Thinking While Doing:
Active Cognition in Bartending

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Abstract:

Everyday activities generally involve multiple kinds and scales of cognitive structures that are temporally integrated with the on-going flow of actions. And, some activities rest on specialized knowledge not widely shared among the general public. This chapter describes how reasonably skilled bartenders think through, and during, the process of taking orders and making drinks. As the example illustrates, bartenders' active cognition involves several kinds of knowledge structures that are active at different times and in different ways in the production process, and bartenders and their customers do not need to think alike to interact successfully.

1. Introduction.

Ordering a mixed drink and getting what you expect is a minor miracle of social organization. Although customers and bartenders pretty much talk the same talk—they share much of the public code of drink names—there is a large discrepancy between their, respective, understandings of the domain. Taking an order and making the drinks is a complex process. Whereas customers usually focus attention on the ingredients and particularly on the social meaning of drinks (as props for "face work"), the bartender's knowledge involves hidden families of drinks based on their common deep structures. Thus, the first step in the production process is translation from the public code into bartenders' own production-oriented categories. Their specialist, sub-cultural knowledge includes not only ingredients and recipes, but also such matters as glassware, garnishes, prices, and economy of motion (critically important when filling multiple orders). This chapter describes aspects of the active knowledge involved in bartending, the "knowing how" that asymmetrically underlies the public discourse of drink names. The case illustrates one way in which specialist knowledge interlinks with public culture and raises general questions concerning the social organization of knowledge and how cognition meshes with actions.

In what follows, I describe some of the action-oriented knowledge bartenders use as they translate customers' orders and make drinks. Much of this knowledge is of the sort that is amenable to ethnoscience: it is explicit, classificatory, and lexicalized. Other aspects of the relevant knowledge are generally invisible and not easily verbalized, particularly the kinesthetic and timing aspects of filling multiple orders. While sketching the range of knowledge actually used in bartending, I shall also make mention of how this knowledge grows and develops as bartenders transform from novice to expert.

The chapter is organized as follows. Firstly, it provides an overview of the conceptual background from which bartending knowledge and skills will be examined. Secondly, the public but mysterious code of "drink names" is analyzed, including its latent sociolinguistic functions. Thirdly, some common misconceptions of bartending are discussed, especially as these are manifest in the contents and organizational structure of bartending manuals. Fourthly, I provide an overview of the different kinds of knowledge actually used when bartending, i.e., the knowledge and skills that are active when taking orders and making drinks. The final section extracts some general lessons from studying active cognition in everyday activities and how these may be relevant to issues of technology transfer.

2. Conceptual Background.

My interest in highly sequenced but only slightly repetitive physical activities comes from several intense, non-academic experiences, for example:

- Playing high school football … mid-1960s
- Bartending for two to three years at University of Illinois Faculty Center … mid-1970s
- Working on Southeast Alaskan salmon seine boats for three seasons … 1975, 1976, 1977
- Playing pool … the past fifty-plus years

All such activities involve a 'head game' along with skilled physical actions in which both sequencing and timing are critical aspects. And, in our everyday behavior, normal humans

manage to integrate their mental and physical activities—most of us can walk, talk, and think at the same time. But, it remains an open question how all the cognitive stuff underlies, guides, coordinates, and meshes with one's behavior in real time. If this is to change, a first step is to take seriously the fact that all knowledge structures have *careers in time*—they take time to construct/learn and have characteristic trajectories of duration when cognitively activated as well as spatiotemporal distributions within and among populations. Still, there are relatively few "cognitive anthropology" studies that address how knowledge and actions are interrelated temporally, let alone resolve the matter of how they are functionally integrated in real time.[1]

There are, of course, many researchers, and from different disciplines, who have tried to model and/or describe the ongoing flow of thoughts and actions, at least with respect to the temporal ordering and sequencing of tasks. Some diverse examples would include Miller, Galanter, and Pribrim's (1960) concept of a TOTE unit (test-observe-test-exit); Schank and Abelson's (1977) concepts of scripts, plans, goals, and themes to explain story-level understanding; Wallace's (1965) introspective account of the mental and physical activities involved in driving to work; Agar's (1974) case-grammar segmentation of the stages in addicts' "getting a fix"; Frake's (1975) evaluative scheme for how to enter a Yakan house; Gatewood's (1978, pp. 132-220; 1985) ethnographic descriptions of the task-level sequencing involved in salmon seining and the fishers' conceptual segmentations of their job routines; Heise's (1989) general formalism for modeling event structures based on lexicalized stages; Keller and Keller's (1996) descriptions of blacksmithing knowledge as involving a stock of knowledge, umbrella plans, and task constellations; Wynn and Coolidge's (2004) comparison of Neandertal and Modern technical expertise with respect to flexibly adjusting to contingencies when producing stone tools but differing with respect to innovation; and Haidle's (2009; Lombard & Haidle, 2012) behavioral "cognigram" approach to analyzing the sequential processes of tool-making.

Methodologically, this chapter's description of bartending is most similar to the precedents by Wallace, Gatewood, and Keller and Keller, cited above. Each of these authors had become personally skillful in the activities about which they wrote. For this reason, they could and did use *ex post facto* introspecting to identify the salient stages or steps that are *typically* part of the activity, whether these phases are lexicalized or not. In addition, if you routinely drive to work or have fished on salmon seine boats or been a blacksmith, it is pretty easy to identify the times when your attention remains tightly focused, when it is diffusely monitoring, and when it is going through a re-orientation. Of course, introspection does have drawbacks: there is no magic window into people's minds, even our own, and one's "key informant" might be insight-deficient. Conversations with and observations of other experts, however, can confirm general features of one's introspective account as well as reveal idiosyncrasies.

Secondly, knowledge structures come in all shapes and sizes, from low-level perceptual processing and categorizing to one's Image (in the sense of Boulding, 1956). D'Andrade's (1995, pp. 179-181) "ontology of cultural forms" provides a useful initial vocabulary for distinguishing different kinds and scales of knowledge structures. In particular, his distinction

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[1] The theoretical framework of mainstream, representational cognitive science can accommodate sequential time pretty well, but understanding how cognition and action are integrated in *real* time is a much more challenging task (Clark, 1998; Kirlik, 1998). Indeed, thoughtful concern with real time functioning generally leads to very different foundational approaches, such as Bickard's (2008, 2009; Bickard and Terveen, 1995) "interactivism" and Chemero's (2009) "dynamical stance". While I am very sympathetic with these newer approaches, my subsequent descriptions of bartending focus mostly on temporal sequences, and I leave the development of real time models of brain architecture and functioning to more qualified scholars.

between *models* and *theories*, conceived as a gradient, is especially relevant with respect to the focus of this edited volume. While both are typically composed of interrelated schemas that cannot fit into short-term memory all at once, models are: (1) much more implicit, (2) slower to learn and to change, and (3) faster at mobilizing and processing than theories (1995, p. 178). Note that D'Andrade's second and third criteria are differences with respect to temporal properties. And, it is their contrasting temporal characteristics that imply models are constructed mostly through connectionist learning, whereas theories are learned mostly through serial symbolic processing.

