This can be elaborated, using special cases:

Pistons: He *blew a gasket.*
Volcanos: She *erupted.*
Electricity: I *blew a fuse.*
Explosives: She's *on a short fuse.*
Bombs: That really *set me off.*

In an explosion, parts of the container go up in the air.

WHEN A PERSON EXPLODES, PARTS OF HIM GO UP IN THE AIR.
I *blew my stack.*
I *blew my top.*
She *flipped her lid.*
He *hit the ceiling.*
I *went through the roof.*

When something explodes, what was inside it comes out.

WHEN A PERSON EXPLODES, WHAT WAS INSIDE HIM COMES OUT
His anger finally *came out.*
Smoke was *pouring out of his ears.*

This can be elaborated in terms of animals giving birth, where something that was inside causing pressure bursts out:

WHEN A PERSON EXPLODES, WHAT WAS INSIDE HIM COMES OUT
She was *having kittens.*
My mother will *have a cow* when I tell her.

Let us now turn to the question of what issues the central metaphor addresses and what kind of ontology of anger it reveals. The central metaphor focuses on the fact that anger can be intense, that it can lead to a loss of control, and that a loss of control can be dangerous. Let us begin with intensity. Anger is conceptualized as a mass, and takes the grammar of mass nouns, as opposed to count nouns. Thus, you can say:

How much anger has he got in him?

but not:

*How many angers does he have in him?

Anger thus has the ontology of a mass entity, that is, it has a scale indicating its amount, it exists when the amount is greater than zero and goes out of existence when the amount falls to zero. In the central metaphor, the scale indicating the amount of anger is the heat scale. But, as the central metaphor indicates, the anger scale is not open-ended; it

has a limit. Just as a hot fluid in a closed container can only take so much heat before it explodes, so we conceptualize the anger scale as having a limit point. We can only bear so much anger, before we explode, that is, lose control. This has its correlates in our cultural theory of physiological effects. As anger gets more intense the physiological effects increase and those increases interfere with our normal functioning. Body heat, blood pressure, agitation, and interference with perception cannot increase without limit before our ability to function normally becomes seriously impaired and we lose control over our functioning. In the cultural model of anger, loss of control is dangerous, both to the angry person and to those around him. In the central metaphor, the danger of loss of control is understood as the danger of explosion.

The structural aspect of a conceptual metaphor consists of a set of correspondences between a source domain and a target domain. These correspondences can be factored into two types: ontological and epistemic. Ontological correspondences are correspondences between the entities in the source domain and the corresponding entities in the target domain. For example, the container in the source domain corresponds to the body in the target domain. Epistemic correspondences are correspondences between knowledge about the source domain and corresponding knowledge about the target domain. We can schematize these correspondences between the FLUID domain and the ANGER domain as follows:

Source: HEAT OF FLUID IN CONTAINER
Target: ANGER

Ontological Correspondences:

The container is the body.
The heat of fluid is the anger.
The heat scale is the anger scale, with end points zero and limit.
Container heat is body heat.
Pressure in container is internal pressure in the body.
Agitation of fluid and container is physical agitation.
The limit of the container's capacity to withstand pressure caused by heat is the limit on the anger scale.
Explosion is loss of control.
Danger of explosion is danger of loss of control.
Coolness in the fluid is lack of anger.
Calmness of the fluid is lack of agitation.

Epistemic correspondences:

Source: The effect of intense fluid heat is container heat, internal pressure, and agitation.
Target: The effect of intense anger is body heat, internal pressure, and agitation.

Source: When the fluid is heated past a certain limit, pressure increases to the point at which the container explodes.
Target: When anger increases past a certain limit, pressure increases to the point at which the person loses control.

Source: An explosion is damaging to the container and dangerous to bystanders.
Target: A loss of control is damaging to an angry person and dangerous to other people.

Source: An explosion may be prevented by the application of sufficient force and energy to keep the fluid in.
Target: A loss of control may be prevented by the application of sufficient force and energy to keep the anger in.

Source: It is sometimes possible to control the release of heated fluid for either destructive or constructive purposes; this has the effect of lowering the level of heat and pressure.
Target: It is sometimes possible to control the release of anger for either destructive or constructive purposes; this has the effect of lowering the level of anger and internal pressure.

The latter case defines an elaboration of the entailment WHEN A PERSON EXPLODES, WHAT WAS INSIDE HIM COMES OUT:

ANGER CAN BE LET OUT UNDER CONTROL
He *let out* his anger.
I *gave vent* to my anger.
Channel your anger into something constructive.
He *took out* his anger on me.

So far, we have seen that the cultural theory of physiological reactions provides the basis for the central metaphor, and that the central metaphor characterizes detailed correspondences between the source domain and the target domain – correspondences concerning both ontology and knowledge.

At this point, our analysis enables us to see why various relationships among idioms hold. We can see why someone who is in a towering rage has not kept cool, why someone who is stewing may have contained his anger but has not gotten it out of his system, why someone who has suppressed his anger has not yet erupted, and why someone who has channeled his anger into something constructive has not had a cow.

Let us now turn to the case where the general ANGER IS HEAT metaphor is applied to solids:

ANGER IS FIRE
Those are *inflammatory* remarks.
She was *doing a slow burn.*
He was *breathing fire.*
Your insincere apology just *added fuel to the fire.*

After the argument, Dave was *smoldering* for days.
That *kindled my ire.*
Boy, am I *burned up!*
He was *consumed* by his anger.

This metaphor highlights the cause of anger (kindle, inflame), the intensity and duration (smoldering, slow burn, burned up), the danger to others (breathing fire), and the damage to the angry person (consumed). The correspondences in ontology are as follows:

Source: FIRE
Target: ANGER

The fire is anger.
The thing burning is the angry person.
The cause of the fire is the cause of the anger.
The intensity of the fire is the intensity of the anger.
The physical damage to the thing burning is mental damage to the angry person.
The capacity of the thing buring to serve its normal function is the capacity of the angry person to function normally.
An object at the point of being consumed by fire corresponds to a person whose anger is at the limit.
The danger of the fire to things nearby is danger of the anger to other people.

The correspondences in knowlege are:

Source: Things can burn at low intensity for a long time and then burst into flame.
Target: People can be angry at a low intensity for a long time and then suddenly become extremely angry.

Source: Fires are dangerous to things nearby.
Target: Angry people are dangerous to other people.

Source: Things consumed by fire cannot serve their normal function.
Target: At the limit of the anger scale, people cannot function normally.

Putting together what we have done so far, we can see why someone who is doing a slow burn has not hit the ceiling yet, why someone whose anger is bottled up is not breathing fire, why someone who is consumed by anger probably cannot see straight, and why adding fuel to the fire might just cause the person you are talking to to have kittens.

THE OTHER PRINCIPAL METAPHORS

As we have seen, the ANGER IS HEAT metaphor is based on the cultural model of the physiological effects of anger, according to which increased body heat is a major effect of anger. That cultural model also maintains

that agitation is an important effect. Agitation is also an important part of our cultural model of insanity. According to this view, people who are insane are unduly agitated – they go wild, start raving, flail their arms, foam at the mouth, and so on. Correspondingly, these physiological effects can stand, metonymically, for insanity. One can indicate that someone is insane by describing him as foaming at the mouth, raving, going wild, for example.

The overlap between the cultural models of the effects of anger and the effects of insanity provides a basis for the metaphor:

ANGER IS INSANITY
I just touched him, and he *went crazy.*
You're *driving me nuts!*
When the umpire called him out on strikes, he *went bananas.*
One more complaint and I'll *go berserk.*
He got so angry, he *went out of his mind.*
When he gets angry, he *goes bonkers.*
She went into an *insane rage.*
If anything else goes wrong, I'll *get hysterical.*

Perhaps the most common conventional expression for anger came into English historically as a result of this metaphor:

I'm *mad!*

Because of this metaphorical link between insanity and anger, expressions that indicate insane behavior can also indicate angry behavior. Given the metonymy INSANE BEHAVIOR STANDS FOR INSANITY and the metaphor ANGER IS INSANITY, we get the metaphorical metonymy:

INSANE BEHAVIOR STANDS FOR ANGER
When my mother finds out, she'll *have a fit.*
When the ump threw him out of the game, Billy started *foaming at the mouth.*
He's *fit to be tied.*
He's about to *throw a tantrum.*

Violent behavior indicative of frustration is viewed as a form of insane behavior. According to our cultural model of anger, people who can neither control nor relieve the pressure of anger engage in violent frustrated behavior. This cultural model is the basis for the metonymy:

VIOLENT FRUSTRATED BEHAVIOR STANDS FOR ANGER
He's *tearing his hair out!*
If one more thing goes wrong, I'll start *banging my head against the wall.*
The loud music next door has got him *climbing the walls!*
She's been *slamming doors all morning.*

The ANGER IS INSANITY metaphor has the following correspondences:

Source: INSANITY
Target: ANGER

The cause of insanity is the cause of anger.
Becoming insane is passing the limit point on the anger scale.
Insane behavior is angry behavior.

Source: An insane person cannot function normally.
Target: A person who is angry beyond the limit point cannot function normally.

Source: An insane person is dangerous to others.
Target: A person who is angry beyond the limit point is dangerous to others.

At this point, we can see a generalization. Emotional effects are understood as physical effects. Anger is understood as a form of energy. According to our cultural understanding of physics, when enough input energy is applied to a body, the body begins to produce output energy. Thus, the cause of anger is viewed as input energy that produces internal heat (output energy). Moreover, the internal heat can function as input energy, producing various forms of output energy: steam, pressure, externally radiating heat, and agitation. Such output energy (the angry behavior) is viewed as dangerous to others. In the insanity metaphor, insanity is understood as a highly energized state, with insane behavior as a form of energy output.

All in all, anger is understood in our cultural model as a negative emotion. It produces undesirable physiological reactions, leads to an inability to function normally, and is dangerous to others. The angry person, recognizing this danger, views his anger as an opponent.

ANGER IS AN OPPONENT (IN A STRUGGLE)
I'm *struggling* with my anger.
He was *battling* his anger.
She *fought back* her anger.
I've been *wrestling* with my anger all day.
I was *seized* by anger.
I'm finally *coming to grips with* my anger.
He *lost control over* his anger.
Anger *took control* of him.
He *surrendered* to his anger.
He *yielded* to his anger.
I was *overcome* by anger.
Her anger has been *appeased.*

The ANGER IS AN OPPONENT metaphor is constituted by the following correspondences:

Source: STRUGGLE
Target: ANGER

The opponent is anger.
Winning is controlling anger.
Losing is having anger control you.
Surrender is allowing anger to take control of you.
The pool of resources needed for winning is the energy needed to control anger.

One thing that is left out of this account so far is what constitutes "appeasement." To appease an opponent is to give in to his demands. This suggests that anger has demands. We will address the question of what these demands are below.

The OPPONENT metaphor focuses on the issue of control and the danger of loss of control to the angry person himself. There is another metaphor that focuses on the issue of control, but whose main focus is the danger to others. It is a very widespread metaphor in Western culture, namely, PASSIONS ARE BEASTS INSIDE A PERSON. According to this metaphor, there is a part of each person that is a wild animal. Civilized people are supposed to keep that part of them private, that is, they are supposed to keep the animal inside them. In the metaphor, loss of control is equivalent to the animal getting loose. And the behavior of a person who has lost control is the behavior of a wild animal. There are versions of this metaphor for the various passions – desire, anger, and so forth. In the case of anger, the beast presents a danger to other people.

ANGER IS A DANGEROUS ANIMAL
He has a *ferocious* temper.
He has a *fierce* temper.
It's dangerous to *arouse* his anger.
That *awakened* my ire.
His anger *grew*.
He has a *monstrous* temper.
He *unleashed* his anger.
Don't let your anger *get out of hand*.
He *lost his grip* on his anger.
His anger is *insatiable*.

An example that draws on both the FIRE and DANGEROUS ANIMAL metaphors is:

He was *breathing fire*.

The image here is of a dragon, a dangerous animal that can devour you with fire.

The DANGEROUS ANIMAL metaphor portrays anger as a sleeping animal that is dangerous to awaken; as something that can grow and thereby become dangerous; as something that has to be held back; and as something with a dangerous appetite. Here are the correspondences that constitute the metaphor.

Source: DANGEROUS ANIMAL
Target: ANGER

The dangerous animal is the anger.
The animal's getting loose is loss of control of anger.
The owner of the dangerous animal is the angry person.
Sleeping for the animal is anger near the zero level.
Being awake for the animal is anger near the limit.

Source: It is dangerous for a dangerous animal to be loose.
Target: It is dangerous for a person's anger to be out of control.

Source: A dangerous animal is safe when it is sleeping and dangerous when it is awake.
Target: Anger is safe near the zero level and dangerous near the limit.

Source: A dangerous animal is safe when it is very small and dangerous when it is grown.
Target: Anger is safe near the zero level and dangerous near the limit.

Source: It is the responsibility of a dangerous animal's owner to keep it under control.
Target: It is the responsibility of an angry person to keep his anger under control.

Source: It requires a lot of energy to control a dangerous animal.
Target: It requires a lot of energy to control one's anger.

There is another class of expressions that, as far as we can tell, are instances of the same metaphor. These are cases in which angry behavior is described in terms of aggressive animal behavior.

ANGRY BEHAVIOR IS AGGRESSIVE ANIMAL BEHAVIOR
He was *bristling* with anger.
That *got my hackles up.*
He began to *bare his teeth.*
That *ruffled her feathers.*
She was *bridling with anger.*
Don't *snap* at me!
He started *snarling.*
Don't *bite my head off!*
Why did you *jump down my throat?*

Perhaps the best way to account for these cases would be to extend the ontological correspondences of the ANGER IS A DANGEROUS ANIMAL metaphor to include:

The aggressive behavior of the dangerous animal is angry behavior.

If we do this, we can account naturally for the fact that these expressions indicate anger. They would do so via a combination of metaphor and metonymy, in which the aggressive behavior metaphorically corresponds to angry behavior, which in turn metonymically stands for anger. For example, the snarling of the animal corresponds to the angry verbal behavior of the person, which in turn indicates the presence of anger.

Aggressive verbal behavior is a common form of angry behavior, as *snap, growl, snarl,* and so forth indicate. We can see this in a number of cases outside of the animal domain:

AGGRESSIVE VERBAL BEHAVIOR STANDS FOR ANGER
She gave him a *tongue-lashing.*
I really *chewed* him *out* good!

Other forms of aggressive behavior can also stand metonymically for anger, especially aggressive visual behavior:

AGGRESSIVE VISUAL BEHAVIOR STANDS FOR ANGER
She was *looking daggers* at me.
He *gave me a dirty look.*
If *looks could kill,* . . . .
He was *glowering* at me.

All these metonymic expressions can be used to indicate anger.

