became familiar with the work itself and found it consisted of an incomprehensible array of little tasks. I had words for meaningless actions, and I had meaningful actions with no words. This was the initial state of affairs. As I reflected upon my work, struggling to improve my mastery, I constructed a personal representation of my routine. This personal mode of portraying seining to myself became linguistically formulated (primarily in inner speech) and even incorporated some of the collective representations. But it remained a *personal* construct, not equivalent to the collective mode of representing the work when conversing with others. Because the cognitive organization of work may differ from its collective representations, interindividual differences are free to arise.

Differences in cognitive organization do not impede collective action. As Wallace (1961) argues generally and I have described for one case, social life is a matter of orchestrating diversity, not replicating

uniformity. Making a set together, coordinating work sequences, does not depend upon shared understandings of what is happening. The development of a seiner's cognitive organization is directed not by some transcendental need to share meanings but by the practical constraints of coordinating his actions with those of his fellows. His actions, and theirs, speak louder than words.

Accounting for action is the problem for cognitive sciences. Thinking, speaking, moving are all forms of action: they are dynamic processes whose specific forms are susceptible to culturing. Here I have concentrated on but a small part of this bigger problem; I have focused on how a person represents his actions to himself. Actions are underlain by personal rather than collective representations. The constituent cognitive structures may or may not be labeled, and, if labeled, these may or may not derive from collective speech forms. Further, cognitive structures, like more observable behaviors, transpire. Hence, in any depiction or diagram of cognitive phenomena there should always be a time line (Witz 1976, Witz and Easley 1975), and we must collect data using methods that record the temporal aspects of thoughts and actions. Congruent with this view, I suggest we change our analytical language habits. Rather than speaking of ideas, concepts, categories, and links, we should speak of flows, contours, intensities, and resonances. By including the temporal dimension in descriptions of cognitive phenomena, our models will explicitly preserve the fundamental temporal properties of the referent psychological behavior and, thereby, be working toward a reconciliation of knowledge and action.

## NOTE

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