The contrast between things that can be learned mostly or only through linguistic means versus things that are mostly or only learned through repeated engagement is widely recognized. For instance, you probably learned the Earth revolves around the Sun when a parent or older sibling informed you of this not-personally-verified fact (yet, we continue talking about the Sun rising and setting as if the Sun were the active agent). But, how did you learn to ride a bicycle? As Polanyi (1958) observes in the beginning of his chapter on "Skills":

> The rule observed by the cyclist is this. When he starts falling to the right he turns the handlebars to the right, so that the course of the bicycle is deflected along a curve towards the right. This results in a centrifugal force pushing the cyclist to the left and offsets the gravitational force dragging him down to the right. This manœuvre presently throws the cyclist out of balance to the left, which he counteracts by turning the handlebars to the left; and so he continues to keep himself in balance by winding along a series of appropriate curvatures. A simple analysis shows that for a given angle of unbalance the curvature of each winding is inversely proportional to the square of the speed at which the cyclist is proceeding.
>
> But does this tell us exactly how to ride a bicycle? No. You obviously cannot adjust the curvature of your bicycle's path in proportion to the ratio of your unbalance over the square of your speed, and if you could you would fall off the machine, for there are a number of other factors to be taken into account in practice which are left out in the formulation of this rule. Rules of art can be useful, but they do not determine the practice of an art; they are maxims, which can serve as a guide to an art only if they can be integrated into the practical knowledge of the arts. They cannot replace this knowledge. (1958, pp. 49-50)

Indeed, virtually all the activities, mental and/or physical, that we regard as "acquired skills" require practice-practice-practice to master (see ==Haidle==, this volume, for an evolutionary perspective). And, at least since craft specialization became common in ancient states, the most reliable way to transmit such skills has been the master-apprentice model, which combines repeated efforts by the apprentice while receiving some degree of demonstration, verbal guidance, and correction from the master. Not surprisingly, the apprenticeship model has much in common with child-raising practices around the world that involve "guided participation" (Rogoff, 1990). The important point for present purposes is that apprenticeship is an excellent mode of transmitting acquired skills (Coy, 1989). The 'head game' aspects can be transmitted rapidly through verbal instruction while the relevant habits of thinking and doing are developed slowly through repetition, and all *within the appropriate social context* (Rogoff & Lave, 1984).

Thirdly, shifting focus from individual cognition to culture, there are several things to keep in mind. Individuals one at a time construct whatever knowledge they come to have. But, as Robinson Crusoe discovered, none of us can reproduce our social traditions by ourselves. Social traditions are developed, transmitted, modified, and sustained by populations of individuals. Thus, a key question is: When do cognitive models (or theories) qualify as cultural models (or theories)?

The most frequently mentioned criterion to distinguish cultural models from cognitive models is that cultural models are shared within some population or group. But, what does

"shared" mean in this context? Well, it certainly does not mean identical versions, rather it is a vague gloss of the fact that individuals *resemble* some people, more or less, with respect to their individually constructed cognitive models. The important issue is not whether such resemblances exist, but how they come about. And, from this perspective, sharing is not definitive; it is simply an epiphenomenon. The proper criteria for distinguishing cultural models are the conformity-inducing processes that produce acquired resemblances among individuals. And, following Durkheim's (1964 [1895]) criteria for a social fact, cultural models must be *socially transmitted* (thereby, shared to some degree and "external" to any given individual) and have some degree of *normativity* (see Berniūnas, this volume) else they remain private cognitive models (see, also, Kronenfeld, 2008; Blount, 2014).

Lastly, given the diversity of knowledge structures referred to as "cultural models" in the literature (see Strauss, this volume), perhaps it is time we resume and refine D'Andrade's effort toward constructing an ontology of cultural forms. For example, here are some criteria by which different kinds of knowledge structures, including cultural models, might profitably be distinguished.

COGNITIVE CRITERIA

- Temporal scale
  - Time to become activated
  - Duration of activation

- Inertial characteristics
  - Time to learn/develop
  - Time to unlearn/modify

- Functional integrity
  - Number of components
  - Degree of integration among components

- Generative capacity

- Motivational force

- Degree of implicitness

SOCIAL CRITERIA

- Degree of elaboration across individuals
  - Components learned separately or as a package
  - Core components widely shared, but variable with respect to peripheral components
  - Idiosyncratic partial versions

- Distributional pattern across individuals
  - Uniformly and widely shared, subcultural differences, expertise gradients, perspectival diversity, or free variation

- Degree to which X is "talked about" and/or "demonstrated"
  - The more X is manifest in ways accessible to others, the more it will be subject to socially induced standardization and/or polarization

(Gatewood, 2012, pp. 368-369)

3. Linguistic and Sociolinguistic Aspects of "Drink Names."

Much of the nomenclature for alcoholic drinks is referentially opaque. Names such as daiquiri, screwdriver, and manhattan give no clue to their ingredients, let alone the stages of their production, the glassware in which they should be served, or price. This state of affairs supports

the view that bartending is an esoteric, secretive realm of human knowledge. Customers, and beginning bartenders alike, often believe the bartender's task consists simply in memorizing the ingredients associated with each peculiarly named drink. Indeed, from the customer's perspective, this is an entirely appropriate and sufficient understanding. It is not, however, accurate.

The lexical domain of "drink names" (by which I mean nouns for alcoholic beverages) is exceedingly large. It is also quite diverse. The *Mr. Boston Deluxe Official Bartender's Guide* (Anonymous, 1974), for example, has a twenty-three-page index of names for "mixed" alcoholic drinks. The entire domain of drink names would include all of these and a long list of unmixed alcoholic beverages as well as their brand name varieties. The size and diversity of drink names is illustrated by the short list in Table 1.

port	sidecar	Ouzo
Stroh's	apple cooler	martini
daiquiri	rob roy	gin and tonic
cuba libre	brandy presbyterian	Drambuie
manhattan	screwdriver	vodka
scotch	Budweiser	old fashioned
harvey wallbanger	bourbon	Campari
Wild Turkey	lager	vodka tonic
stinger	singapore sling	gin
Pernod	scotch and soda	salty dog
triple sec	Grand Marnier	gimlet
tom collins	bloody mary	brandy alexander
black russian	mai tai	seven and seven
champagne	Bombay	perfect manhattan
Galliano	tequila sunrise	margarita
creme de cacao	stout	zombie
pink lady	white russian	sherry
Absolut	vodka martini	bacardi
between the sheets	frozen daiquiri	brandy sour
rosé	ale	pousse-café

Table 1: A Sample List of "Drink Names"

An important feature of drink nomenclature is that the drink names do not form a closed set. New names are coined all the time, most commonly for brand names and new mixed drinks, but occasionally for new "pure" (or "straight") alcoholic beverages (Lehrer, 1983, notes that "wine descriptors" have this same property of open-endedness). Creativity is on-going, and the lexicon allows for this.

Lexical analysis of drink names reveals a shallow taxonomy. An ethnoscientist would rapidly discover that "brand names" refer to particular realizations of more basic, generic beverage types. Johnnie Walker Black, J&B, Chivas Regal, Pinch, and Cutty Sark are kinds of scotch; Tanqueray, Beefeater, Bombay, and Gordon's are kinds of gin; Hennessy, Martell, and Courvoisier are kinds of cognac; Budweiser, Moosehead, Beck's, and Heineken are kinds of beer; and so forth. Set inclusion of this sort might fascinate a Martian (or a teenager), but it is obvious and boring to most bar-goers.

A slightly more subtle aspect of the classificatory system is the distinction between names for "pure" (or "straight") beverage types and names for "mixed drinks." Of course, the notion that any alcoholic beverage is "pure" is absurd from a chemical perspective. Scotch, gin, beer, sherry, bourbon, etc., are made up of complex chemical compounds that vary from year-to-year and month-to-month even in products from the same distillery or brewery. Still, it is customary to think that categories such as these refer to stable, homogeneous substances that are, in some sense, fundamental for the domain as a whole—rather like the periodic chart of elements. They constitute what Rosch (1973; Rosch, et al., 1976) would call the basic object level. Liquid substances such as scotch, bourbon, gin, vodka, anisette, triple sec, vermouth, beer, wine, and sherry occupy a privileged level in the classificatory system because they define the basic contrast set of ingredients from which other drinks (i.e., "mixed drinks") can be made. Table 2 shows the drink names from Table 1 sorted into the three major categories[2] recognized so far.