As in the case of the OPPONENT metaphor, our analysis of the DANGEROUS ANIMAL metaphor leaves an expression unaccounted for – "insatiable." This expression indicates that the animal has an appetite. This "appetite" seems to correspond to the "demands" in the OPPONENT metaphor, as can be seen from the fact that the following sentences entail each other:

Harry's anger is *insatiable.*
Harry's anger cannot be *appeased.*

To see what it is that anger demands and has an appetite for, let us turn to expressions that indicate causes of anger. Perhaps the most common group of expressions that indicate anger consists of conventionalized forms of annoyance: minor pains, burdens placed on domestic animals, and so forth. Thus we have the metaphor:

THE CAUSE OF ANGER IS A PHYSICAL ANNOYANCE
Don't be *a pain in the ass.*
Get *off my back!*
You don't have to *ride me so hard.*
You're *getting under my skin.*
He's *a pain in the neck.*
Don't *be a pest!*

These forms of annoyance involve an offender and a victim. The offender is at fault. The victim, who is innocent, is the one who gets angry.

There is another set of conventionalized expressions used to speak of, or to, people who are in the process of making someone angry. These are expressions of territoriality, in which the cause of anger is viewed as a trespasser.

CAUSING ANGER IS TRESPASSING
You're beginning to *get to* me.
This is where I *draw the line!*
Don't *step on my toes!*

Again, there is an offender (the cause of anger) and a victim (the person who is getting angry). In general, the cause of anger seems to be an offense, in which there is an offender who is at fault and an innocent victim, who is the person who gets angry. The offense seems to constitute some sort of injustice. This is reflected in the conventional wisdom:

Don't get *mad,* get *even!*

In order for this saying to make sense, there has to be some connection between anger and retribution. Getting even is equivalent to balancing the scales of justice. The saying assumes a model in which injustice leads to anger and retribution can alleviate or prevent anger. In short, what anger "demands" and has an "appetite" for is revenge. This is why warnings and threats can count as angry behavior:

If I get mad, watch out!
Don't get me angry, or you'll be sorry.

The angry behavior is, in itself, viewed as a form of retribution.

We are now in a position to make sense of another metaphor for anger:

ANGER IS A BURDEN
Unburdening himself of his anger gave him a sense of *relief.*
After I lost my temper, I felt *lighter.*
He *carries* his anger around with him.
He *has a chip on his shoulder.*
You'll feel better if you *get it off your chest.*

In English, it is common for responsibilities to be metaphorized as burdens. There are two kinds of responsibilities involved in the cultural model of anger that has emerged so far. The first is a responsibility to control one's anger. In cases of extreme anger, this may place a considerable burden on one's "inner resources." The second comes from the model of retributive justice that is built into our concept of anger; it is the responsibility to seek vengeance. What is particularly interesting is that these two responsibilities are in conflict in the case of angry retribution: If you take out your anger on someone, you are not meeting your responsibility to control your anger, and if you do not take out your anger on someone, you

are not meeting your responsibility to provide retribution. The slogan "Don't get mad, get even!" offers one way out: retribution without anger. The human potential movement provides another way out by suggesting that letting your anger out is okay. But the fact is that neither of these solutions is the cultural norm. It should also be mentioned in passing that the human potential movement's way of dealing with anger by sanctioning its release is not all that revolutionary. It assumes almost all of our standard cultural model and metaphorical understanding, and makes one change: sanctioning the "release."

SOME MINOR METAPHORS

There are a few very general metaphors that apply to anger as well as to many other things, and are commonly used in comprehending and speaking about anger. The first we will discuss has to do with existence. Existence is commonly understood in terms of physical presence. You are typically aware of something's presence if it is nearby and you can see it. This is the basis for the metaphor:

EXISTENCE IS PRESENCE
His anger *went away.*
His anger eventually *came back.*
My anger *lingered on* for days.
She couldn't *get rid of* her anger.
After a while, her anger just *vanished.*
My anger slowly began to *dissipate.*
When he saw her smile, his anger *disappeared.*

In the case of emotions, existence is often conceived of as location in a bounded space. Here the emotion is the bounded space and it exists when the person is in that space:

EMOTIONS ARE BOUNDED SPACES
She flew *into* a rage.
She was *in* an angry mood.
He was *in* a state of anger.
I am not easily roused *to* anger.

These cases are relatively independent of the rest of the anger system, and are included here more for completeness than for profundity.

THE PROTOTYPE SCENARIO

The metaphors and metonymies that we have investigated so far converge on a certain prototypical cognitive model of anger. It is not the only model of anger we have; in fact, there are quite a few. But as we shall see, all of the others can be characterized as minimal variants of the model that the metaphors converge on. The model has a temporal dimension, and can be conceived of as a scenario with a number of stages. We will call

this the "prototype scenario"; it is similar to what De Sousa (1980) calls the "paradigm scenario." We will be referring to the person who gets angry as *S*, short for the Self.

Stage 1: offending event

There is an offending event that displeases *S*. There is a wrongdoer who intentionally does something directly to *S*. The wrongdoer is at fault and Self is innocent. The offending event constitutes an injustice and produces anger in *S*. The scales of justice can only be balanced by some act of retribution. That is, the intensity of retribution must be roughly equal to the intensity of offense. *S* has the responsibility to perform such an act of retribution.

Stage 2: anger

Associated with the entity anger is a scale that measures its intensity. As the intensity of anger increases, *S* experiences physiological effects: increase in body heat, internal pressure, and physical agitation. As the anger gets very intense, it exerts a force upon *S* to perform an act of retribution. Because acts of retribution are dangerous and/or socially unacceptable, *S* has a responsibility to control his anger. Moreover, loss of control is damaging to *S*'s own well-being, which is another motivation for controlling anger.

Stage 3: attempt at control

S attempts to control his anger.

Stage 4: loss of control

Each person has a certain tolerance for controlling anger. That tolerance can be viewed as the limit point on the anger scale. When the intensity of anger goes beyond that limit, *S* can no longer control his anger. *S* exhibits angry behavior and his anger forces him to attempt an act of retribution. Since *S* is out of control and acting under coercion, he is not responsible for his actions.

Stage 5: act of retribution

S performs the act of retribution. The wrongdoer is the target of the act. The intensity of retribution roughly equals the intensity of the offense and the scales are balanced again. The intensity of anger drops to zero.

At this point, we can see how the various conceptual metaphors we have discussed all map onto a part of the prototypical scenario, and how they jointly converge on that scenario. This enables us to show exactly how the various metaphors are related to one another, and how they function together to help characterize a single concept. This is something that Lakoff and Johnson (1980) were unable to do.

The course of anger depicted in the prototype scenario is by no means the only course anger can take. In claiming that the scenario is prototypical we are claiming that according to our cultural theory of anger, this is a

normal course for anger to take. Deviations of many kinds are both recognized as existing and recognized as being noteworthy and not the norm. Let us take some examples:

Someone who "turns the other cheek," that is, who does not get angry or seek retribution. In this culture, such a person is considered virtually saintly.

Someone who has no difficulty controlling his anger is especially praiseworthy.

A "hothead" is someone who considers more events offensive than most people, who has a lower threshold for anger than the norm, who cannot control his anger, and whose acts of retribution are considered out of proportion to the offense. Someone who is extremely hotheaded is considered emotionally "unbalanced."

On the other hand, someone who acts in the manner described in the prototypical scenario would not be considered abnormal at all.

Before turning to the nonprototypical cases, it will be useful for us to make a rough sketch of the ontology of anger: the entities, predicates, and events required. This will serve two purposes. First, it will allow us to show in detail how the nonprototypical cases are related to the prototypical model. Second, it will allow us to investigate the nature of this ontology. We will include only the detail required for our purposes.

It is part of our cultural model of a person that he can temporarily lose control of his body or his emotions. Implicit in this concept is a separation of the body and the emotions from the *S*. This separation is especially important in the ontology of anger. Anger, as a separable entity, can overcome someone, take control, and cause him to act in ways he would not normally act. In such cases, the *S* is no longer in control of the body. Thus, the ontology of anger must include an *S*, anger, and the body. A fuller treatment would probably also require viewing the mind as a separate entity, but that is beyond our present purposes.

Since anger has a quantitative aspect, the ontology must include a scale of anger, including an intensity, a zero point, and a limit point. The basic anger scenario also includes an offending event and a retributive act. Each of these has a quantitative aspect, and must also include an intensity, a zero point, and a limit. In the prototypical case, the offending event is an action on the part of a wrongdoer against a victim. The retribution takes the form of an act by an agent against some target.

The ontology of anger also includes a number of predicates: *displeasing, at fault, exert force on, cause, exist, control, dangerous, damaging, balance,* and *outweigh*. There are also some other kinds of events: the physiological effects; the angry behaviors; and the immediate cause of anger, in case it is not the same as the offending event.

SUMMARY OF THE ONTOLOGY OF ANGER

Aspects of the person:	*S*
	Body
	Anger
Offense and retribution:	Offending Event
	Retributive Act
Scales of intensity:	Intensity of Anger
	Intensity of Offense
	Intensity of Retribution
End points:	Zero
	Limit
Predicates:	Displease
	At Fault
	Cause
	Exist
	Exert Force on
	Control
	Dangerous
	Damaging
	Balance
	Outweigh
Other events:	Physiological Reactions
	Angry Behaviors
	Immediate Cause

RESTATEMENT OF THE PROTOTYPICAL SCENARIO

Given the preceding ontology and principles of the cultural model, we can restate the prototypical anger scenario in terms that will facilitate showing the relationships among the wide variety of anger scenarios. We will first restate the prototypical scenario and then go on to the nonprototypical scenarios.

PROTOTYPICAL ANGER SCENARIO

Constraints:
- Victim = *S*
- Agent of Retribution = *S*
- Target of Anger = Wrongdoer
- Immediate Cause of Anger = Offending Event
- Angry Behavior = Retribution

Stage 1: Offending Event
- Wrongdoer offends *S*
- Wrongdoer is at fault
- The offending event displeases *S*

The intensity of the offense outweighs the intensity of the retribution (which equals zero at this point), thus creating an imbalance.
The offense causes anger to come into existence.

Stage 2: Anger
Anger exists.
S experiences physiological effects (heat, pressure, agitation).
Anger exerts force on the *S* to attempt an act of retribution.

Stage 3: Attempt to control anger
S exerts a counterforce in an attempt to control anger.

Stage 4: Loss of control
The intensity of anger goes above the limit.
Anger takes control of *S*.
S exhibits angry behavior (loss of judgment, aggressive actions).
There is damage to *S*.
There is a danger to the target of anger, in this case, the wrongdoer.

Stage 5: Retribution
S performs retributive act against *W* (this is usually angry behavior directed at *W*).
The intensity of retribution balances the intensity of offense.
The intensity of anger drops to zero.
Anger ceases to exist.

THE NONPROTOTYPICAL CASES

We are now in a position to show how a large range of instances of anger cluster about the above prototype. The examples are in the following form: a nonprototypical anger scenario with its name in **boldface**, followed by an informal description; an account of the minimal difference between the given scenario and the prototype scenario; finally, an example sentence.

Insatiable anger: You perform the act of retribution and the anger just does not go away.
In Stage 5, the intensity of anger stays above zero and the anger continues to exist.
Example: His anger lingered on.

Frustrated anger: You just cannot get back at the wrongdoer and you get frustrated.
It is not possible to gain retribution for the offensive act. *S* engages in frustrated behavior.
Option: S directs his anger at himself.
Examples: He was climbing the walls. She was tearing her hair out. He was banging his head against the wall. He's taking it out on himself.

Redirected anger: Instead of directing your anger at the person who made you angry, you direct it at someone or something else.

The target of anger is not the wrongdoer.
Examples: When I lose my temper, I kick the cat. When you get angry, punch a pillow until your anger goes away. When something bad happened at the office, he would take it out on his wife.

Exaggerated response: Your reaction is way out of proportion to the offense.
The intensity of retribution outweighs the intensity of offense.
Examples: Why jump down my throat? You have a right to get angry, but not to go *that* far.

Controlled response: You get angry, but retain control and consciously direct your anger at the wrongdoer.
S remains in control. Everything else remains the same.
Example: He vented his anger on her.

Constructive use: Instead of attempting an act of retribution, you put your anger to a constructive use.
S remains in control and performs a constructive act instead of a retributive act. The scales remain unbalanced, but the anger disappears.
Example: Try to channel your anger into something constructive.

Terminating event: Before you have a chance to lose control, some unrelated event happens to make your anger disappear.
Anger doesn't take control of *S*. Some event causes the anger to go out of existence.
Example: When his daughter smiled at him, his anger disappeared.

Spontaneous cessation: Before you lose control, your anger just goes away.
Anger doesn't take control of *S* and the intensity of anger goes to zero.
Example: His anger just went away by itself.

Successful suppression: You successfully suppress your anger.
S keeps control and the intensity of anger is not near the limit.
Example: He suppressed his anger.

Controlled reduction: Before you lose control, you engage in angry behavior and the intensity of anger goes down.
S does not lose control, *S* engages in angry behavior and the intensity of anger goes down.
Example: He's just letting off steam.

Immediate explosion: You get angry and lose control all at once.
No Stage 3. Stages 2 and 4 combine into a single event.
Example: I said "Hi Roundeyes!" and he blew up.

Slow burn: Anger continues for a long time.
Stage 2 lasts a long time.
Example: He was doing a slow burn.

Nursing a grudge: *S* maintains his anger for a long period waiting for a chance at a retributive act. Maintaining that level of anger takes special effort.

Stage 2 lasts a long time and requires effort. The retributive act does not equal angry behavior.

Don't get mad, get even: This is advice (rarely followed) about the pointlessness of getting angry. It suggests avoiding Stages 2, 3, and 4, and instead going directly to Stage 5. This advice is defined as an alternative to the prototypical scenario.

Indirect cause: It is some result of the wrongdoer's action, not the action itself, that causes anger.

The offense is not the immediate cause of anger, but rather is more indirect – the cause of the immediate cause.

Consider the following case: Your secretary forgets to fill out a form that results in your not getting a deserved promotion. Offending event = secretary forgets to fill out form. Immediate cause = you do not get promotion. You are angry *about* not getting the promotion. You are angry *at* the secretary *for* not filling out the form. In general, *about* marks the immediate cause, *at* marks the target, and *for* marks the offense.

Cool anger: There are no physiological effects and *S* remains in control.

Cold anger: *S* puts so much effort into suppressing the anger that temperature goes down, while internal pressure increases. There are neither signs of heat nor agitation, and there is no danger that *S* will lose control and display his anger. In the prototypical case, a display of anger constitutes retribution. But since there is no such display, and since there is internal pressure, release from that pressure can only come through retribution of some other kind, one that is more severe than the display of emotion. It is for this reason that cold anger is viewed as being much more dangerous than anger of the usual kind. Expressions like *Sally gave me an icy stare* are instances of cold anger. This expression implies that Sally is angry at me, is controlling her anger with effort, and is not about to lose control; it suggests the possibility that she may take retributive action against me of some sort other than losing her temper.

Anger with: To be angry with someone, *S* has to have a positive relationship with the wrongdoer, the wrongdoer must be answerable to *S*, the intensity is above the threshold, but not near the limit. Perhaps the best example is a parent–child relationship, where the parent is angry with the child.

Righteous indignation: The offending event is a moral offense and the victim is not the *S*. The intensity of anger is not near the limit.

Wrath: The intensity of the offense is very great and many acts of retribution are required in order to create a balance. The intensity of the anger is well above the limit and the anger lasts a long time.