Today, there is very little change in the "basic beverage types" part of the classificatory system from one year to the next. By contrast, one can see sustained growth in the number of brand name varieties. The area of greatest productivity, however, is clearly in the culture's inventory of named "mixed drinks." Indeed, every self-respecting, pretentious bar will try to come up with its own specialty concoctions (see, for example, the American Bartenders School's list of 500 popular mixed drinks in New York City: http://www.barschool.com/drink-recipes/). Creative efforts of this sort justify higher prices all around.

Focusing on segregate labels for "mixed drinks," we see several lexical forms in use. There are two fundamental dimensions of contrast: (1) morphological complexity of the name, and (2) whether the name gives a clue as to the ingredients or not. Table 3 shows the previous sample data analyzed in this way (for definitions of lexeme types see Frake, 1962; Berlin, Breedlove, & Raven, 1973; Casson, 1981, pp. 79-80).

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[2] There are a few superordinate-subordinate relations among the generic beverage categories that complicate the otherwise simple mapping of brand names into basic beverage types. The category "cordial" (or "liqueur"), for example, encompasses a few generic sub-types such as anisette, triple sec, creme de menthe, and schnapps, each of which is available under several brand names. "Wine" is perhaps the most heterogeneous and fuzzy category, including blended generic varieties such as chablis, rosé, and red as well as single-grape varietals such as cabernet sauvignon and chenin blanc, but context seems to determine whether "wine" contrasts with or includes categories such as "port," "sherry," "Madeira," and "champagne."

Brand Names	Basic Beverage Types	Mixed Drinks	
Absolut (vodka)	ale	apple cooler	old fashioned
Bombay (gin)	bourbon	bacardi	perfect manhattan
Budweiser (lager beer)	champagne	between the sheets	pink lady
Campari	creme de cacao	black russian	pousse-café
Drambuie	gin	bloody mary	rob roy
Galliano	lager	brandy alexander	salty dog
Grand Marnier	port	brandy presbyterian	scotch and soda
Ouzo	rosé	brandy sour	screwdriver
Pernod	scotch	cuba libre	seven and seven
Stroh's (lager beer)	sherry	daiquiri	sidecar
Wild Turkey (whiskey)	stout	frozen daiquiri	singapore sling
	triple sec	gimlet	stinger
	vodka	gin and tonic	tequila sunrise
		harvey wallbanger	tom collins
		mai tai	vodka martini
		manhattan	vodka tonic
		margarita	white russian
		martini	zombie

Table 2: "Drink Names" by Major Categories

	Referentially Opaque	Referentially Indicative
Un-analyzable Primary Lexemes	daiquiri gimlet mai tai manhattan margarita martini pousse-café [1] stinger zombie	
Analyzable Primary Lexemes	between the sheets black russian bloody mary cuba libre harvery wallbanger old fashioned pink lady rob roy salty dog screwdriver sidecar singapore sling white russian	brandy alexander brandy presbyterian tequila sunrise
Productive Primary Lexemes	frozen daiquiri perfect manhattan tom collins [2]	apple cooler bacardi (cocktail) gin collins [2] brandy sour vodka martini
Secondary Lexemes		
Polylexemes	seven and seven [3]	gin and tonic scotch and soda vodka (and) tonic

Notes:

[1]   Analyzed from viewpoint of monolingual English speaker.

[2]   Alternate name for "tom collins" is "gin collins," as opposed to a "vodka collins." "Gin collins" is a referentially indicative, productive primary lexeme.

[3]   A "seven and seven" means a highball composed of Seagram's 7 whiskey and 7-Up. If one knows these brand name products, then the segregate label would be referentially indicative, otherwise not.

Table 3: Lexemic Analysis of Names for "Mixed Drinks"

Although it might be entertaining to continue analyzing drink names as if we did not know anything about them, I want to draw this section to a close with some observations on the general social functions of drink names.

1. The primary function of drink names, independent of their linguistic form, is to establish an unambiguous, 1:1 referential relation—a publicly-known semiotic code, a standardized system of collective representations—whereby customers can ask for a particular potent potable and be reasonably assured of getting what they asked for. (I say reasonably assured because the precise ingredients and/or their proportions associated with a given drink name vary somewhat from region to region and bar to bar.)

2. The public code bridges over a very asymmetrical knowledge boundary. All the customer needs to know about a drink is its name. The bartender is supposed to supply all the other knowledge. The public code is, thus, for many customers, a matter of "loose talk" (Gatewood, 1983, 1984). So long as customer and bartender share the same public code, invoke the appropriate collective representation, they can interact successfully despite substantial differences in their knowledge of drinks.

3. Drink names serve an important, though latent, social function. They are used to signal in-group boundaries. People "in the know" can wield this lexical set to accomplish a variety of face-work (Goffman, 1958) vis-a-vis bartenders, cocktail waitresses, and other customers. (Spradley & Mann, 1975, expound on this social function at some length from the viewpoint of the cocktail waitress.) This latent function probably accounts for the lexical irregularities and idiosyncrasies of drink names, as well as their referential opacity.

4. The referential focus of drink names is on the ingredients that make up the drinks, including their relative proportions. Other aspects of the actual drink—what might be called the drink's full "presentation"—are usually left unsaid. There are, however, a few expressions whereby customers can emphasize, or deviate from, their drink's standard presentation. These utterances are generally linguistic tag-on's to the drink name, for example:

> "scotch, <u>neat</u>"
> "Wild Turkey, <u>on the rocks</u>"
> "whiskey sour, <u>up</u>"
> "Campari and soda, <u>with a twist</u>"
> and, as James Bond would say:
> "martini, <u>shaken not stirred</u>."

There are some peculiar asymmetries in these abbreviated specifications. For example, the order, "a margarita, no salt," is readily interpretable, i.e., do not rim the glass with salt. But, the converse order, "a margarita, with salt," would be confusing. Is the customer asking for salt in the drink itself, or is the customer just being emphatic about wanting the usual salted rim? Correct usage of these auxiliary expressions, thus, signifies that one knows the unsaid standard or norm that is being modified. For this reason, correct talk of this sort conveys the meta-message that the customer is both discriminating in taste and knowledgeable as regards customary bartending procedures.

4. Common Misconceptions of Bartending.

Most folks think bartending is pretty much a matter of memorizing the recipes that go with drink names: they think bartending is mixology. This view is supported, implicitly, in the way bartender manuals and guidebooks are usually written (e.g., Foley, 1990, 2014). I've selected one such book to illustrate this point.

Mr. Boston Deluxe Official Bartender's Guide is the classic recipe manual for bartenders, and it is an indispensable reference tool. Hundreds, if not thousands, of drink recipes are presented in the most useful way for a practicing bartender: alphabetically. I am serious about this being the most useful organization. Many customers love to play "stump the bartender"— they take perverse pleasure in ordering an obscure drink as if every person in the world knows what it is and orders it all the time. If the customer is winning the silly game, then the bartender knows only the name for the drink. *Mr. Boston*'s alphabetical listing of drinks, thus, provides the fastest way to discover what is in a "tuxedo cocktail" or a "Buck Jones," and in the real-life context of bartending, speed is synonymous with useful.

Pages 1-168 of *Mr. Boston* (1974 edition), or about 78 percent of the whole book, consist of drink recipes organized in this fashion. Following the main recipe section, there are a series of special sections. These begin with three pages on egg-nog drinks and two pages devoted to the martini.

Pages 175-181 contain some brass tack, useful stuff: (1) the kinds of equipment needed to make drinks, (2) volumes and measures, and (3) succinct instructions concerning the essential drink-making techniques such as shaking, stirring, blending, flaming, floating, rimming, etc.

Pages 182-192 define and give some history for each of the major generic beverage types such as brandy, rum, gin, vodka, and whiskey.

Pages 193-215 cross-index all the drinks mentioned in the recipe section in broad categories based on either their principal alcoholic ingredients (e.g., rum drinks, vermouth drinks, coffee brandy drinks) or their shared production routines (e.g., fizzes, toddies, etc.). This section is useful for bartenders to study before coming to work.

The point of this textual review is that books such as *Mr. Boston* reinforce three popular misconceptions about real bartending:

1. *Drink recipes are as idiosyncratic and diverse as their names*. (Corollary: Bartenders must have prodigious memories.) The alphabetical listing of recipes by drink names totally obscures the essential similarities that exist among drinks. Unless you spend days pouring over the recipes, intuitively synthesizing as you go, you will fail to recognize from *Mr. Boston* that the huge array of drinks are just variants on a few themes.

2. *Drink recipes are immutable and unchanging*. The mere fact that drink recipes and names are printed supports the illusion that they are fixed and standardized. Recipes and names are much more flexible and fluid. Accomplished bartenders play with the standard recipes in small ways to make their bars distinctive, e.g., adding a drop of scotch to an otherwise traditional martini to make it smoother, or mixing a stinger closer to a 1:1 ratio of brandy and creme de menthe instead of *Mr. Boston*'s recommended 2:1 ratio. Playful creativity of this sort goes on all the time. Sometimes what begins as a variant becomes a new named drink; other times the variant is just served under its standard name (e.g., "margaritas" are incredibly variable one bar to the next).

3. *The individual drink is the basic unit around which the bartender's thoughts and actions revolve*. Because each drink's recipe is discrete in the manual and each customer's drink

is served up discretely, one is inclined to believe that bartenders make drinks one at a time. Unless the bar is full of slow-drinking social outcasts, this is patently false. Most orders come in batches, and the various drinks in a group-order are made concurrently rather than sequentially. Nothing in *Mr. Boston* explains how to organize actions for mass-production, yet this is the key to improving a bartender's output efficiency.

5. Taking Orders, Making Drinks.

Professional bartending involves quite a range of acquired skills. The outline in Figure 1 shows the range of activities. Since it is the second activity group (taking orders, making drinks) that distinguishes bartending *per se*, I concentrate on it.

Outline of Bartending Tasks and Skills

A. Setting Up
- getting the ice ready
- cleaning glassware
- checking the booze, beer, and wine stocks and loading the well
- preparing mixers (sour mix, juices, sodas)
- preparing garnishes (cutting fruit, celery, making lemon twists)
- twirling paper napkins, preparing bar towel
- cleaning and checking the mixing/blending tools
- getting the cash drawer ready
- miscellaneous (setting up sink for cleaning glasses, tapping beer kegs, changing CO_2 tanks)

B. Taking Orders, Making Drinks
- understanding the domain of drinks in terms of a developed classification scheme ("deep structures" rather than merely the "surface structures")
- hearing and remembering the customers' orders
- translating drink orders into basic recipe templates and recalling, quickly, the specific recipes for each drink ordered
- measuring ingredients quickly
- performing, quickly, the appropriate mixing technique (pouring, stirring, shaking, blending, floating)
- presenting drinks appropriately and quickly (glassware, special glassware preparations, garnishes, using ice correctly)

C. Handling Cash and the Cash-Register
- knowing the price structure for the various product types
- totaling bills accurately and making change quickly
- being able to deal with screw-ups on the register (cancel mistaken ring-ups, change the receipt roll in the register)
- balancing the cash drawer when starting or stopping your shift

D. Establishing Rapport
- judging when to talk and when not to talk
- carrying on polite conversation with people you may not like
- making other people feel at ease
- working with and around other people (managers, waitresses, other bartenders)

E. Cleaning Up
- washing glassware
- putting liquor and wine stocks away
- cleaning the beer taps
- mopping the floor
- locking up

Figure 1: The Five Major Bartending Tasks

The bartender's action-oriented knowledge of drinks reflects several concerns. Firstly, bartenders need to know how and when to use the various tools of their trade (see Figure 2). Secondly, they need to know which kinds of drinks go in which kinds of glassware (see Figure 3). Indeed, proper presentation is a major difference between the usual home bar and the professional bar. Finally, experienced bartenders develop a specialized, usually implicit cognitive organization of drinks that simplifies the otherwise bewildering complexity of final products by grouping them according to their fundamental similarities (see Figure 4 for a simplified taxonomy). These categories also relate easily to price structure, which is generally based on three considerations: the cost of the ingredients, the knowledge and mixing skill required of the bartender, and how much time it takes to make the drink.
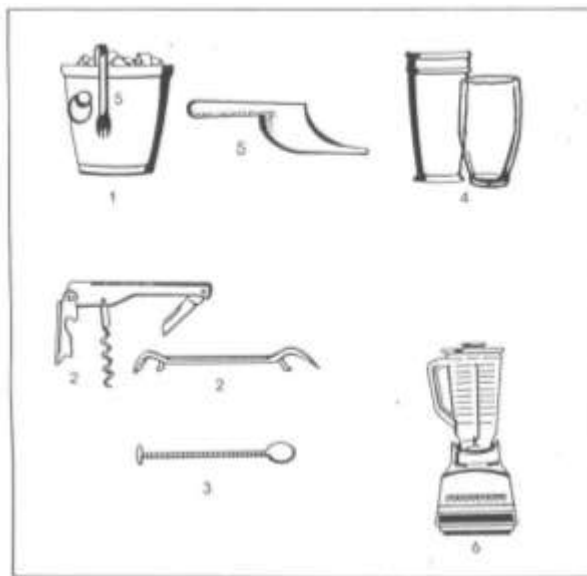
Bar Tools
The following should be displayed on your bar top (or table):
1. **Ice Bucket.** Try to find one with a vacuum seal, and large enough to hold at least three (3) trays of ice.
2. **Wine/Bottle Opener.** A good wine opener or waiter type. Church key or bottle opener that can open cans as well as snap off bottle tops.
3. **Bar Spoon.** One long spoon for stirring drinks or pitchers of drinks.
4. **Cocktail Shaker and Mixing Glass.** Mixing glass for use in stirring drinks. Shaker fits over glass to shake drinks.
5. **Ice Scoop/Tongs.** Use to pick up ice cubes from an ice bucket and place in glass. A must for every home bar. Never use your hands. If necessary, a large mouth spoon can be used.
6. **Blender.** Blending Margaritas, Pina Coladas and Daiquiris.