There appears to be a recognizable form of anger for which there are no conventional linguistic expressions, so far as we can tell. We will call this

a manipulative use of anger. It is a case where a person cultivates his anger and does not attempt to control it, with the effect that he intimidates those around him into following his wishes in order to keep him from getting angry. This can work either by fear or by guilt. The people manipulated can either be afraid of his anger or may feel guilty about what the anger does to him. This form of anger is fairly distant from the prototype and it is no surprise that we have no name for it.

Interestingly enough, there is a linguistic test that can be used to verify that what we have called the prototypical scenario is indeed prototypical. It involves the use of the word *but*. Consider the following examples (where the asterisk indicates a semantic aberration):

Max got angry, but he didn't blow his top.
*Max got angry, but he blew his top.
Max blew up at his boss, but the anger didn't go away.
*Max blew up at his boss, but the anger went away.
Sam got me angry, but it wasn't him that I took my anger out on.
*Sam got me angry, but it was him that I took my anger out on.

The word *but* marks a situation counter to expectation. In these examples, the prototypical scenario defines what is to be expected. The acceptable sentences with *but* run counter to the prototypical scenario, and thus fit the conditions for the use of *but*. The unacceptable sentences fit the prototypical scenario, and define expected situations. This is incompatible with the use of *but*. Thus we have a linguistic test that accords with our intuitions about what is or isn't prototypical.

Each of the nonprototypical cases just cited is a case involving anger. There appear to be no necessary and sufficient conditions that will fit all these cases. However, they can all be seen as variants of the prototypical anger scenario. Prototypes often involve clusters of conditions and the prototypical anger scenario is no exception. The clustering can be seen explicitly in identity conditions such as: Victim = Self, Target = Wrongdoer, Offending Event = Immediate Cause, and so forth. When these identities do not hold, we get nonprototypical cases. For example, with righteous indignation, Victim does not have to equal Self. In the case of an indirect cause, Offending Event does not equal Immediate Cause. In the case of redirected anger, Target does not equal Wrongdoer. Usually the act of retribution and the disappearance of anger go together, but in the case of spontaneous cessation and insatiable anger, that is not the case. And in the Don't-get-mad-get-even case, angry behavior is avoided, and is therefore not identical to the act of retribution. Part of what makes the prototypical scenario prototypical is that it is sufficiently rich so that variations on it can account for nonprototypical cases, and it also has a conflation of conditions that are not conflated in nonprototypical cases.

The point is that there is no single unified cognitive model of anger. Instead there is a category of cognitive models with a prototypical model in the center. This suggests that it is a mistake to try to find a single

cognitive model for all instances of a concept. Kinds of anger are not all instances of the same model; instead they are *variants* on a prototypical model. There is no common core that all kinds of anger have in common. Instead, the kinds of anger bear family resemblances to one another.

METAPHORICAL ASPECTS OF THE PROTOTYPE SCENARIO

The analysis we have done so far is consistent with a certain traditional view of metaphor, namely:

> The concept of anger exists and is understood independently of any metaphors.
> The anger ontology and the category of scenarios represent the literal meaning of the concept of anger.
> Metaphors do no more than provide ways of talking about the ontology of anger.

This view entails the following:

> The elements of the anger ontology really, literally exist, independent of any metaphors.

A brief examination of the anger ontology reveals that this is simply not the case. In the ontology, anger exists as an independent entity, capable of exerting force and controlling a person. This is what Lakoff and Johnson (1980) refer to as an "ontological metaphor." In this case, it would be the ANGER IS AN ENTITY metaphor. A person's anger does not really, literally exist as an independent entity, though we do comprehend it metaphorically as such. In the ontology, there is an intensity scale for anger, which is understood as being oriented UP, by virtue of the MORE IS UP metaphor. The intensity scale has a limit associated with it – another ontological metaphor. Anger is understood as being capable of exerting force and taking control of a person. The FORCE and CONTROL here are also metaphorical, based on physical force and physical control. The anger ontology also borrows certain elements from the ontology of retributive justice: offense and retribution, with their scales of intensity and the concept of balance. These are also metaphorical, with metaphorical BALANCE based on physical balance. In short, the anger ontology is largely constituted by metaphor.

Let us now examine these constitutive metaphors. Their source domains – ENTITY, INTENSITY, LIMIT, FORCE, and CONTROL – all seem to be superordinate concepts, that is concepts that are fairly abstract. By contrast, the principal metaphors that map onto the anger ontology – HOT FLUID, INSANITY, FIRE, BURDEN, STRUGGLE – appear to be basic-level concepts, that is, concepts that are linked more directly to experience, concepts that are information-rich and rich in conventional mental imagery. Let us call the metaphors based on such concepts "basic-level metaphors." We would like to suggest that most of our

understanding of anger comes via these basic-level metaphors. The HOT FLUID and FIRE metaphors give us an understanding of what kind of entity anger is. And the STRUGGLE metaphor gives us a sense of what is involved in controlling it. Without these metaphors, our understanding of anger would be extremely impoverished, to say the least. One is tempted to ask which is more primary: the constitutive metaphors or the basic-level ones. We do not know if that is a meaningful question. All we know is that both exist, and have their separate functions: The basic-level metaphors allow us to comprehend and draw inferences about anger, using our knowledge of familiar, well-structured domains. The constitutive metaphors provide the bulk of the anger ontology.

The embodiment of anger

We have seen that the concept of anger has a rich conceptual structure and that those who view it as just a feeling devoid of conceptual content are mistaken. But the opposite view also exists. Schachter and Singer (1962) have claimed that emotions are *purely cognitive,* and that there are no physiological differences among the emotions. They claim that the feeling of an emotion is simply a state of generalized arousal, and that *which* emotion one feels is simply a matter of what frame of mind one is in. The results of Ekman, Levenson, and Friesen (1983) contradict the Schacter-Singer claims with evidence showing that pulse rate and skin termperature do correlate with particular emotions.

Although the kind of analysis we have offered does not tell us anything direct about what the physiology of emotions might be, it does correlate positively with the Ekman group's results. As we saw, the conceptual metaphors and metonymies used in the comprehension of anger are based on a cultural theory of the physiology of anger, the major part of which involves heat and internal pressure. The Ekman group's results (which are entirely independent of the analysis given here) suggest that our cultural theory of the physiology of anger corresponds remarkably well with the actual physiology: when people experience anger their skin temperature and pulse rate rises.

Although the cultural theory is only a "folk" theory, it has stood the test of time. It has made sense to hundreds of millions of English speakers over a period of roughly a thousand years. The Ekman group's results suggest that ordinary speakers of English by the million have had very subtle insight into their own physiology. Those results suggest that many of the details of the way we conceptualize anger arise from the autonomic nervous system, and that the conceptual metaphors and metonymies used in understanding anger are by no means arbitrary; instead they are motivated by our physiology.

The Ekman group's results, together with our hypothesis concerning conceptual embodiment, make an interesting prediction. It predicts that

if we look at metaphors and metonymies for anger in the languages of the world, we will not find any that contradict the physiological results that they found. In short, we should not find languages where the basic emotion of anger is understood in terms of both cold and freedom from pressure. The nonbasic case of *cold anger* discussed above is irrelevant, since it is a special form of anger and not an instance of the normal basic-anger emotion, and since it does involve internal pressure.

If Schachter and Singer are right and the Ekman group has made a mistake, then the English metaphors and metonymies for anger are arbitrary, that is, they are not embodied, not motivated by any physiological reality. The heat and internal pressure metaphors should thus be completely accidental. If there is no physiological basis for anger at all, as Schachter and Singer suggest, we would then expect metaphors for anger to be randomly distributed in the languages of the world. We would expect metaphors for cold and freedom from pressure to be just as common as metaphors for heat and pressure; in fact, on the Schacter–Singer account, we would expect that metaphors based on shape, darkness, trees, water – anything at all – would be just as common as metaphors based on heat and pressure. The research has not been done, but our guess is that the facts will match the predictions of the Ekman group. If those predictions hold up, it will show that the match between the Ekman group's results and ours is no fluke, and it will give even more substance to our claim that concepts are embodied.

Review

We have shown that the expressions that indicate anger in American English are not a random collection, but rather are structured in terms of an elaborate cognitive model that is implicit in the semantics of the language. This indicates that anger is not just an amorphous feeling, but rather that it has an elaborate cognitive structure.

However, very significant problems and questions remain.

First, there are aspects of our understanding of anger that our methodology cannot shed any light on. Take, for example, the range of offenses that cause anger and the corresponding range of appropriate responses. Our methodology reveals nothing in this area.

Second, the study of the language as a whole gives us no guide to individual variation. We have no idea how close any individual comes to the model we have uncovered, and we have no idea how people differ from one another.

Third, our methodology does not enable us to say much about the exact psychological status of the model we have uncovered. How much of it do people really use in comprehending anger? Do people base their actions on this model? Are people aware of the model? How much of

it, if any, do people consciously believe? And most intriguingly, does the model have any effect on what people *feel?*

Certain things, however, do seem to be clear. Most speakers of American English seem to use consistently the expressions we have described and make inferences that appear, so far as we can tell, to be consistent with our model. We make this claim on the basis of our own intuitive observations, though to really establish it, one would have to do thorough empirical studies. If we are right, our model has considerable psychological reality, but how much and what kind remains to be determined. The fact that our analysis meshes so closely with the physiological study done by the Ekman group suggests that emotional concepts are embodied, that is, that the actual content of the concepts are correlated with bodily experience.

This is especially interesting in the case of metaphorical concepts, since the correlation is between the metaphors and the physiology, rather than directly between the literal sense and the physiology. It provides confirmation of the claim by Lakoff and Johnson (1980) that conceptual metaphors are not mere flights of fancy, but can even have a basis in bodily experience.

What does all this say about cultural models? First, they make use of imaginative mechanisms – metaphor, metonymy, and abstract scenarios. Second, they are not purely imaginative; they can be motivated by the most concrete of things, bodily experience. Third, linguistic evidence is an extraordinarily precise guide to the structure of such models.

Note

1. This is a shortened, slightly revised version of the chapter entitled "Anger" that appears as Case Study 1 in Women, Fire, and Dangerous Things: What Categories Reveal about the Mind, by George Lakoff, University of Chicago Press, 1987.

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9
Two theories of home heat control[1]

Willett Kempton

Human beings strive to connect related phenomena and make sense of the world. In so doing, they create what I call folk theory. The word *folk* signifies both that these theories are shared by a social group and that they are acquired from everyday experience or social interaction. To call them *theories* is to assert that they use abstractions that apply to many analogous situations, enable predictions, and guide behavior. I contrast folk theories with institutionalized theories, which are used by specialists and acquired from scientific literature or controlled experiments. Thus, a folk theory is one type of cultural model.

This chapter analyzes folk theories for home heating control, particularly thermostat control. From interviews with Michigan residents, folk theories were inferred using methods developed by Lakoff and Johnson (1980; also see Lakoff & Kövecses this volume) and Quinn (1982; this volume). The inferred folk theories were compared with behavior guided by the theory, using both observed behavior and self-reported behavior. The interviews also elicited lists of devices analogous to thermostats and a history of use in present and past residences.

The concept of folk theory

Anthropological interest in folk theory has germinated over the past few years in the form of two recent volumes (Dougherty 1985; Marsella & White 1982) and the conference leading to the present volume. Present work on folk models and folk theory continues the expansion of cognitive anthropology from folk categories to more complex structures, such as sets of propositions (D'Andrade 1981; Kay 1966), inference rules (Cole & Scribner 1974; Hutchins 1980), cognition in everyday activities (Holland 1985; Lave & Rogoff 1983; Murtaugh, Faust, & de la Rocha unpublished), and connections in discourse (Agar 1980; Rice 1980).

Recent discoveries by psychologists and educators provide the most precisely defined example of folk theory to date. Related cognitive structures have been called "naïve theory" (DiSessa 1982; McCloskey 1983a; McCloskey, Caramazza & Green 1980), "mental models" (de Kleer &

Brown 1983; Gentner & Stevens 1983; Johnson-Laird 1981), "naïve problem representation" (Larkin 1983; Larkin et al. 1980), or "intuitive theory" (McCloskey 1983b; see DiSessa 1985 for a contrasting view).[2] I describe one study to provide an example of folk theory and to show how my perspective differs. The study compared folk theories of motion with physicists' theories of motion:

> . . . People develop on the basis of their everyday experience remarkably well-articulated naïve theories of motion . . . theories developed by different individuals are best described as different forms of the same basic theory. Although this basic theory appears to be a reasonable outcome of experience with real-world motion, it is strikingly inconsistent with the fundamental principles of classical physics. In fact, the naïve theory is remarkably similar to a pre-Newtonian physical theory popular in the fourteenth through sixteenth centuries. (McCloskey 1983a:299)

To paraphrase this quotation, the folk theory of motion (1) is based on everyday experience; (2) varies among individuals, although important elements are shared; and (3) is inconsistent with principles of institutionalized physics. McCloskey makes a fourth finding, that the folk theory persists in the face of formal physics training. Students simply reinterpret classroom material to fit their preexisting folk theory (McCloskey 1983a:318). The physics instructors would not usually even be aware their students had a preexisting folk theory.[3]

To an anthropologist, the nonrecognition of conflicting systems and the persistence of the folk system both resemble phenomena at a cultural boundary. Isolated elements and terms diffuse across the cultural boundary, but they are incorporated into the prior folk theory rather than inducing change. There is also a parallel in that one culture seems dominant: When the folk and institutional theories differ, the folk theory is considered wrong. The research just cited does not question the correctness of the institutional theory, since a major objective of the classroom studies has been to improve teaching.

Wiser and Carey caution that we cannot understand folk theory by simply diagnosing its failure to solve problems in the domain of the expert. We must find the problems it does solve correctly and examine the explanatory mechanisms it uses to do so (Wiser & Carey 1983:295). Anthropologists' naturalistic proclivities have led them away from folk theory in the classroom and toward the environments in which folk theory earns its keep in everyday use; many examples are found in this volume.

Residential thermostats

This study deals with home heating thermostats for several reasons. Home heating systems are fairly simple and well understood (at least in comparison with marriage, disease etiology, gender roles, divination, the mind, and other topics of this volume). Information about them is communicated

almost entirely through folk channels – no one must study thermostats in high school or pass examinations; there is no widespread institutionalized dogma. Yet, many people adjust their thermostats, typically more than once per day, so they must have some principles or theories guiding this behavior. Also, since the range of behavior affected by the theory is restricted – turning a single dial – behavioral records can be collected automatically. By comparing behavior patterns with interviews, we can better infer how folk theory guides the behavior we observe. Finally, this domain was selected because an improved understanding of what people do with thermostats would have significant practical consequence for national energy programs.

The following discussion draws from two sets of interviews and one set of behavioral data. The first set of interviews, with people in 30 Michigan households, elicited general information about energy management. Since these interviews were exploratory, they often did not go into much detail on thermostats. The second is a set of 8 interviews, with 12 Michigan informants, that focused on thermal comfort and especially dealt with thermostat control. I use the interview data to infer folk theory, which in turn is compared with behavioral patterns. The data on behavior derive from automatic recordings of thermostat settings in 26 houses in New Jersey. In addition, my analysis draws from discussions with heating specialists and energy conservation analysts and from technical energy articles.