Bar Tools (continued)
Can also be used for crushing ice and making three or more drinks at once.
7. **Napkins/Coasters.** To place drink on or hold drink.
8. **Stirrers/Straws.** For mixing and sipping drinks.
9. **Pitcher of Water.** A large pitcher for water only.
10. **One Box of "Superfine" Sugar.**
11. **Three Large Bowls.** One for cut fruit, two for garnish, (olives, onions, etc.)
12. **Knife and Cutting Board.** Use to cut more fruit.
13. **Jigger/Measuring Glass.** All drinks should be made with a measuring glass or jigger. Drinks on the rocks or mixed drinks should not contain more than 1½ oz. of alcohol. Doubles should not be served.
14. **Muddler.** To muddle your fruit.
15. **Pourer.**
16. **Strainer.**

Figure 2: Bartending Tools
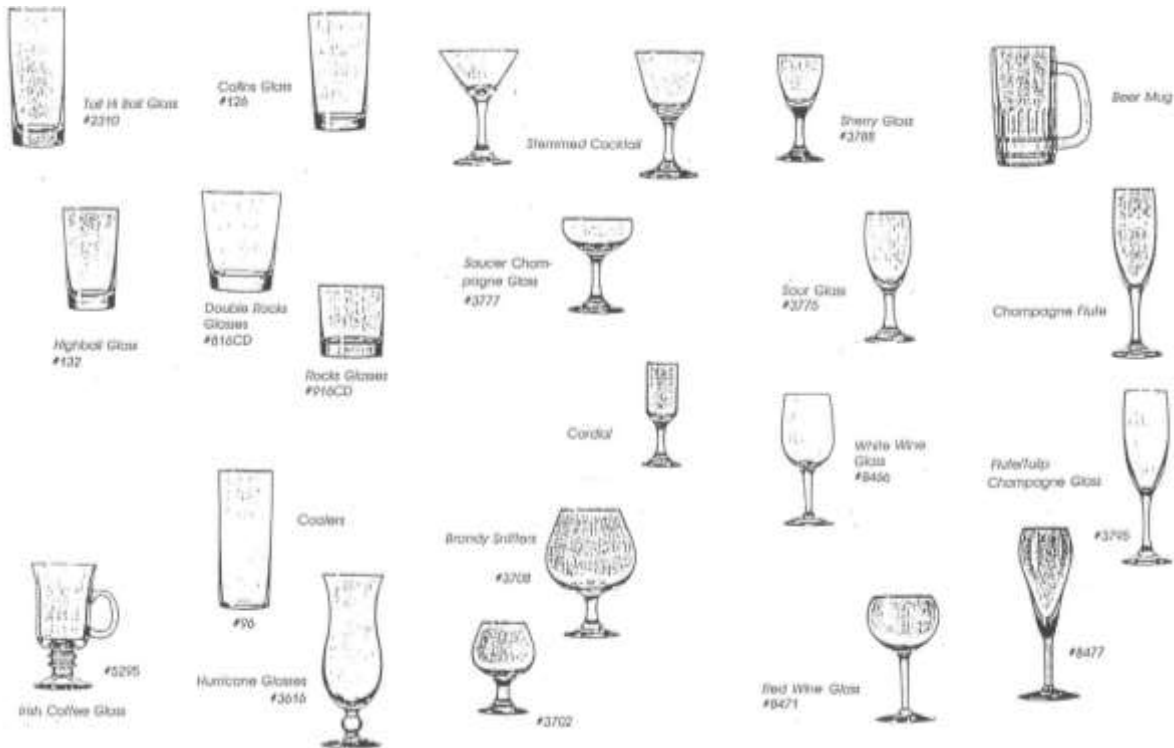
Figure 3: Glassware for Different Kinds of Drinks

Alcoholic Drinks

(Non-Mixed Drinks) · **Mixed Drinks**

Beers · Wines · Booze · Highballs · Cocktails

Liquors · Cordials, Liqueurs · Juicers · Sours · Classics · Fancy Drinks

Beers	Wines	Liquors	Cordials, Liqueurs	Highballs	Juicers	Sours	Classics	Fancy Drinks
Varieties:	Varieties:	Varieties:	Grand Marnier	scotch & soda	screwdriver	whiskey sour	martini	stinger
lager	port	scotch	Drambuie	gin & tonic	harvey wallbanger	daiquiri	gibson	sidecar
ale	sherry	bourbon	amaretto	bourbon & water	bloody mary	frozen daiquiri	vodka martini	black russian
stout	red wine	gin	Campari	brandy presbyterian	(virgin mary)	bacardi	manhattan	white russian
Types:	rosé	vodka	Galliano	seven and seven	salty dog	Tom Collins	perf. manhattan	rusty nail
draft	white wine	etc.	Pernod	vodka tonic	clandigger	margarita	rob roy	brandy alexander
bottled	champagne	Brands:	Ouzo	cuba libre	apple cooler	brandy sour	gimlet	pink lady
Brands:	Brands:	Pinch	triple sec	etc.	tequilla sunrise	etc.	old fashioned*	singapore sling
Budweiser	Paul Masson	Wild Turkey	creme de cacao		etc.		etc.	mai tai
Stroh's	Dry Sack	Bombay	etc.					zombie
Corona	B & G	Absolut						between the sheets
etc.	etc.	etc.						pousse-café
								etc.

→ Skill / Knowledge / Effort Requirements

Figure 4: One Bartender's Taxonomy of Drink Types

The principal difference between novice and expert bartenders is not so much how many drink recipes they have memorized, but the expert's economy of motion and temporal efficiency when making drinks. Friends and relatives might be dazzled were you to memorize all the recipes in *Mr. Boston*'s guide, but if you knew all that and made drinks one at a time, you would be an inept bartender. Recipe knowledge—mixology—is only one aspect of bartending skill. Anyone who can read a drink manual can make drinks. The trick is being able to make drinks very quickly and present them in aesthetically pleasing fashion, all without looking harried or upset.

Speed and efficiency generally increase concomitantly with the bartender's recognition of what might be called "basic recipe templates." Once the bartender develops this new and specialized understanding, and it usually takes some time, they are better at remembering multiple orders and can make several drinks at once. Let me expand on this peculiar, non-public cognitive organization a bit.

In the expert's view, there are surprisingly few basic recipe structures underlying the domain of mixed drinks. The tremendous variety in finished products is generated mostly by combinatorics, i.e., varying the particular alcoholic ingredients within a template and, to a lesser extent, by varying the kind of glass the drink is served in, how ice is used in the drink, the use of "spice" ingredients (bitters, Rose's lime juice, grenadine, etc.), and choice of garnishes. In this respect, the domain of mixed drinks has a grammar of sorts—a loose and incomplete grammar—based mostly on the number of main ingredients and their approximate proportions. On the other hand, the few underlying and seldom-verbalized recipe templates certainly do not partition the whole domain of mixed drinks, nor do they constrain deviations or innovations. Nonetheless, when novice bartenders learn to recognize and then utilize these basic recipe templates, they generally find it easier to remember specific drink recipes and become faster at making drinks.

Consider, for example, the following classic drinks: martini, gibson, manhattan, and rob roy. All four share the same recipe template or 'deep structure': they are 2:1 ratios of booze and vermouth,[3] plus a customary garnish, and, in most bars, all would normally be served "up" (rather than "on the rocks").

RECIPE TEMPLATE =	BOOZE + (1.5 oz.)	VERMOUTH + (0.75 oz.)	GARNISH
martini =	gin	dry vermouth	olives
gibson =	gin	dry vermouth	pickled onions
manhattan =	whiskey	sweet vermouth	cherry/orange slice
rob roy =	scotch	sweet vermouth	cherry/orange slice

Similarly, a daiquiri, whiskey sour, tom collins, and bacardi cocktail are all variants of the basic "sour" template: 1 oz. of booze and 2 oz. of sour mix (the mix volume includes any additional liquid ingredients), then shake or blend to a froth, pour, and add garnish. The

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[3] As noted, the "traditional" recipe for martinis and gibsons is a 2:1 ratio of gin and dry vermouth. Nowadays, however, most customers prefer a very "dry" martini or gibson with just a quick splash of vermouth (or the extreme of simply holding the vermouth bottle aloft and saluting toward Italy). From a bartender's viewpoint, these contemporary preferences are regarded as slight "bendings" from the traditional recipe, rather than a new underlying template.

differences reflect the main booze ingredient and a few slight "bendings" from the basic structure in terms of glassware, additional ingredients, and garnishes.