This study reports the first phase of our research on this topic. The second phase, now being analyzed, combines both interview and behavioral data from the same households. Although the combined method is conceptually appealing, the expense of combined data – particularly when using automatic recorders – has necessitated smaller samples than we are able to draw on here.

I hypothesize that two theories of thermostats exist in the United States (and perhaps throughout the industrialized world). One, the feedback theory, holds that the thermostat senses temperature and turns the furnace on and off to maintain an even temperature. The other, which I call the valve theory, holds that the thermostat controls the amount of heat. That is, like a gas burner or a water valve, a higher setting causes a higher rate of flow. Technically knowledgeable readers of this paper have commented that the feedback theory is correct and the valve theory is wrong. However, as I will demonstrate, both folk theories simplify and distort as compared to a full physical description, each causes its own types of operational errors and inefficiencies, and each has certain advantages.

Records of thermostat use

Behavioral records of thermostat settings have been collected by Princeton University's Center for Energy and Environmental Studies (Dutt,

Eichenberger, & Socolow 1979; Socolow 1978). During a 2-year period, automatic devices recorded hourly thermostat settings (and many other energy variables) of 26 upper middle-class families in identical townhouses. Here, I examine 2 of those homes to illustrate 2 patterns of thermostat adjustment, which I link to the 2 folk theories.

Figure 9.1 shows hourly measurements of thermostat settings in one house over a 3-day period in the winter of 1976. The solid line shows the hourly thermostat setting, and the dotted line shows the room temperature. We see that the thermostat usually is changed at times when occupants and activities change: 8 A.M., noon, and 5 to 8 P.M. During other periods, not shown in Figure 9.1, the thermostat may be left at the same setting for several days. I conclude that the thermostat setting is changed when the desired temperature changes: when waking or going to sleep, when entering or exiting the house, and around mealtimes.

Figure 9.2 shows hourly thermostat settings for a second house, also during the winter of 1976. In this house, the thermostat is often changed between each hourly datum. In fact, the only times on the figure when the thermostat is not changed are probable sleeping times, for example, from 1 A.M. to 7 A.M. Monday, and from 10 P.M. Monday to 8 A.M. Tuesday. It appears that whenever someone is awake in this house, the thermostat is adjusted at least hourly. Examination of the full 2 years of data (not shown here) also shows many thermostat adjustments, not at regular times, and a wide range of settings (from 61° to 85° F; 16° to 29°C).

I hypothesize that the frequent thermostat settings of this second household result from the residents' having a valve theory of their thermostat.[4] Although I could not interview the people in the households shown in Figures 9.1 and 9.2, informants in my interviews do report following similar patterns (though rarely as extreme as Figure 9.2). The next two sections discuss interview evidence for the two theories.

The feedback theory

According to the feedback theory, the thermostat turns the furnace on or off according to room temperature. When the room is colder than the setting on the thermostat dial, the thermostat turns the furnace on. Then, when the room is as warm as the setting, it turns the furnace off. Since the theory posits that the furnace runs at a single constant speed, the thermostat can control the amount of heating only by the length of time the furnace is on. Thus, if the dial is adjusted upward only a little, the furnace will run a short time and turn off; if it is adjusted upward a large amount, the furnace must run longer to bring the house to that temperature. Left at one setting, the thermostat will switch the furnace on and off as necessary to maintain approximately that temperature.

Heating engineers are fairly comfortable with the folk theory described

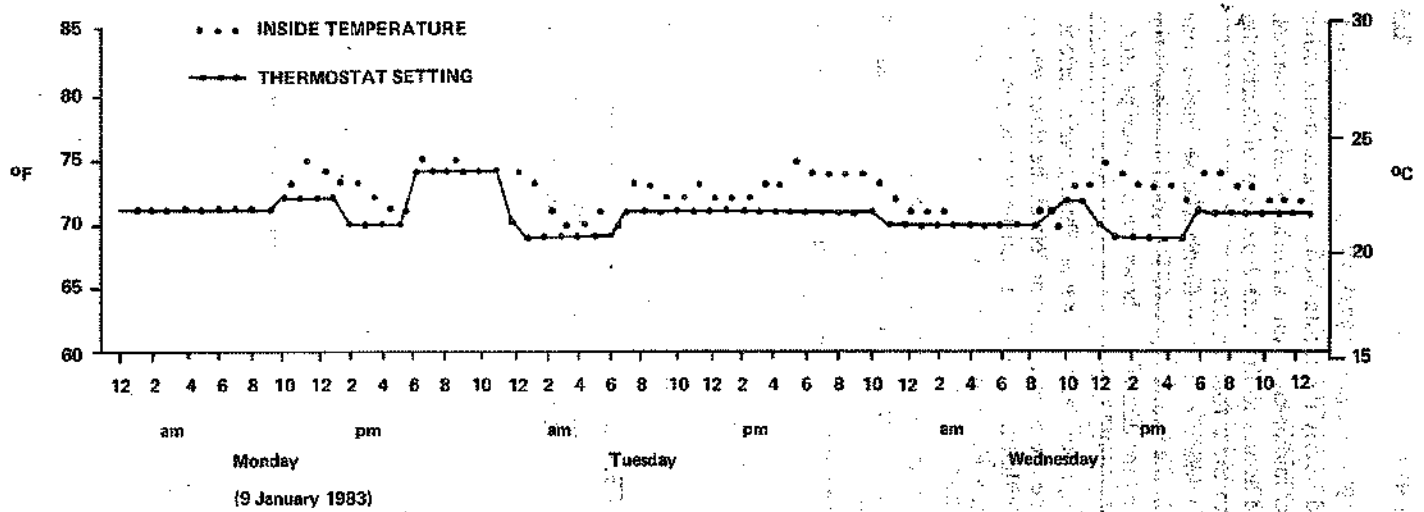

Figure 9.1. Pattern of thermostat adjustments consistent with the feedback theory

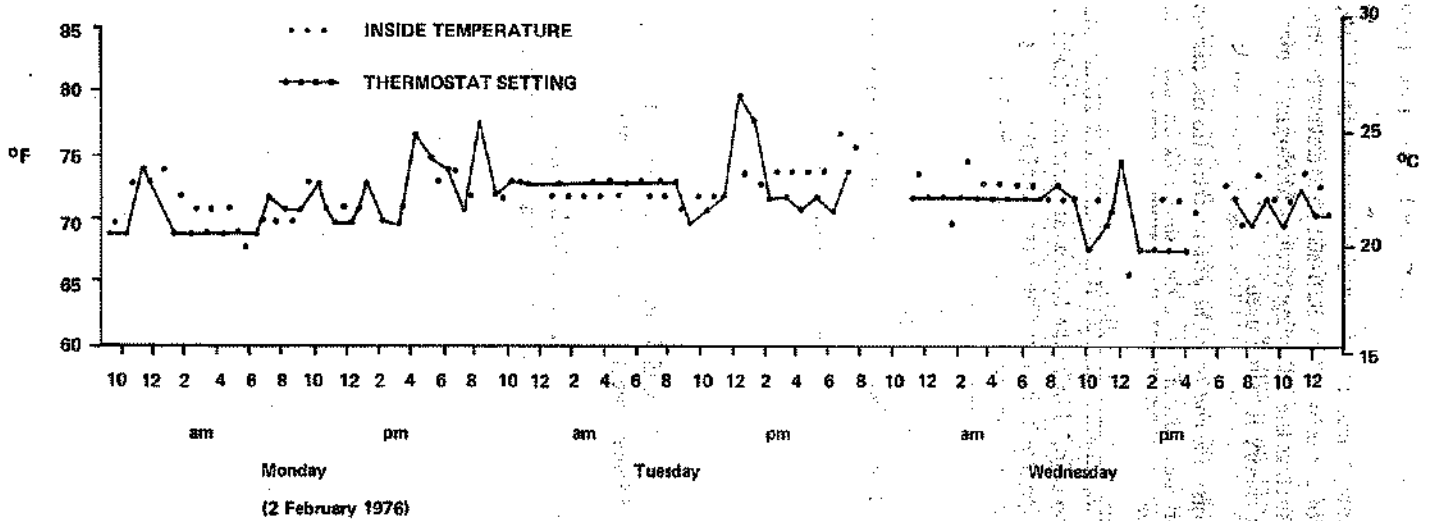

Figure 9.2. Pattern of thermostat adjustments consistent with the valve theory

here – they consider it simplified, but essentially correct. As I show, however, their evaluation of correctness may be based on irrelevant criteria.

In interview segments such as the following (from a Michigan farmer), I infer that the feedback theory is being used:

> You just turn the thermostat up, and once she gets up there [to the desired temperature] she'll kick off automatically. And then she'll kick on and off to keep it at that temperature.

From anthropomorphic statements such as this and others about the thermostat "feeling it is too cold," I infer the following metaphor (Lakoff & Johnson 1980) for the feedback theory: The thermostat is a little person with a switch controlling the furnace. The little person turns the switch on and off, based on perceived temperature.

Thermostats and the mathematical description of self-regulating devices (Wiener 1948) are new to this century. These devices trace their ancestry to Watt's steam engine governor. Thermostats are the only self-regulating devices whose operation is visible in the average home (most homes have visible thermostats not only for the furnace control but also in the refrigerator, oven, portable heater, etc.).

The valve theory

I elucidate the valve theory first through interview material from a single informant then present evidence that it is held by a substantial proportion of Americans.

The valve theory was most clearly articulated by Bill, a well-educated man in his thirties. Bill was raised in California but has lived in Michigan for three years. As shown in the following quotation, Bill described the thermostat dial as not just switching on and off, but as controlling the rate of heat flow. (In dialogues, *W* labels my question and *B* labels Bill's response.)

> *W:* What would the system do at 68° versus 85°? How did the numbers on the thermostat dial relate to anything that was going on with the furnace?
>
> *B:* Well, you could feel the heat coming up the vent. There'd be less, less warm air, less hot air at the different setting. I mean – that was clear.

Similarly, in describing the house in which he grew up:

> *B:* I do remember, as a kid, the heat vents were more or less hot to touch – to the hand as a sensor near the vent – at different settings. . . .

When I asked Bill for a description of how the thermostat works, he said he could not describe it technically. However, when I asked him to explain how it works in relation to what he did with it, he immediately explained:

B: I think it's pretty simple really. Um, I assume, um, that there is some kind of linear relationship between where the lever is and the way some kind of heat generating system functions. And, um, that it's like stepping on the gas pedal; that there I have a notion of hydraulics, you know, the harder you push there is, the more fluid gets pushed into the engine, and the more explosions there are, and the faster it goes. And so here, the, the harder or the more you push the lever or twist the lever in - there is a scale which indicates, you know, regular units - the . . . more power the system puts out to generate heat. . . .

Bill's analogy of an automobile gas pedal describes the continuously varying flow of heat he believes he is regulating.

To elicit operational practices, I posed hypothetical situations. Bill's practices were consistent with his theory and his metaphor:

W: Let's say you're in the house and you're cold. . . . Let's say it's a cold day, you feel cold, you want to do something about it.

B: Oh, what I might do is, I might turn the thing up high to get out, a lot of air out fast, then after a little while turn it off or turn it down.

W: Un-huh

B: So there are also, you know, these issues about, um, the rate at which the thing produces heat, the higher the setting is, the more heat that's produced per unit of time, so if you're cold, you want to get warm fast, um, so you turn it up high. Um, my feeling is, my, my kind of Calvinist or Puritan feeling is that that's sinful. That, that really ought to turn it to the setting, the warmth setting which you think you'll eventually be comfortable and just bear the cold until the thing slowly heats up the house to that level.

Although Bill believes that a higher setting would cause the house to heat up faster, he may refrain from doing this because he considers it wanton. Thus, for reasons other than the theory of the thermostat itself, he sometimes operates the device in the same way as someone who holds the feedback theory.

His conceptualization of why the house maintains a steady temperature is radically different from that predicted by the feedback theory.

W: OK, so how would you use the thermostat and, and how would it be different from the way you used that oven?

B: Um, well, I guess you'd find some kind of moderate, steady, steady setting, setting for the thermostat to maintain a comfortable temperature in a steady state.

W: OK, and that would be something intermediate between having it cranked all the way up for heating up quickly, which would be too much, and having it all the way down, which would not be enough?

B: Right, yea.

W: So what, what's this, what's steady state about? You're trying to balance off what against what?

B: Humm. Uh, well I guess basically, the amount of heat that comes into the system has to equal the amount that's somehow disappearing.

In this passage, Bill states that an even temperature is not maintained by the thermostat itself; rather, it is a balance set by the human operator.

The operator adjusts the rate of heat entering the system to equal the amount leaving or dissipating. The operator's balance of energy input against dissipation is also captured by the gas pedal analogy to which Bill referred frequently. When Bill says the thermostat is like a gas pedal, he is using what Gentner (1983) calls analogy or structure mapping – the gas pedal is analogous to the thermostat because they both have the same relations between objects and actions, not because they have similar attributes or appearance.

A person who is attempting to balance heat against dissipation would reasonably change the thermostat setting frequently. The result would be a pattern of many adjustments like that seen in Figure 9.2.

Since our environment contains many more valves than feedback devices, everyone is likely to have a valve theory (applied to water faucets, etc.). People who have a feedback theory will also have a valve theory and will apply the feedback theory to only a small set of devices. To elicit devices Bill saw as similar to thermostats, I suggested that the burner on a gas stove operates like Bill's description of the thermostat; the higher you turn it, the more heat you get. He agreed, so I asked which other devices would be similar:

B: I just flashed to electric mixers. The higher you turn them, the faster they go . . . the harder you push on the gas, the faster the car moves . . . turning on the faucet . . . you can see the water squirting out in greater volume at a greater rate, you know, as the lever is increased to turn it up.

By contrast, he discards on–off controls as different:

B: What other analogies might I think of? Uh, turning on and off the lights just, uh, that's a more binary kind of process.

Bill's device analogies are consistent with his abstract description, his reported operational practices, and the metaphors he uses to describe the thermostat.

Bill recognized that his model of thermostat operation may be different from that of specialists. In fact, early in the interview he described himself as not having any knowledge about thermostats. He thought someone had given him a formal explanation, but he could not remember it. Since he could not reproduce the institutionally sanctioned explanation, he describes himself as "ignorant":

B: Now um, I really am ignorant about the functioning of these devices . . . once or twice, somebody might have described to me how the thermostat operated, but, my reaction at the time was maybe comprehension, but the sense of feeling out of control. And, maybe partly because of anxiety or lack of familiarity with the device, I've since forgotten what I was told.

W: That's fine.

B: Yea, so, this really would be, if I tried speculating on how they worked, it would really be just that.

W: Speculation.
B: Sort of *de novo*.