A third recipe template is exemplified by the black russian, rusty nail, sidecar, and stinger (at least the way we used to make them). The drinks in this unnamed, underlying category mix a straight booze with a sweet cordial in almost equal proportions, i.e., close to a 1:1 ratio, but heavier on the booze side. A black russian is vodka and Kahlua, a rusty nail is scotch and Drambuie, a sidecar is brandy and triple sec (with lemon juice), and a stinger is brandy and white creme de menthe.

Some recipe templates have names, others do not. They also vary in terms of their psychological salience among different bartenders. Figure 4 shows one classification scheme based on the deep structures (recipe templates) of drinks.

Now, to illustrate how all these sorts of knowledge come together in bartending, let us follow step-by-step how a reasonably skilled bartender would handle two drink orders:

5.1 Example 1 — Single Drink Order.

Order =   1 Margarita

STAGE 1: Cognitively Process the Order
- repeat the customer's order with internal speech
- assimilate "margarita" to its basic recipe template, i.e., a "sour"
- recall the standard presentation for margaritas: served in stemmed globular glass with salt on rim

STAGE 2: Prepare the Glassware
- get the appropriate glass from rack
- rim the glass with a lime wedge
  (put lime aside for the moment)
- twirl rim of glass in salt dish until the rim is coated, then put glass on mixing pad
  (While preparing the glass, recall the exact recipe for margarita, i.e., 1 oz. of clear tequila, 1 oz. of sour mix, 0.5 oz. of triple sec, and 0.5 oz. of Rose's lime juice.)

STAGE 3: Mix the Drink
- scoop up some ice with the metal half of the shaker and put it in the glass half on mixing area
- grab bottles of tequila and of sour mix from well
  (one in each hand)
- pour tequila and sour mix into shaker at the same time
  (count-pouring[4] to four => 1 oz. of tequila + 1 oz. of sour mix)
- return tequila and sour mix to well, grab triple sec and Rose's lime

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[4] "Count-pouring" was the most useful and subtle sensorimotor skill I acquired while bartending. One converts time to volume by silently counting at a practiced cadence while free-pouring liquids through bottles' stoppers. With practice, one gets very accurate at measuring ingredients this way, and it greatly speeds up making drinks. Also, it enhances the visual performance for customers who are watching and see, for example, a margarita made this way fill its glass to just below the salted rim.

- pour triple sec and Rose's lime into shaker at the same time
  (count-pouring to two => 0.5 oz. triple sec + 0.5 oz. Rose's lime)
- return triple sec and Rose's lime to well
- put shaker's halves together and shake
- take metal half of shaker off
  (BE CAREFUL)
- put strainer on shaker's glass half (which has the drink)
- pour drink through strainer into prepared glass
- wash strainer and shaker
- squeeze lime wedge into drink and gently drop in lime
  (While mixing this drink, watch the bar to determine if anyone else wants to order and who is first in queue. Also, as the drink is almost ready, recall the price for margaritas.)

STAGE 4: Serve the Drink
- pick up the drink from the mixing area and with the other hand pick up a paper napkins or coaster
- set drink on napkin in front of customer and state the price
- take the money and make change

5.2 Example 2 — Multiple Drink Order.

Order =   2 Margaritas
           1 Martini
           1 Gibson
           1 Cuba Libre
           1 Scotch and Soda
           1 Red Wine
           3 Draft Beers

STAGE 1: Cognitively Process the Order
- repeat the customer's order with internal speech (several times)
- assimilate the ordered drinks to their basic recipe templates, i.e., two "sours," two "martinis," two "highballs," one "room-temperature wine," and three "draft beers"
- recall the standard presentation for each drink: margaritas in stemmed globular glasses with salt on rim, martini and gibson in stemmed triangular cocktail glasses (up), highballs in highball glasses, red wine in globular wine glass, draft beers in chilled mugs or pint glasses
- contemplate how each drink will be served and, from that, *formulate an appropriate production plan* (a slowly acquired mental skill), e.g., red wine first, margaritas second, then martini and gibson, then the two highballs, and draft beers last
  (General Principle: serve drinks as cold as possible, i.e., try not to let drinks stand in glasses very long before they are served.)

STAGE 2: Prepare the Glassware
- get the appropriate glasses, except beer mugs, from rack and line them up, left to right, according to the production plan one has formulated

(While getting the glasses in order, recall the actual recipes that will go into each drink and mentally associate each glass with its drink, because for the next several minutes, the glasses will function as external mnemonic aids.)

- put glasses for martini and gibson in ice trough so they will be chilled
- rim the margarita glasses with lime wedges
  (then put limes aside for the moment)
- twirl rims of margarita glasses in salt dish until the rims are coated, then put the glasses back on mixing pad

STAGE 3: Mix the Drinks

- grab bottle of house red wine and pour into wine glass until it is two-thirds full
- return wine bottle to its place
- scoop up some ice with the metal half of the shaker and put it in the glass half on mixing area
- scoop up some more ice and put it in the two highball glasses
- rim one of the highball glasses with lime wedge, squeeze wedge into glass, then drop it on top of ice
- grab bottles of tequila and of sour mix from well (one in each hand)
- pour tequila and sour mix into shaker at the same time
  (count-pouring to eight => 2 oz. of tequila + 2 oz. of sour mix)
- return tequila and sour mix to well, grab triple sec and Rose's lime
- pour triple sec and Rose's lime into shaker at the same time
  (count-pouring to four => 1 oz. of triple sec + 1 oz. of Rose's lime)
- return triple sec and Rose's lime to well
- put shaker's halves together and shake
- take metal half of shaker off
  (BE CAREFUL)
- put strainer on shaker's glass half (which has the drinks)
- pour the "margarita mix" through strainer into prepared glasses, filling up each half way before topping each off (total of 3 oz. in each glass)
- squeeze lime wedges into drinks, then gently drop the wedges into drinks
- wash strainer and shaker and put some more ice into the glass half
- grab bottles of gin and of dry vermouth from well (one in each hand)
- pour gin and vermouth into shaker's glass half
  (for "traditional" 2:1 recipe of gin to vermouth: begin pouring together, then stop pouring vermouth at the count of 6 while continuing to pour gin until count of 12 => 3 oz. gin + 1.5 oz. vermouth)
- gently stir shaker's ingredients with bar spoon
- put strainer on shaker's glass half
- move (chilled) stemmed cocktail glasses from ice trough and put them on mixing pad
- pour "martini mix" into the martini and gibson glasses, filling up each half way before topping each off (total of 2.25 oz. in each glass)
- wash strainer and shaker
- grab bottles of light (not dark) rum and scotch from the well (one in each hand)

- pour rum into the highball glass that was already rimmed with lime, pour scotch into the other
  (pour at same time; count-pour to four => 1 oz. "booze" in each glass)
- return rum and scotch to well
- grab soda gun with one hand and get a swizzle stick with the other
- pour club soda into highball glass with scotch while stirring mixture with swizzle stick (leave swizzle stick in the drink)
- pour cola into highball glass with rum and, while doing this, reach for another swizzle stick and stir the emerging cuba libre (leave swizzle stick in the drink)
- return soda gun to its position
- pick up two to three olives, pierce them with toothpick, and place them in one or the other of the two "martini mix" glasses
- get two to three pickled cocktail onions from jar, pierce them with toothpick, and place them in the other "martini mix" glass (now it is a gibson!)
- walk over to beer area and get three mugs from refrigerator
- draw the three draft beers and return to mixing area with them
  (While drawing the beers, if not before, look at the drinks in the mixing area, recall their individual prices, and start tallying them up.)

STAGE 4: Serve the Drinks
(Serving depends on where the customers are seated, whether one of their party or a waitress gave the order, and so forth. If the order was given by one customer who is paying with cash, then…)
- when the whole order is ready, move the drinks within reach of the customer, or put them on a tray (busy bartenders don't leave the bar itself)
- state the price
- take the money and make change

I suspect it is hard to read my descriptions of drink-making and catch all the little ways an expert's procedures differ from those of a less skilled bartender. Part of the problem is that the subtleties of actions are difficult to talk or write about. Bartending is not a verbal art, it is a performance event. Even if I had staged a demonstration, however, using bartenders at differing skill levels, it would be hard for you to see what they do differently unless you already knew what to watch for.

Someone who has gone through the metamorphosis—someone who has gotten beyond the initial understandings and glimpsed the simplifying, "deep structure" level of particular drink recipes—can gauge others' general competence just by watching them work. For those without a trained eye, a simple, global measure of skill is how many drinks per hour the bartender can handle. It is rather like typing speed: how many words can you type per minute—how many drinks per hour can you make?

When people first begin as bartenders, they are lucky to manage forty to fifty drinks per hour, and they feel rather like Charlie Chaplin with his conveyer belt of widgets. After a few months, most bartenders can handle about one hundred drinks per hour and not feel terribly pressured (see Beach, 1988, for experimental findings confirming this). And, if someone else is dealing with the glassware, or if the bar uses plastic cups, then good bartenders can handle maybe 150 or more drinks per hour, and these would be mixed drinks, not shots-and-beers.

Let me highlight four of the important ways skilled bartenders increase their speed and reduce their mental turmoil. Skilled bartenders:

1. Understand drinks in terms of basic recipe templates. Thinking of drinks this way—realizing there is a grammar of sorts underlying the superficially disparate products—facilitates recipe recall, speeds up glassware selection and preparation, and is essential to determining the most time-efficient production order. Unfortunately, very little, if any, of this classificatory knowledge is readily available to the would-be bartender. To the extent that it is socially transmitted, one acquires this specialized cognitive organization from accomplished bartenders during a training apprenticeship and, to a lesser extent, through reflection on personal experience making what are slowly recognized as *similar* drinks despite their different names and ingredients.

2. Use glassware as mnemonic aids. While the customer's order is fresh in mind, bartenders get the glasses on the counter. Once the glasses are in place, the bartender can give full attention to the specific tasks associated with individual drinks—temporarily forgetting everything else—and then, just by looking at the glasses, remember what is next. The glassware functions as an extra-somatic memory aid (Beach, 1988; and see Levinson, this volume, for a general discussion of how cognitive artifacts amplify individual psychology).

3. Use *both* hands. Beginning bartenders generally have to watch everything their hands are doing, rather like beginning pianists or guitarists. So long as they yield to this tendency, they are functionally one-handed. Even if they grab two bottles at once, one with each hand, they will pour one, then pour the other. Likewise, the ability to pour booze with one hand while reaching for garnishes or a swizzle stick with the other is simply beyond them. Eventually, however, persistent efforts to achieve bilateral independence will bear fruit, and the two hands take on lives of their own. Visual monitoring is no longer necessary, except at certain key junctures, because the bartender becomes kinesthetically aware of the immediate environment. Without looking, he or she can reach down and grab scotch, gin, vodka, or sour mix from its position in the well. The motor routines become so familiar one could make many drinks blind-folded.

4. Know when to mix drinks concurrently instead of sequentially. Indeed, Scribner's general *least effort strategy*—"reorganization of work tasks to reduce the number of physical or mental steps required for their accomplishment" (1997[1984], p. 378; see, also, 1984)—is the essence of time-compression in bartending. For example, if one were to make three highballs sequentially, there would be six round-trip motions (counting each hand separately) from the well to the mixing counter: one for each of the booze ingredients and one for each of the soda or water mixers. If, however, the three highballs are mass-produced, there are only four round-trip motions: one for each of the booze ingredients, but only one for the soda gun. Mass production, thus, is more efficient.

6. Lessons from the Bartending Example.

As I hope to have made clear by now, there is more to bartending than most people realize. So long as you are in the role of customer, it is unimportant whether you understand drinks and drink-making the way a bartender does. As an example of "everyday cognition at work," however, the bartender's knowledge is typical in several respects.

Firstly, there are different kinds of knowledge structures that comprise the specialist's understanding. Holding aside physical skills, bartending's 'head game' has at least four very different kinds of knowledge structures. At the lowest level, a skilled bartender can both

recognize and knows a considerable amount about the different beverage types as well as their brand name varieties. This sort of object-level, encyclopedic knowledge concerning ingredients for mixed drinks is explicit (learned through language) and accumulates with time and experience, but such object-level knowledge is quite fleeting in terms of how long "scotch," "gin," "triple sec," "Campari," "Martel VSOP," etc., are active in working memory when actually mixing or preparing drinks, perhaps just a split-second or two as the bartender recalls the ingredients for a specific drink and, a bit later, confirms he or she has the correct bottles in hand when mixing the drink.

A second level of knowledge is the recipes for specific mixed drinks. Again, these are learned mostly through language, and many are learned fairly quickly and early in a bartender's career, with more and more accumulating over time. Furthermore, recipe books provide an externalized crutch for ignorance and/or failing long-term memory. The recipe for a given drink, including the drink's full "presentation," must be recalled from long-term memory (or looked up in *Mr. Boston*). And, it is the drink's name that binds the recipe's components together in memory. Then, if the order is just a single drink, different components of the recipe remain active while the drink is being made, something like ten to thirty seconds depending on the glassware preparation required, the number of ingredients, and the garnishes. If the order is for multiple drinks, however, then the individual recipes are cognitively active at several points in the production process, but for shorter durations each occurrence (compare the "margarita" portions of Example 1 versus Example 2, above).

The more generalized *recipe templates* function to organize specific recipes and constitute a third kind of knowledge structure with different properties than the lower-level structures. I suppose it is possible that novice bartenders might slowly come to recognize some of the fundamental similarities of different drinks on their own. Much more commonly, however, novices learn to think about drinks this way from other, more experienced bartenders (even though the templates themselves are not well lexicalized), after which they may or may not discern some additional templates on their own. In addition, recipe templates have different temporal properties in terms of when and how long they are active. Templates are most useful when cognitively processing a multi-drink order and formulating a production plan. Assimilating the named drinks to their underlying recipe templates (which helps identify significant commonalities) and then doing the initial cognitive processing usually takes something like five to twenty seconds and may involve several templates, depending on the drinks ordered. Once the glassware mnemonics for the production plan are in place, the general templates themselves usually fade from attention, but come up again briefly when remembering the "counts" for ingredients when count-pouring. Given their temporal characteristics, their generative capacities (open-endedness with respect to instantiations of ingredients), and how they are learned and function while bartenders formulate production plans, these recipe templates are perhaps most similar to what are typically called cultural models.