Bill's denial of a solid understanding here is belied by the other quotations, which show a detailed and complete theory of thermostat operation, including a set of predictions, past perceptions, and operating rules consistent with his theory. Further, his theory is stable enough to resist change. Later in the interview, he hypothesizes a possible second "level of sophistication" that some thermostats might have, in order to explain why his parents' furnace seemed to turn on and off without human intervention:

B: . . . I can imagine the devices at varying levels of sophistication and you'd have this, uh, kind of, feedback arrangement on, that exists for my parents'.
W: Un-huh.
B: Uh, where, uh, you know, it's not the human, the human operator isn't the only person that – the only agent that – turns the system on and off. The system itself is self-regulating. So, hm, in the course of the night, you know, it could turn on and, and off according to some measurement that it's making of the temperature, in the room. And um, um, you know, in my parents' house you could hear that thing going on and off in the course of the night making those irritating, windy sounds.
W: Irritating, windy sounds. This is the drafts you were talking about before.
B: Right. Um, now, I can't remember whether the thermostat in this other house had that self-control, kind of procedure. I don't think it did and I think that might have been one of the reasons why we couldn't leave it on all night.

Bill proposed this partial feedback theory to explain what he could not explain with his valve theory, but he seemed to consider the feedback thermostat (in his parents' house) to be a special case. In discussing my analysis with Bill 7 months later, he described this partial feedback theory as transitory:

B: I didn't have the feedback theory until your questioning forced it upon me . . . I discovered it for the moment, but later forgot it. When I went back to using the thermostat, I probably went back to doing it the same way.

Bill's reported return to the valve theory suggests that folk theory is resistant to change.

Informal data suggest even more that the valve theory is resistant to change. In casual discussions of this material with proponents of the feedback theory, three individuals told me that their spouse turned up the thermostat to heat the house faster, that this practice was ineffective, and that their repeated attempts to convince their spouse of this had failed. Their failures may be attributed to the proselytizers' working to convey an individual belief when they needed to convey an entire theory. Worse, they had to supplant a theory that was already working satisfactorily and that was not explicitly acknowledged as existing.

To summarize the valve theory as described by Bill, the thermostat controls the rate at which the furnace generates heat. People maintain a constant temperature in their houses by adjusting the setting so that the amount of heat coming in just balances the amount being dissipated. Devices that operate similarly include the water faucet and the gas pedal on an automobile. Bill allows that some sophisticated systems may consider temperature and automatically adjust the heat from the furnace. Even though Bill's theory resists change, he devalues his own theory relative to the institutionally sanctioned one. Despite having a fully elaborated conceptualization and complex operating rules, he describes himself as "ignorant about the functioning of these devices."

Is Bill's valve theory unusual? No national survey data exist on this issue, but estimates can be made. Of the 12 informants in my focused interviews, the valve theory was given in full form by 2, and in partial form by at least 3 more; data were indeterminate in some of the more brief interviews. Another study, in Wales, interviewed residents of 38 new thermostatically controlled rural houses. When asked whether a cold house would warm up quicker to the desired level if the thermostat were turned up full, past its normal setting, 62% said it would (O'Sullivan & McGeevor 1982:104). A third study asked 43 college students in Cambridge, Massachusetts, to assume they entered a cold house and wanted it to heat up as quickly as possible. Those who would turn it above the desired temperature for faster heating ranged from 24% to 46%, the percentage varying with previous questions about analogous situations (Gentner & Tenney, unpublished 1983 data). Therefore, from those limited studies I estimate that 25% to 50% of the population of the United States uses at least part of the valve theory. My sense, which I do not yet have formal data to support, is that the majority of the population holds a combination of these two theories.

Functionality of the two theories

In many anthropological studies, it would be nonsensical or impractical to evaluate the functionality of a folk theory. In this study, the domain and the goals of the folk are fairly straightforward. Known scientific theories describe home heating systems, and the major goals of using them are presumably to be comfortable without spending too much money. Thus, the functionality question can be addressed by asking how well each folk theory meets the goals of its users (this approach is advocated in more detail by Rappaport 1979:98; and by Kempton & Lave 1983).

MANAGEMENT EFFORT AND THERMAL COMFORT

The valve theory does rather well in many situations. For example, if one assumes that thermostats do not have feedback mechanisms, a house would become colder when the weather is colder. The corresponding manage-

ment rule is: When it is colder outside, you must turn up the heat. This practice is rationalized by the device model itself. Conversely, with a feedback device model, this adjustment would not seem necessary. In fact, the valve theory leads to correct management, since in many houses infiltration and distribution asymmetries will cool marginal rooms more in cold weather.

A second issue is whether a higher setting provides faster warmup. The feedback theory denies faster warmup because the furnace runs at a constant rate. However, due to human comfort factors and characteristics of interacting systems, a person entering a cold house from outside will not feel warm when the air first reaches the correct temperature.[5] Thus, greater comfort would be realized if the thermostat were set high, to raise the air temperature above normal initially, then returned to the normal setting. Again, the correct action would logically follow from the valve model, but not from the feedback model.

ENERGY USE

The valve theory correctly predicts a third fact of considerable importance to the user: More fuel is consumed at higher settings than at lower ones. The prediction is correct, even if the explanation is wrong (higher fuel use does not occur not because of a valve opening wider but because higher inside temperatures cause more heat loss through the shell of the house). Nevertheless, higher use is a direct prediction of the valve theory, not of the feedback theory. Consequently, some interviews suggest that valve theorists are more likely to believe correctly that night setback saves energy. The following quote illustrates how the informant's husband follows the logic of the feedback theory to an erroneous conclusion:

I: Now, my husband disagrees with me. He, he feels, and he will argue with me long enough, that we do not save any fuel by turning the thermostat up and down. . . . Because he, he feels that by the time you turn it down to 55 and all the objects in the house drops to 55°, and in order to get all the objects in the house back up to 65°, you're going to use more fuel than if you would have left it at 65 and it just kicks in now and then.

This error is due to having the feedback theory without having additional theories of the interacting systems, particularly a theory of heat loss at different indoor temperatures. The feedback theory would work if it were augmented. But the necessary augmentations would complicate the model considerably – perhaps beyond the level of complexity most people are willing to bother learning about home heating. By contrast, if one considers the thermostat to be like a valve, these problems are solved with little effort.

These points favor the valve theory. However, it seems to encourage frequent unneeded adjustments of the thermostat. These adjustments may induce considerable waste of time and human effort. Frequent adjustments

will not necessarily increase energy consumption as long as the thermostat is turned back down as soon as the house becomes warm. If the occupant forgets, energy will be wasted.

THE EXPERT'S PERSPECTIVE

Another problem with the valve theory is that it does not correspond to the mechanism inside the device. Inside, one sees a temperature-activated switch that can be on or off but cannot control the amount of heat from the furnace. This fact will seem a decisive failure to the few technically minded people who might actually look inside, but it is of little consequence for normal use of the thermostat.

Why do heating experts consider the valve theory incorrect when it provides its users with about the same number of useful predictions as the feedback theory? After their training, experts possess a full, institutionally sanctioned theory. This full theory can be arrived at from the feedback theory by simply adding details and adjacent systems. By contrast, arriving from the valve theory requires a conversion – at some point, the learner will say something like, "Oh, I see, it's not a valve, it's an automatic switch." The technical experts will evaluate folk theory from this perspective – not by asking whether it fulfills the need of the folk. But it is the latter criterion on which the anthropologist will rely due to her methodological training, and on which sound public policy must be based.

Change in folk theory

By examining folk theory as it changes, further clues are provided about the consistency between the theory's metaphor and the inferences and practices derived from it. Such data were fortuitously provided in one interview, in which the informant initially held parts of each theory and later shifted predominately to the feedback theory. This is shown in the following series of quotes, which also illustrate the difficulties in definitively identifying a person's theory without an extensive interview.

This informant, Peggy, is a language teacher who grew up in Michigan. In the beginning of the interview, she described the thermostat as sensitive to temperature:

> *P:* I guess, what I always thought was when you turn the, the temperature, you turn the thermostat to 65, the furnace works to keep the room at 65 and then as soon as it's 65, the furnace stops working and then when it starts to get a little bit cold again the furnace will work again. And I think, that the, the temperature on the thermos – I think it keeps it at that temperature in that area. So maybe on the other side of the room, there might be window or a door and it could be draftier over there. But where the thermostat is, it will always be 65.

Peggy is clearly aware of the feedback nature of the thermostat. Correspondingly, when I elicited the list of similar devices, Peggy choose a different set from Bill's:

P: I guess it might be like an oven. You know, when you want to cook something at 350? You turn the oven on to 350 and it, a, the, fire or the electricity or whatever, or the gas, works to keep the temperature at 350 and to not get hotter and to not get colder.

She also mentioned the refrigerator, saying that it has a number or letter for coldness, and the refrigerator is "working to maintain an even temperature"; another example was the dial on the toaster, which selects "lighter or darker."

After these portions of the interview, I was certain that Peggy had a feedback theory. It was thus a surprise when I asked for her operating rules:

W: Let's say it's very cold . . . you come into the house and it's *very* cold, and you want to heat the house up. Let's say you want to heat the house up to 65. What would you do . . .

P: If it's very, very cold?

W: Un-huh.

P: I might turn it up to 70, for maybe 20 minutes, half an hour and then turn it back down to 65 to see if I can get it warmer faster.

W: Uhh [*trying to maintain composure*] You wouldn't turn it to 80 or something, 85?

P: I wouldn't feel comfortable doing that, no.

W: Because of danger, or because of just cost, it would be wasteful, or?

P: Yeah, I think it would be wasteful. I don't know, I just, I, even 70 seems immoral, somehow, you know.

W: Yeah [*laugh*]. Well, I don't consider [it] a moral issue, I don't inject that, I just try to get an idea of what you think would work best for you. Let's, you could take two cases, maybe. In one case, there's no more energy crisis and you don't have to worry about it any more.

P: Yeah, maybe 80.

Of the 12 informants interviewed in depth about the thermostat, Peggy was one of 3 who described the thermostat with feedback theory but nevertheless in practice turned it higher to heat faster. Such complications make it difficult to determine which theory is being used from the answer to a single fixed question (as we might like to do in a survey to estimate national rates of these theories).

In elaborating on this practice, Peggy compares the house thermostat with the oven:

P: But I think people have the general idea, and I guess I do too, that the higher you put it [the house thermostat], the faster and harder it's going to work.

W: Right, the harder it will work.

P: . . . I know the oven, when you turn it on 450, well we have a gas oven, the flame is higher than it is if you turn it on at 200.

During this description of the oven, she hesitates and says "But it might not work that way at all," meaning perhaps turning the house thermostat up further does not make it run faster; she says "It could be either way."

In thinking over the issue, she notes that her immediately previous description of turning the thermostat up to heat the house faster . . .

P: . . . contradicts what I said at the beginning. That a thermos – how a thermostat works, that it works up to a certain point and then when it gets to that point it turns off until, or it goes down until it needs to go on again. So I thought, well if it does that, then if I turn it at 80, it's going to get to 65 after ten minutes. If I turn it on 65, it's going to get to 65 . . . after ten minutes. And if I forget about it [at 80], it's going to keep going up to 80 unless I turn it back.

P: So, . . . I thought that it probably contradicted what I said before, but then I kept thinking about the oven and how I know [*untntelligible*] it gets hotter faster.

W: Un-huh.

P: So I thought, well maybe some furnaces are different.

W: Yeah, yeah.

P: Maybe some are very well regulated and maybe some do just produce a little more heat.

The concrete, observable case of the oven brings Peggy to use the valve theory in practice (whether she is correct about the oven is irrelevant here), but some internal reason seems to draw her to the feedback theory in her abstract description. I asked her how she arrived at her initial description of the thermostat.

P: I don't know. I don't think I learned it from my parents because I never paid much attention to the thermostat. . . . [*later*] Oh, I know, one time when I was living in the same house [with friends] and I lived in one of the bedrooms that didn't have a register. It was an added-on, it was an addition to the house and they, they didn't bother to put, you know, to connect the furnace . . . there was no register or, yeah, so there was a little space heater in there and I know you turned the knob on that space heater, to a certain temperature and then the little, you know, the coils would light up and make a lot of noise, and then when it got to be that temperature, the whole thing would just turn off. And then a few minutes later it came back on.

W: So you could see that happening.

P: I – you could see that happening and feel that happening. And I may have thought, yea, that must be how the furnace, the regular furnace works too. And then maybe from things people said.

This striking example shows how an immediately visible device can display its operation and thus influence folk theory. This experiential background, as Peggy points out, may also have dovetailed with someone's explanation, thereby reinforcing her recollection of both. As a result of integrating this information during the interview, Peggy said that the interview made her realize that turning the setting above the desired temperature was not effective.

Another event that makes system operation highly salient is a change in the type of system. A rural couple who switched from nonthermostatic space heaters to a furnace describe the change:

I: With the other ones, the space heaters, there was just no regulating to it. You know, if the temperature dropped outside, if you didn't wake up and go out and turn it up, it drops, you know, it would cool down. But with, naturally with the thermostatically controlled fuel oil furnace, it would kick on automatically by itself when it got down below that temperature.

The amount of adjustment needed for a true value-controlled system is highly salient. Accordingly, this couple, and another who had grown up with wood heat, had a fully elaborated and consistent feedback theory.

Conclusions

In studying residential heat control, I found that two folk theories were applied to thermostats. Of the two, the feedback theory is more closely related to expert theory.

Home heating, like many other areas of knowledge in our society, has a "correct" set of theories defined by experts and their institutions. Informants who held the valve theory were insecure about it – they denied understanding the device, even when they had complete descriptive models and elaborate procedures for using it. This insecurity has also been manifested on several occasions of giving this paper as a talk. Some questioners seem to be inhibited by feeling that they may have a "wrong" theory and they do not want to be embarrassed by their questions. One might suppose that choice of the correct theory for thermostats concerns straightforward technical facts and presume that the experts must know how thermostats really work – after all, they design them! We have seen, however, that the folk theory endorsed by the experts may not work as well in practical day-to-day application. A theory that is useful for designing thermostats is not guaranteed to be a good theory for using them.

More needs to be known before this research can have practical applications. In earlier work on household methods for measuring energy, my colleagues and I argued that many folk measurement methods are counterproductive and that individuals would benefit if folk methods were made more similar to expert ones (Kempton et al. 1982; Kempton & Montgomery 1982). In the case of folk theory for thermostats, the jury is still out. If people converted from the valve to the feedback model, they would save management effort by not having to adjust the thermostat so often and they would occasionally save energy by not forgetfully leaving it set high. However, widespread conversion to feedback theory would risk eliminating the theoretical rationale for night setback – an immensely larger penalty. A simple valve theory always directly predicts less use from lower settings since the valve is partially shut at lower settings. This prediction of lower use is not made by a simple feedback theory alone, but requires an accompanying theory of heat loss. The problem is seen by the quote on page 233, in which a feedback theorist argued that savings from night setback

of the thermostat would be cancelled by subsequent turning up of the thermostat.

More research is needed, since two problems with the valve theory do argue for conversion. First, the problems with the first order feedback theory can be solved by simply adding on components, whereas problems with the valve model require ad hoc repairs (as in Bill's Calvinism) or replacement of the entire model. A second argument is that when the operation of the system is made visible (either by a miniature model – the space heater – or by system conversion), the folk, on their own, choose feedback theory.

Postscript: thermostat management as an industry

I close with a down-to-earth question: What is thermostat management worth? Although no national data exist on thermostat energy savings, rough estimates can be made. During the 1982 heating year, households in the United States spent $85 billion on direct energy purchases, averaging $1,022 per household (DOE, EIA 1983). Since the 1973 oil embargo, households have decreased their energy use by about 15% (Crane 1984; Williams, Dutt, & Geller 1983), which represents a current savings of $15 billion per year. Heating accounts for roughly half of residential energy cost; since consumers know more conservation methods for heating than for appliances, I estimate that heating accounts for two-thirds of the savings, or $10 billion annually. The only reliable estimate of actual thermostat savings has been made by Fels and Goldberg (1984), who analyzed New Jersey residential gas consumption. By a statistical procedure that compared monthly gas use with weather fluctuations, they were able to separate the effects of thermostat setting from other factors, such as home improvement (e.g., insulation) or more efficient appliances. They estimate that more than half of the natural gas savings were due to lower thermostat settings. If we assume the same proportion applies generally to heating fuels,[6] $5 billion is saved annually due to changes in home thermostat use since the oil embargo. To put this number in perspective, Socal's recent agreement to purchase Gulf for $13 billion was the largest corporate acquisition in history (Cole 1984). With three years of thermostat savings, American households could have outbid Socal and purchased Gulf Oil for themselves.

Although the dollar figure is an approximation, one can safely conclude that thermostat management provides American households with annual savings in the billions. Yet little reliable data link my aggregate national estimate to specific behavioral changes (e.g., nighttime setback versus constant lower settings), or to the cognitive and social systems that generate the behavior. Whatever the cause, increased household thermostat

management now provides disposable income for other spending. Thus, thermostat management can be considered a multibillion dollar cottage industry. Further study of this industry's production methods would seem warranted.

Notes

1. For comments on this paper, I am grateful to Dan Bobrow, Roy D'Andrade, Gautam Dutt, Peter Gladhart, Dedre Gentner, Dorothy Holland, Charlotte Linde, Ann Millard, Bonnie Morrison, William Rittenberg, Jeff Weihl, and an anonymous reviewer for *Cognitive Science*. Other helpful questions were raised following my presentations of this material at University of California, Irvine, the Princeton Conference on Folk Models, Xerox PARC, the MSU Families and Energy Conference, and at Bolt Beranek and Newman, Inc. Unpublished data were kindly provided by Gautam Dutt at Princeton University and Jim Barnett at the National Bureau of Standards (thermostat behavior records); and by Dedre Gentner and Yevette Tenney at BBN (Cambridge survey of college students). This work is supported by the National Science Foundation, under grant BNS-82 10088, and by the Michigan State University Agricultural Experiment Station, as project 3152. This paper is Michigan Agricultural Experiment Station Journal Article No. 11141, and also appears in *Cognitive Science* 10(1):75–90 (1986).
2. DiSessa (1985) argues that the things McCloskey calls single coherent theories are in fact data-driven collections of heterogeneous "phenomenological primitives." These primitives originate in superficial interpretations of reality applied to common situations via recognition. The data in this paper argue for more connectedness than DiSessa sees, although I acknowledge the possibility that the word *theory* conveys more consistency and coherence than is appropriate.
3. Nonrecognition of cognitive variation within a culture, and even within a single family, seems common (Kempton 1981).
4. Although I propose folk theory as an explanation of the pattern in Figure 9.1, many factors contribute to thermostat setting, and frequent shifts could be due to non-folk-theoretical causes such as domestic conflict over desirable setting.
5. This can be demonstrated by a simple thought experiment. On entering a warm building with a point-source of heat (say, a wood stove), a person feels cold although the building is warm. That person will choose to stand near the point source, despite the higher-than-normal temperature. After the person has "warmed up," he or she will choose a normal temperature. In the case of turning the thermostat up on entering a cold house, there appear to be two physical causes: (1) The cold near-body masses – clothing, skin surface, and trapped surface air – are heated more rapidly by warmer ambient temperature; and (2) When air temperature rises but (slower-heating) wall and furniture surfaces are still cold, a person will feel colder than air temperature because of infrared radiation losses. A more complete analysis of these effects would require quantitative analysis of their relative magnitudes and time constants.
6. This figure probably underestimates the thermostat's proportion, since Fels and Goldberg calculated it to be 50% of all gas conservation, whereas I consider it only 50% of heating conservation.

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10
How people construct mental models[1]

Allan Collins & Dedre Gentner

Analogies are powerful ways to understand how things work in a new domain. We think this is because analogies enable people to construct a structure-mapping that carries across the way the components in a system interact. This allows people to create new mental models that they can then run to generate predictions about what should happen in various situations in the real world. This paper shows how analogies can be used to construct models of evaporation and how two subjects used such models to reason about evaporation.

As Lakoff and Johnson (1980) have documented, our language is full of metaphor and analogy. People discuss conversation as a physical transfer: (e.g., "Let's see if I can get this across to you" (Reddy 1979). They analogize marriage to a manufactured object: (e.g., "They had a basic solid foundation in their marriages that could be shaped into something good" (Quinn this volume). They speak of anger as a hot liquid in a container (Lakoff & Kövecses this volume); and they describe their home thermostat as analogous to the accelerator on a car (Kempton this volume).

Why are analogies so common? What exactly are they doing for us? We believe people use them to create generative mental models, models they can use to arrive at new inferences. In this paper, we first discuss the general notion of a generative mental model, using three examples of artificial intelligence models of qualitative physics; second, we lay out the analogy hypothesis of the paper, which we illustrate in terms of the component analogies that enter into mental models of evaporation; and finally, we describe how two subjects used these analogies in reasoning about evaporation.

The notion of running a generative model can be illustrated by an example from Waltz (1981). People hearing "The dachshund bit the mailman on the nose" spontaneously imagine scenarios such as the dachshund standing on a ledge, or the mailman bending down to pet the dachshund. Similarly, if you try to answer the question, "How far can you throw a potato chip?" your thought processes may have the feel of a mental simulation. Examples such as these suggest that simulation and generative inference are integral to language understanding (Waltz 1981). However, such

Table 10.1. *Examples of liquids in different states (after Hayes 1985)*

	Supported on surface	Supported in space	Unsupported
Still, in Bulk	Liquid on a wet surface	Liquid in a container	—
Moving, in Bulk	Liquid flowing on a surface, e.g., a roof	Liquid pumped in pipe	Liquid pouring from a container
Still, Divided	Dew drops on a surface	Mist filling a valley?	Cloud
Moving, Divided	Raindrops on a window	Mist rolling down a valley?	Rain

imagistic descriptions have a magical quality, which we try to resolve in terms of the formalisms of mental models research.

Inference and qualitative simulation become possible when the internal structure of a model is specified in terms of connections between components whose input–output functions are known. Hayes (1985) and de Kleer (1977) have independently tried to characterize how people decompose different systems in order to reason about the world. Both came up with tacit partitions of the world in order to simulate what will happen in a particular situation. Hayes attacked the problem of how people reason about liquids and de Kleer how they reason about sliding objects. Forbus (1981) later extended the de Kleer analysis to bouncing balls moving through two dimensions. Understanding these ideas is central to our argument about the role of analogies in constructing mental models, so we briefly review the way these three authors partition the world in order to construct qualitative simulations.

Hayes (1985) partitions the possible states of liquids into a space with three dimensions: (1) whether the liquid is moving or still; (2) whether it is in bulk or divided (e.g., a lake vs. mist); and (3) whether it is on a surface, supported in space, or unsupported. For example, rain is liquid that is moving, divided, and unsupported, whereas pouring liquid is moving, in bulk, and unsupported. Spilled liquid is still, in bulk, and on a surface except when it is first moving on the surface. Hayes gives examples for most of the possible states in these three dimensions (see Table 10.1), except some that are impossible (e.g., bulk liquid that is both still and unsupported).

Hayes shows how one can construct transitions between different liquid states using a small number of possible transition types in order to construct "a history" of some event. He illustrates this with the example of pouring milk from a cup onto a table. Initially, the milk is contained in

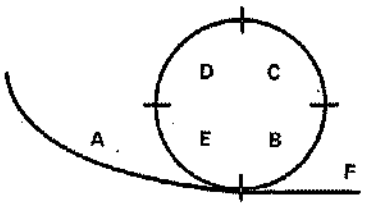

Figure 10.1. Partitioning of loop-the-loop track (after de Kleer 1977)

bulk in the cup as it is tipped. When the surface reaches the lip of the cup, there begins a falling from the cup to the table, which extends through time until the cup is empty, except for the wetness on its surface. Beginning at the point when the falling liquid hits the table, there is a spreading of the liquid on the table top until the pool of liquid reaches the table edge. At that point, another falling starts along the length of the edge that the spreading reaches. This falling continues until there is only a wetness on the table top. The falling also initiates a spreading on the floor, which lasts until there is a nonmoving wetness covering an area of the floor. Because people can construct this kind of history out of their knowledge of liquid states and the transitions between them, they can simulate what will happen if you pour a cup of milk on a table. Alternatively, if they find liquid on the floor and table, they can imagine how it got there.

In the roller coaster world that de Kleer (1977) has analyzed, he partitions the kinds of track a ball might roll along into concave, convex, and straight tracks. de Kleer uses a small number of allowable transitions – for example, slide forward, slide back, and fall – to construct a simulation of the behavior of a ball on a loop-the-loop track such as shown in Figure 10.1. In the figure, the track starts in segment *A* and continues up and around through segments *B*, *C*, *D*, *E*, and *F*.

By constructing all possible continuations for a given input, one forms a directed graph, which de Kleer calls the *envisionment*. Each alternative transition is a branch that can be followed out. Suppose one starts a ball rolling at the end of segment *A*. It will slide forward to segment *B*. From *B*, it can slide forward into *C* or slide back to *A*. If a slide forward occurs, then the ball can either slide forward into *D* or fall. Sliding backward from *B* into *A* leads to oscillation.

The same sort of branching of possible states occurs in Hayes's physics of liquids. For example, in the milk-pouring episode, the spread of milk on the table may never reach the edge, in which case the episode ends with wetness on the table and in the cup. Thus, using qualitative models can allow a person to generate all the different possible events that might happen.

Forbus (1981) has made a similar analysis of bouncing balls in two-dimensional space. To do this, he developed a vocabulary for partition-

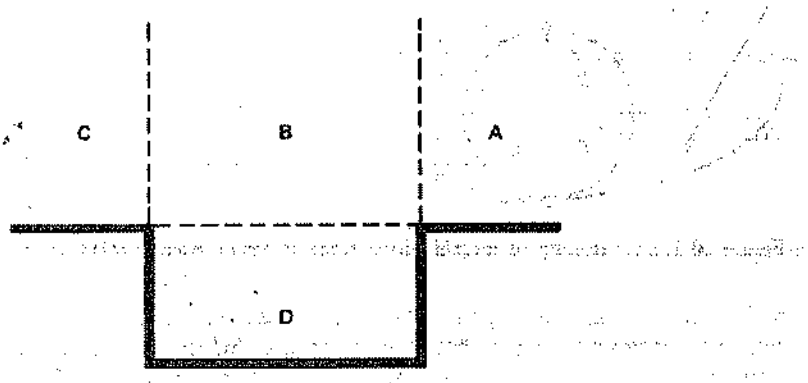

Figure 10.2. Partitioning of two-dimensional space above a well (after Forbus)

ing space into places in which significantly different behaviors can occur. In this model, the qualitative state of an object at a given moment consists of a place, an activity (e.g.: *fly* or *collide*), and a direction (e.g., *left and up*). As in the other two models discussed, simulation rules specify the allowable transitions between qualitative states. Figure 10.2 shows his example of how a space above a well would be partitioned into regions.

Table 10.2 shows the allowable state transitions for a ball moving in a region. The table shows the region in which the ball will be next (including "same") and its next direction. What the ball will do next – its next activity – depends on the kind of place it enters next. If the next place is a surface, the next activity is a collision; otherwise, the next activity will be a continuation of its present motion. If we begin with a ball in region *A* that is headed left and down, it can either go downward and collide with the surface below *A*, or go into the middle region *B*, where its direction will also be left and down. From *B*, going left and down, it can either go into the lower region *D* or into the left region *C*, still heading left and down. If it goes into *D*, it can collide either with the left side wall or with the bottom. Collisions with vertical walls reverse the left–right direction; collisions with horizontal walls reverse the up–down direction. As should be evident, it is possible to imagine a number of different paths for the ball to travel, only some of which end up with the ball caught in the well.

The point of these examples is that they illustrate how people might be able to construct mental models that have the introspective feel of manipulating images (Kosslyn 1980). Put in the terms of Hayes, de Kleer, and Forbus, there is no magic to starting a ball moving or a liquid flowing mentally and seeing what happens. You do not have to know in advance what happens, and you do not have to store a mental moving picture of the events. Indeed, you may decide that a particular candidate event

Table 10.2. *Transition rules for a ball moving from region to region in Forbus's (1981) bouncing ball world showing next place and next direction for the case of a ball moving in some region of space*

Direction	Next Place	Next Direction
none	same	D
D	down	D
LD	down	LD
	left	LD
L	same	LD
LU	same	L
	left	L
	left	LU
	up	LU
U	same	D
	up	U
RU	same	R
	right	R
	right	RU
	up	RU
R	same	RD
RD	right	RD
	down	RD

Note: Regions are represented by words and directions by capital letters. Each line represents a next-place, next-direction pair.

could not ever have occurred. All you have to know is what inputs lead to what outputs for each state transition and how those kinds of states are connected together.

The analogy hypothesis

It should by now be clear that qualitative-state models provide a powerful, versatile way for people to reason about familiar domains in which the states and transitions are known. But what happens when people want to go beyond familiar physical situations and reason about domains, such as evaporation, in which the states and transitions may be unfamiliar or even invisible? Here, we come to the central proposal of this paper, the analogy hypothesis. According to this hypothesis, a major way in which people reason about unfamiliar domains is through analogical mappings. They use analogies to map the set of transition rules from a known domain

(the base) into the new domain (the target), thereby constructing a mental model that can generate inferences in the target domain. Any system whose transition rules are reasonably well specified can serve as an analogical model for understanding a new system (Collins & Gentner, 1982; Gentner 1982).

So far, this analogy hypothesis is a special case of Gentner's (1982; 1983; Gentner & Gentner 1983) more general claim that analogy is a mapping of structural relations from a base domain to a target domain that allows people to carry across inferences from the base to the target. To construct a mental model in a new domain, a particularly powerful set of relations to map across is the transition rules between states. These rules allow one to generate inferences and create simulations in the target domain analogous to the ones that can be performed in the base domain.

However, the situation is often more complicated. Often, no one base domain seems to provide an adequate analogy for all the phenomena in the target domain. In these cases, we find that people partition the target system into a set of component models, each mapped analogically from a different base system. As we demonstrate, people vary greatly in the degree to which they connect these component models into a consistent whole. An extreme case of inconsistency is the *pastiche model,* in which a target domain model is given by a large number of minianalogies, each covering only a small part of the domain and each somewhat inconsistent with the others. At the other extreme, some people connect together their component models into a consistent overall model. Thus, they can combine the results of their mappings to make predictions about how the overall target system will behave.