The production plans a bartender formulates for filling multiple-drink orders are a fourth kind of knowledge structure.[5] They build upon all the foregoing kinds of knowledge, but are created on the fly, as rapidly as possible, and specifically for a given multiple drink order. While

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[5] Single drink orders also invoke a production plan, but the steps for making a single drink are virtually merged with the bartender's knowledge of the drink's recipe. In this respect, production plans for single drinks are not formulated anew, but simply recalled from long-term memory. By contrast, multiple drink orders require the bartender to think creatively to identify which tasks, if any, are involved in more than one drink and can be done concurrently in order to speed up the production process.

there are a few general principles one tries to take into account, each plan is an *ad hoc* mental construction, which is mercifully forgotten once the order is completed. In other words, production plans for multiple drink orders are ephemeral and task-specific; they are not memorized and stored in long-term memory. And, given the pressure to fill each order quickly, even skilled bartenders do not always come up with the best plans; they just have a better batting average than less experienced bartenders. The temporal characteristics of production plans are also quite different from drink recipes and recipe templates. The time it takes to formulate a reasonably good plan varies with the complexity of the order, the mental skill of the bartender, and whether the order was given verbally or in writing. (Written orders—a form of extra-somatic information storage—reduce the short-term memory burden of having to memorize the entire order while thinking through alternative production plans.) Formulating a plan for a fairly complicated order, such as Example 2 above, would likely take ten to twenty seconds of cognitive processing, but it does not remain continuously active in the bartender's thinking. Rather, the plan itself fades from attention as various little tasks are being performed, but has to be remembered intermittently as the bartender finishes one set of tasks and re-orients attention to the next. Experienced bartenders solve this problem of "prospective memory" (Winograd, 1988) by off-loading the general sequence of production from short-term memory onto plainly visible physical objects (glassware). This frees the bartender to concentrate on more immediate tasks, and then with a glance be reminded where he or she is in the overall process. Finally, production plans have very short life spans: they are forgotten as soon as they have served their task-specific purpose.

All four kinds of knowledge structures noted above are active when bartenders take orders and make drinks. They are part and parcel of what bartenders are thinking while doing their work, they differ in their temporal characteristics, and they develop concomitantly with the bartender's "education of attention" (Ingold, 2001) as novices improve their skills. In these general respects, bartending is remarkably similar to other skilled activities with which I am familiar, such as playing pool, salmon fishing, and American football. The rapid flow and polyphony of thoughts as one shifts attention while doing such activities are amazing, as is the facility with which humans use inanimate objects as memory aids. But, it is precisely the *flow*— the temporal dimension—that cognitive anthropology tends to ignore. I hope the example of bartending presented here will encourage others to focus attention on the active cognition involved in everyday activities.

A second general point illustrated by bartending concerns the social organization of knowledge. Spectators of football games or pool matches do not need to know how the players are thinking to enjoy the spectacle. Similarly, customers do not need to know how bartenders are thinking to enjoy the drinks being made. Customers only need to tell bartenders the names of the drinks they want. Role-based asymmetries like this are not only very common, they are the foundation of contemporary human societies. When the "check engine" light comes on in my car, all I need to know is to take the car as soon as I can to my trusted car mechanic. When my house's main water line springs a leak and is flooding the basement, all I need to know is how to turn off the water and phone my plumber. In short, I need to know what sorts of people know what I don't know, but I don't need to know what they do know. And, I need to be able to communicate with the appropriate experts as situations warrant, else the adaptive benefits of individuals being reciprocally ignorant and interdependent cannot be realized (Gatewood, 2011). Of course, there are some matters where widespread agreement is at a premium: things work better if everyone in a region agrees what day it is, railroads run on the same gauge tracks, and

weights and measures are standardized. But, expertise is by definition *not* widely shared, and specialists' knowledge has been a critical part human social organizations for thousands of years, undoubtedly pre-dating the sort of craft specialization that eventually emerged in ancient states. As Wallace (1961) argued years ago, cultures are not replicated uniformities, but rather organizations of diversity. I would only amend Wallace's phrasing to *orchestrations* of diversity, because the musical metaphor emphasizes the temporal interplay among diverse parts.

Finally, let me conclude by asking the reader to contemplate a hypothetical situation. Suppose your brother, sister, son, or daughter were opening a bar and asked you to be in charge of training the new bartenders. Are there any lessons from the cognitive ethnography provided in this chapter that might guide you in such an applied effort?

Well, there are at least four basic approaches one might take to any technology-transfer effort, for that is a more general label for the problem.

1. *Independent Invention*: Provide the raw materials (stocks of booze, wine, and beer), then walk away. That is, let the trainees invent mixology and drink-making procedures *de novo*.

2. *Stimulus Diffusion*: Provide the raw materials, mix up a batch of different drinks, let the trainees taste them, then walk away. That is, let the trainees try to copy, through trial-and-error, the drinks they have tasted.

3. *Printed Manuals*: Give the trainees the raw materials and a copy of *Mr. Boston* (or *Bartending for Dummies*, if you prefer), then walk away. That is, supply them with drink-by-drink recipe knowledge, but no organizing conceptual framework for all these details or actual demonstrations of mixing drinks.

4. *Apprenticeship:* Give the trainees the raw materials, a copy of *Mr. Boston*, and then conduct training sessions on the recipe templates underlying families of mixed drinks as well as step-by-step demonstrations of how to use these to fill multiple-drink orders most efficiently. Finally, when the lecturing and demonstrating are done, coach, time, and critique the apprentices as they fill drink orders themselves, because developing new and coordinated motor skills are also part of skilled bartending.

I suspect the reader would agree that the fourth approach has a greater chance of succeeding with respect to bartending, at least it is the sort of training program I would do if it were my brother's bar. But should we agree on this? Just because the fourth training program includes supervised practice and processual knowledge as part of the "technology" to be transferred does not, necessarily, imply it is better than the other three approaches. Why is the cognitive organization of a skilled bartender in one region of the country relevant to training new bartenders in another place? If the trainees can make drinks their customers order, or if they make a whole bunch of new ones their customers like, then hasn't the technology, in all important senses, been transferred successfully?

Questions such as these are not trivial for anthropologists involved in more serious technology-transfer projects in foreign countries. How much expertise knowledge needs to accompany a particular item of technology or technique—a new vaccine, a new fertilizer, a new device that removes arsenic from well water? How much of the socially distributed knowledge in the 'host' culture needs to accompany the transferred technology or technique? Who decides what accompanying knowledge is relevant? And, at a more abstract theoretical level, how integrated is a culture? ... Difficult questions! Hmmm…

In Joseph Conrad's novella, *Heart of Darkness*, there is a native character who works on the boat carrying Marlowe upriver. This native knows that if he doesn't keep the engine's boiler stoked with coal, the boat's propeller won't turn, and the boat won't go upstream. However, the

native understands this causal chain rather differently than the European engineer. In the native's view, the steam engine is an angry god who must be appeased with coal. In return, the god makes the boat go.

Now, the intriguing thing about this story is that, under normal circumstances, it does not matter whether the native understands how steam engines really work. So long as he stokes the coal, the boat makes headway. The only time the engineer's understanding does matter is when the engine breaks down. Should that happen, the native depends on the engineer to overcome the god's malaise.

I suppose whether or not one includes conceptual and processual knowledge in technology-transfer projects depends on the project's larger goals. If the goal is simply to transfer the ability to replicate products or procedures, then deeper understandings might be imparted only on a need to know basis. If, however, the goal is to transfer the technology or technique as a means of facilitating the recipient's autonomy and future creativity, then a more complete understanding of the technology and how to work with and maintain it should be part of the package. And, the apprenticeship model has a long history of being successful in such endeavors.

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NOTE: Unfortunately, neither my in-text citations nor references to four chapters in the same edited book – highlighted in yellow, above – were included in the published version of my chapter. I have no explanation for this; life is a mystery…