The remainder of this paper illustrates the analogy hypothesis by showing how analogies can be used to construct different versions of a molecular model of evaporation (see Stevens & Collins 1980). We then show how two subjects used these analogies to reason about evaporation.

A molecular model of evaporation involves a set of component subprocesses:

1. How molecules behave in the water
2. How molecules escape from the water to the air
3. How molecules behave in the air
4. How molecules return to the water from the air
5. How molecules go from liquid to vapor, and vice versa

Notice that this analysis bears some similarity to the Forbus analysis of bouncing balls. There are two regions, the water and the air, and the transitions (i.e., escape and return) between them. The behavior of the molecules in the water and air describes the transitions that keep the molecules in the same region. There is also a second kind of transition, from liquid to vapor and vice versa. Thus, there are two types of state transi-

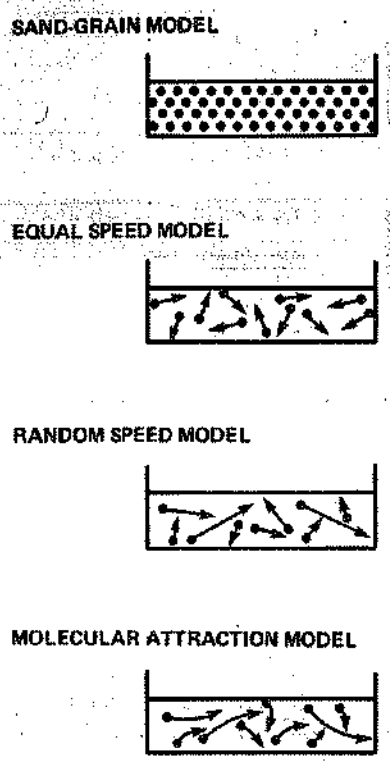

Figure 10.3. Component models of the behavior of molecules in water

tions that occur for evaporation processes: from one region to another, and from one phase to another.

We contrast different possible views of each of these component processes. Some of these views we have clearly identified in subjects' protocols; others are only alluded to. Where the protocols were unclear as to which of two alternative models was implied, we have generally included both models. This is not an exhaustive set of all possible component models but only of those that were suggested in subjects' protocols. However, they do show how people can derive their views from different analogies.

BEHAVIOR IN WATER

Figure 10.3 shows four different analogical models that subjects might have of how molecules behave in water. The first view we call the *sand-grain model* – the molecules just sit there like grains of sand, moving and slipping when something pushes on them. The temperature of the water

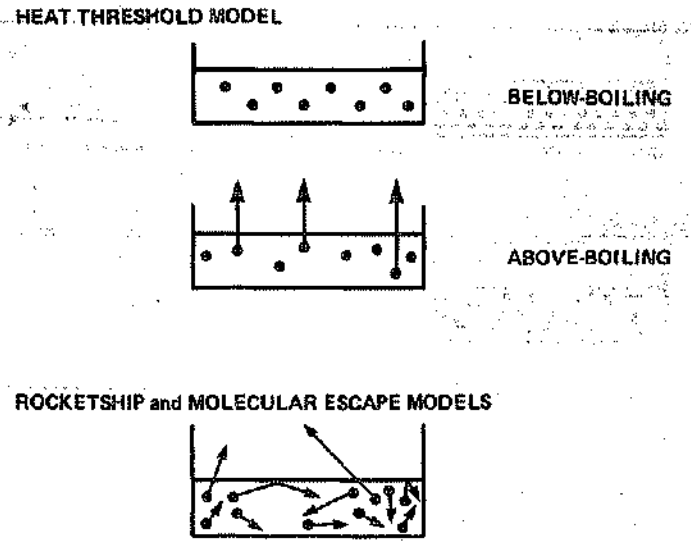

Figure 10.4. Component models of how water molecules escape from water to air

is the average temperature of the individual molecules. This is a very primitive model. The next two views assume that the molecules are bouncing around in the water like billiard balls in random directions (Collins & Gentner 1983). In both views, the speed of the molecules reflects the temperature of the water. The difference is that in one version – the *equal speed model* – all the molecules are moving at the same speed. The other version is a *random speed model,* which allows for differences in speed for different particles. On this view, temperature reflects the average speed of a collection of molecules. The fourth view, called the *molecular attraction model,* incorporates attraction between molecules into the random speed model. In it, molecules move around randomly, but their paths are highly constrained by the attractive (or repulsive) electrical forces between molecules. This view is essentially correct.

ESCAPE FROM THE WATER

Figure 10.4 shows three possible component models for escape (pictorially, two are the same). What we labeled the *heat-threshold* model is a threshold view of escape: The molecules have to reach some temperature, such as the boiling point of the liquid, and then they pop out of the liquid, the way popcorn pops out of the pan when it is heated. The remaining two models focus on molecular velocity, rather than on the incorrect notion of molecular temperature. The *rocketship model* is based on the assumption that the molecules in the water are moving in random direc-

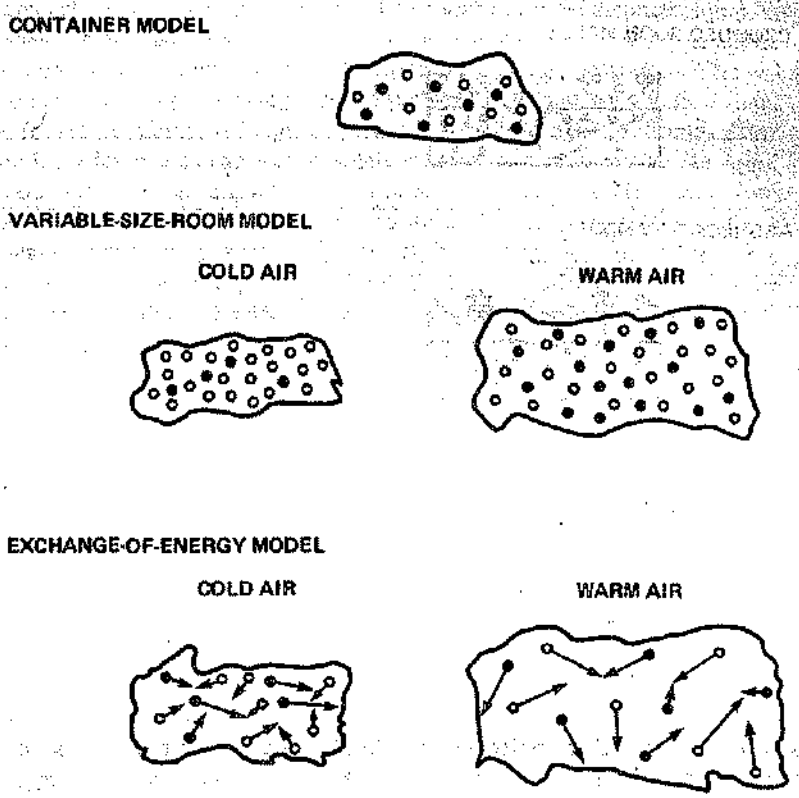

Figure 10.5. Component models of the behavior of water molecules in air (water molecules are filled circles, air molecules are open circles)

tions. To escape from the water (like a rocketship from the earth), a molecule must have an initial velocity in the vertical direction sufficient to escape from gravity. The third view, the *molecular escape model,* posits that the initial velocity must be great enough to escape from the molecular attraction of the other molecules. Both latter models are in part correct, but the major effect is due to the molecular attraction of the water.

BEHAVIOR IN THE AIR

Three component models of how the water molecules behave in the air are depicted in Figure 10.5. The *container model* posits that the air holds water molecules and air molecules mixed together until it is filled up (at 100% humidity). The *variable-size-room model* is a refinement of the container model to account for the fact that warm air holds more moisture than cold air. In this model, molecules in warm air are further apart and

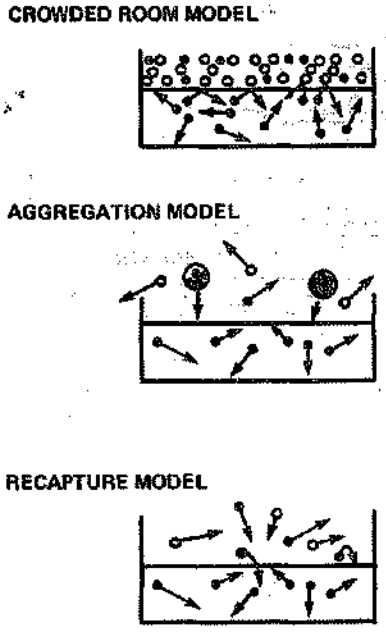

Figure 10.6. Component models of how water molecules return from air to water

so are less dense than molecules in cold air. That leaves more space to put water molecules in warm air than in cold air. In the *exchange-of-energy model*, the chief reason that cold air holds less moisture than warm air is that its air molecules are less energetic. When water molecules in the air collide with air molecules, they are more likely to give up energy if the air is cold (and hence less energetic) than if it is warm. If the water molecules become less energetic, they are more easily captured by the molecular attraction of other water molecules (or a nucleus particle) in the air. When enough water molecules aggregate, they will precipitate. This latter view is essentially correct.[2]

RETURN TO THE WATER

Figure 10.6 shows three models of how water molecules return to the water. The *crowded room model* assumes that when all the space in the air is filled, no more water molecules can get in. This is more a prevention-of-escape model than a return model. The *aggregation model* assumes that water molecules move around in the air until they encounter a nucleus or particle (which could be another water molecule) around which water accumulates. The less energetic the molecule, the more likely it is to be caught by the molecular attraction of the particle. As these particles accumulate water, gravitational forces overcome the random movement of

the particles and they precipitate. The *recapture model* assumes that particles are attracted by the surface of the water (or other surfaces). The less energy they have, the more likely they are to be recaptured. The action in this view takes place near the surface, unlike the aggregation view. A fourth possibility is to ignore return processes altogether. Some of our subjects described evaporation solely in terms of water leaving the liquid state and appeared unaware of any need to consider the other direction, of water vapor returning to the liquid state. Both the aggregation and the recapture models are essentially correct, but the aggregation model takes place over a long time period with relatively high humidities, whereas the recapture model is applicable in any situation in which evaporation is occurring.

LIQUID–VAPOR TRANSITION

Figure 10.7 shows four different views we have identified for the transition from liquid to vapor and from vapor to liquid. One view, *the coterminus model,* is that the transition occurs when the molecules leave the

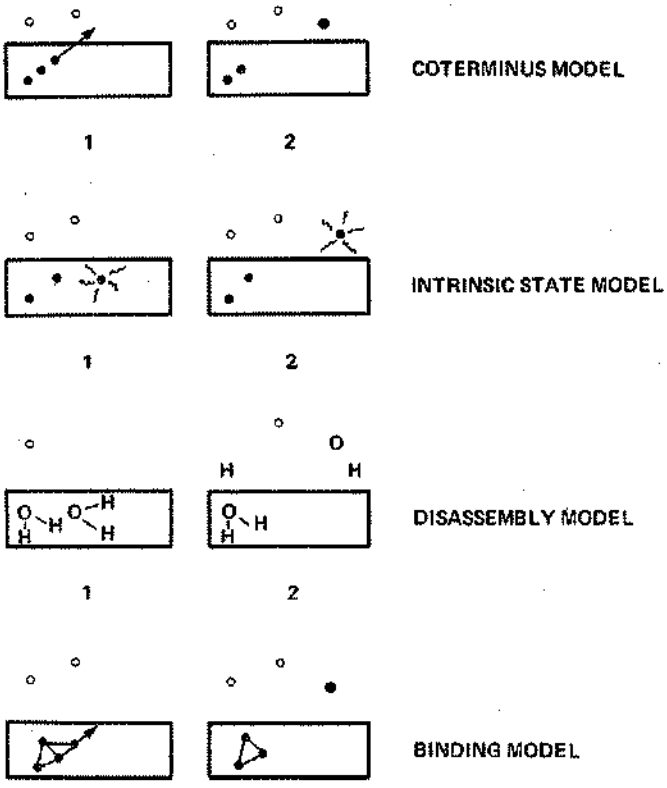

Figure 10.7. Component models of the liquid–vapor transition

water and escape to the air, and vice versa. In this view, the two transitions, between water and air, and between liquid and vapor, are the same transition. In other words, whether a molecule is in the vapor or liquid state depends solely on the location: All molecules beneath the surface of the water are liquid, and all molecules above the surface of the water are vapor. A second view, *the intrinsic state model,* treats the liquid or gas state as an intrinsic property of the molecule. If the molecule becomes hot enough, it changes from liquid to vapor, and if it becomes cold enough, it changes from vapor to liquid. Location is correlated with state in that molecules in the vapor state tend to move into the air, whereas molecules in the liquid state remain in the water. A third view, *the disassembly model,* is based on a little chemistry: In it, liquid water is thought of as made up of molecules of H_2O, whereas the hydrogen and oxygen are thought to be separated in water vapor. The expert view, which we call the *binding model,* is based on molecular attraction: Water molecules in the liquid state are partially bound together by electrical attraction of the neighboring molecules, whereas molecules in the gaseous state bounce around rather freely. The bubbles in a boiling pan of water are thus water molecules that have broken free of each other to create a small volume of water vapor, and clouds and mist are microscopic droplets of liquid water that have condensed but are suspended in the air.

COMBINING COMPONENT MODELS

Table 10.3 summarizes all the component models described here. Subjects can combine these component models in different ways. The following section shows two subjects, *RS* and *PC,* who had different models. *RS* had a model constructed from the random speed model of water, the rocketship or molecular escape model of escape, the variable-size-room-model of the air, the crowded room model of return, and the coterminus model of the liquid–vapor transition. The other subject, *PC,* had a less consistent and less stable model of evaporation. His view included something like the heat-threshold model of escape, the container model of the air, the recapture model of return, and the intrinsic state model of the liquid–vapor transition. In contrast, as we have indicated, the expert view is made up of the molecular attraction model of water, the rocketship and molecular escape models of escape, the exchange-of-energy model of the air, the aggregation and recapture models of return, and the binding model of the liquid–vapor transition.

An experiment on mental models

Four subjects were asked eight questions (shown in Table 10.4) about evaporation. They were asked to explain their reasoning on each question. The

Table 10.3. *Component models of evaporation*

Models of Water
Sand-Grain Model
Equal Speed Model
Random Speed Model
Molecular Attraction Model
Models of Escape
Heat-Threshold Model
Rocketship Model
Molecular Escape Model
Models of Air
Container Model
Variable-Size-Room Model
Exchange-Of-Energy Model
Models of Return
Crowded Room Model
Aggregation Model
Recapture Model
Models of Liquid–Vapor Transition
Coterminus Model
Intrinsic State Model
Disassembly Model
Binding Model

Table 10.4. *Evaporation questions*

Question 1. Which is heavier, a quart container full of water or a quart container full of steam?
Question 2. Why can you see your breath on a cold day?
Question 3. If you put a thin layer of oil on a lake, would you increase, decrease, or cause no change in the rate of evaporation from the lake?
Question 4. Which will evaporate faster, a pan of hot water placed in the refrigerator or the same pan left at room temperature and why?
Question 5. Does evaporation affect water temperature, and if so how? Why or why not?
Question 6. If you wanted to compress some water vapor into a smaller space but keep the pressure constant, what would you do? Why?
Question 7. On a hot humid day, you must sweat *more* or *less* or *the same amount* as on a hot dry day at the same temperature. Why?
Question 8. If you had two glasses of water sealed in an air-tight container, and one was half filled with pure water, while the other half was filled with salt water, what would you expect to happen after a long period of time (say about a month)? Why?

subjects were two male Harvard undergraduates, one female secretary with a college degree, and one female doctoral student in history. All were reasonably intelligent but were novices about evaporation processes. Our analysis centers on the first two subjects because they best illustrate the kind of reasoning we see in novice subjects.

ANALYSIS OF SUBJECT *RS*'S MODEL OF EVAPORATION PROCESSES

The first subject (*RS*) has a model of evaporation processes based on (1) the random speed model of water, (2) some variation of either the rocketship or the molecular escape model of escape, (3) the variable-size-room model of the air, (4) the crowded room model of return, and (5) the coterminus model of the liquid–vapor transition. His view includes notions of the energy needed for molecules to escape from a body of water and the difficulty water molecules have in entering a cold air mass because of the higher density. He seems to share a common misconception with the second subject: namely, that visible clouds (such as one sees coming out of a boiling kettle) are made up of water vapor rather than recondensed liquid water. This misconception forced him into several wrong explanations, even though his reasoning powers are impressive. As we show, he seems to check out his reasoning by running different models of evaporation processes (Stevens & Collins 1980) and to try to account for any differences in results when he finds them.

We present the most relevant portions of his responses to three of the questions and our analysis of his reasoning processes (omitted portions of his response are indicated by dots).

Q2: On a cold day you can see your breath. Why?

RS: I think again this is a function of the water content of your breath that you are breathing out. On a colder day it makes what would normally be an invisible gaseous expansion of your breath (or whatever), it makes it more dense. The cold temperature causes the water molecules to be more dense and that in turn makes it visible relative to the surrounding gases or relative to what your breath would be on a warmer day, when you don't get that cold effect causing the water content to be more dense. . . . So I guess I will stick with that original thinking process that it is the surrounding cold air – that the cold air surrounding your expired breath causes the breath itself (which has a high water content and well I guess carbon dioxide and whatever else a human being expels when you breathe out), causes the entire gaseous matter to become more dense and as a consequence become visible relative to the surrounding air.

What in fact happens on a cold day is that the invisible water vapor in one's breath condenses, because it is rapidly cooled. This condensed liquid water is visible as clouds or mist. However, the subject did not know that the clouds were liquid rather than water vapor, since he seems to think of water molecules in the air as vapor by definition (i.e., the coterminus model), so he needed to find some other account of what happens. For

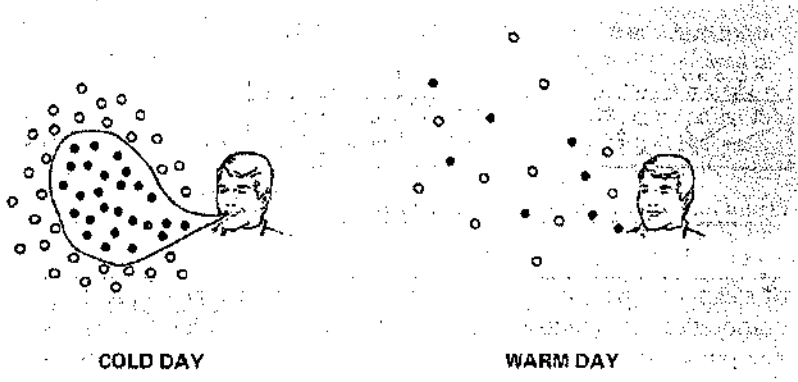

Figure 10.8. *RS*'s model of why you see your breath on a cold day

that, he turned to his knowledge that cold air masses are more dense than warm air masses – his protocol includes a clear statement of the variable-size-room model of the air. Our depiction of the process he imagined is shown in Figure 10.8.

What his view seems to involve is a vapor-filled gas cloud being emitted from a person's mouth. On a cold day, the surrounding air cools the emitted breath, causing it to compact into a small visible cloud. The denser the breath, the more visible it is. This latter inference has its analogue with smoke or mist: The more densely packed they are, the more visible they are. In fact, as the breath disperses, the particles become less visible. This suggests that the subject may be invoking an analogy, not explicitly mentioned, to the behavior of smoke or mist in constructing his model.

The next protocol segment clearly illustrates his belief in the variable-size-room model of the air and the crowded room model of return.

Q4: Which will evaporate faster, a pan of hot water placed in the refrigerator or the same pan left at room temperature? Why?

RS: When I first read that question, my initial impression, that putting a pan of hot water in the refrigerator you suddenly have these clouds of vapor in it, threw me off for a second. I was thinking in terms of there is a lot of evaporation. Well I guess, as I thought through it more, I was thinking that it was not an indication of more evaporation, but it was just (let us say) the same evaporation. Immediately when you put it in anyway, it was more visible. Ahmm, as I think through it now, my belief is that it would evaporate less than the same pan left standing at room temperature and my reasoning there is that the air in the refrigerator is going to be relatively dense relative to the room temperature air, because at a colder temperature again its molecules are closer together and that in effect leaves less room to allow the molecules from the hot water to join the air. . . .

Here, the subject first simulates what happens at the macroscopic level when you put a pan of hot water in the refrigerator. He imagines clouds

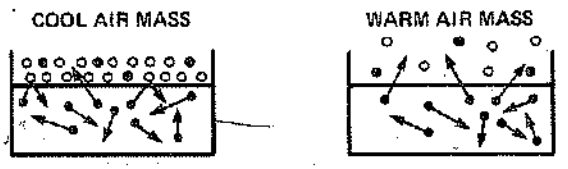

Figure 10.9. *RS*'s model of evaporation from a hot pan of water in the refrigerator

of steam coming out of the pan and initially thinks there must be more evaporation. It is unlikely he would ever have seen what happens when you put a pan of hot water in a refrigerator. He probably constructed this process from some analogous situation(s), such as warm breath on a cold day, running hot water in a cold room, or mist rising off a lake, for example. He is correct about the visible clouds of vapor, but as he concluded later, these clouds do not represent more evaporation. In fact, they represent condensation of the evaporated moisture (which he did not know).

This subject frequently considers different perspectives on a question. Thus, he did not stop with his macroscopic analysis; he also simulated what would happen at a microscopic level. Figure 10.9 shows his view of why cold air leads to less evaporation. It is a clear statement of what we have called the crowded room model. There is not enough space, so some of the water molecules bounce back into the water, as shown in the picture, whereas they do not when the air is warm. This is an incorrect model that *RS* probably constructed on his own. However, it leads to a correct prediction in this case.

The last protocol segment shows *RS* following three different lines of reasoning:

Q5: Does evaporation affect water temperature? If so, in what way, and why?

RS: . . . My initial impression is that it doesn't. It does not affect the water temperature. The surfaces of that water, the exterior surfaces of that water are in contact with air or some other gaseous state, which allow molecules from the water to evaporate into that other gaseous substance. So I guess I don't see where the loss of water molecules would affect the water temperature.

In a way, however, I guess those water molecules that do leave the surface of the water are those that have the highest amounts of energy. I mean, they can actually break free of the rest of the water molecules and go out into the air. Now if they have a, if they are the ones with the most energy, I guess generally heat is what will energize molecules, then that would lead me to believe that maybe, although it may not be measurable, maybe with sophisticated instruments it is, but maybe it would be measurable after your most energetic molecules have left the greater body of water. Those that remain are less energetic and therefore their temperature perhaps is less than when all of the molecules that have already left or were a part of the whole. So I guess that has led me into a circle to perhaps change my initial response – maybe now I could im-

agine where even if not measurable because of a lack of a sensitive enough instrument, maybe my logic or nonlogic (whichever the case may be) has allowed me to believe that maybe there is an effect on the water temperature. So I feel pretty good about it . . . . I guess even the original model with the sun striking the surface of water, that I thought initially, threw me off. Maybe that is accurate too, because the sun's rays certainly don't go down to the bottom. So I guess it depends how deep we are talking, of course. But it would penetrate only so far into the surface of the lake and energize those layers that are at the top surface of the lake or water, whatever the body of water is. So those top layers would then be more energized than deeper layers, and it would obviously be more able to evaporate off. As they evaporate off, assuming conditions are constant and you have got a situation where the succeeding layers get struck by the same heat energy, in this case the sun, from the sun. And they become as the preceding layers were, they become energized and then go off. You are left with less and less water, where a surface is at a given temperature and the rest is at a lower temperature, but your volume is less. So therefore it sounds like again, I am getting to the point where the average temperature would increase, ahmn, because you have less volume, but the surface is at a higher energy level then as a percentage of the whole.

Initially, he cannot think of any way in which evaporation affects the temperature of the water and starts to conclude that there is no effect. This is a lack-of-knowledge inference, that we discuss elsewhere (Collins 1978; Gentner & Collins 1981).

Then, based on the random speed model of water and either the rocketship or molecular escape model of escape (which make the same prediction here), he infers that the higher energy molecules are the ones that will escape, leaving behind molecules with less energy. This, he infers correctly, will cool the water. Said in another way, molecules headed up from the surface with less energy will not escape, whereas those with more energy will escape. This is a subtle inference that follows directly from the rocketship and molecular escape models. Notice he does not have the misconception that all molecules in the water are moving at the same speed (i.e., the equal speed model). His reasoning depends crucially on variation in speed (i.e., the random speed model).

Later in his response, however, he comes up with an argument that leads to a conclusion opposite to the one above. He realizes that as water evaporates away, there is less water left for the sun to heat. Thus, given a fixed input of energy, the temperature of the water will rise. Why does he adopt this line of reasoning, given that nothing in the question supposed there was any further input of energy? *RS* seems here to be considering a canonical example of evaporation: the sun's warming a lake. Under these conditions, the temperature of the remaining water will indeed rise.

Here, two generative models come into conflict. The first view is based on a microscopic model of molecules escaping. The second view is based on layers of water evaporating, leaving behind less water to be heated by

the sun. As in the previous protocol, the subject worked on the problem from different viewpoints; but in this case, two opposing conclusions seemed correct and he did not know how to choose between them.

We have tried to show how *RS* drew on a set of underlying component models to construct his molecular model of evaporation and how he used his model to find answers to novel questions. Based on this model, *RS* was able to deal quite successfully with the eight questions (he gave essentially correct answers on seven of eight questions). Nevertheless, his model was incorrect in the ways we have described.

ANALYSIS OF SUBJECT *PC*'S MODEL OF EVAPORATION PROCESSES

The second subject, *PC* had many more difficulties in dealing with these questions. His view was much less coherent. He relied frequently on local analogies to phenomena he had observed or things he had heard about, shifting among them without checking their consistency. This shifting made it difficult to ascertain his models, especially his model of water itself. However, most of his responses suggest that he combined (1) the sand-grain model of water, (2) the heat-threshold model of escape, (3) the container model of the air, (4) the recapture model of return, and (5) the intrinsic state model of the liquid–vapor transition. What is most striking about his view is how he treats heat as an intrinsic property of individual molecules rather than as a property of aggregates of molecules, as experts do.

The first protocol shows *PC*'s response to question two:

Q2: On a cold day you can see your breath; why?

PC: The reason is because the air that you breathe, or rather the air that you should breathe out, comes from your body and is hot air. The air which surrounds your body, because it is a cold day, will be cold air. When the hot air that you breathe meets with the cold air of the atmosphere, it will tend to vaporize almost like steam from a kettle, which of course, can be seen. Thus unlike on a hot day, when there is hot air around you and the hot air that you breathe are the same temperature, roughly, you cannot see your breath because the steam will not be formed, but on a cold day because of the variation in the temperatures and the vaporization of your breath, you can see when you are breathing. This phenomenon would not occur on a hot day because of the similarity in temperature.

This response would be correct as far as it goes if the words *vaporize* and *vaporization* were replaced by the words *condense* and *condensation*. This could be a simple lexical confusion, but other answers suggest it is a conceptual confusion (i.e., he really does think that the visible cloud formed is vapor). One piece of evidence for this belief occurs in answer to question four, where he refers to "the water which has already condensed in the refrigerator" (see below), suggesting he does understand the

distinction between vaporizing and condensing. Furthermore, it is a common misconception to think of a cloud of steam as water vapor, rather than recondensed liquid water. His response suggests he does not have a coterminus model of the liquid–vapor transition, as *RS* had, since he sees the transition occurring in the air. Rather, he appears to have constructed a version of the intrinsic state model, where the transition depends on a temperature difference between the air and the liquid water.

His analysis relies on an analogy to a core observation he has seen many times – steam from a kettle. To solve the problem, he has to find some factor in common between one's breath on a cold day and steam from the kettle that is different from one's breath on a warm day. The factor he comes up with is the temperature difference. Boiling water from a kettle is much warmer than room air. Likewise, warm breath is much warmer than air on a cold day. But warm breath is about the same temperature as air on a warm day. Since he believes that steam is vaporized water, he therefore concludes that the temperature difference must somehow cause vaporization of water. He does not push his analysis down to a microscopic level, as did *RS*, to account for how this might be. Instead, he stops with identifying the analogous factor in the two situations.

PC's response to the fourth question shows some of the conceptual problems he has:

Q4: Does a pan of hot water in the refrigerator evaporate more, less, or the same amount as the same pan left standing at room temperature? Why?

PC: Hmmmm. Hot water, when it meets with – wait a second. Hot water will only evaporate if it is sufficiently heated. By placing the hot water in a refrigerator you are not heating it, you are cooling it, and in fact the reverse process will occur. That is, the water will decrease in temperature and the refrigerator's temperature itself will also decrease. Not only that, but also the water which has already condensed in the refrigerator, because of the heat from the hot water when you put it in the refrigerator, will go into water itself because of the difference in the temperatures. To sum up, the pan of water in the refrigerator will not evaporate at the same rate, but will evaporate at a lesser rate than the same pan left standing at room temperature for the above reason.

This question came soon after the question about breath on a cold day, and *PC* starts out answering the same way, "Hot water, when it meets with – ." This line of reasoning would conclude "the cold air, vaporizes to produce clouds of steam, and so there is more evaporation" just as *RS* has at first imagined and *PC* had argued in response to question two. But *PC* aborted that line of reasoning, whereas *RS* pursued it and ruled it out as incorrect.

The next sentence reveals *PC*'s heat-threshold model of escape: that the temperature of the water has to be sufficiently high (presumably boiling) for evaporation to occur. Sometimes in his answers, *PC* invoked this heat-threshold notion, and other times he violated it.

In answer to the question, *PC* concludes that evaporation will decrease

for two reasons. First, the water in the pan will cool, and hence evaporate less or not at all. Second, the water that has condensed in the refrigerator will tend to "return to the pan of water." Both ideas are essentially correct, but there are several incorrect statements associated with the latter argument. One is that the refrigerator's temperature will decrease (just like the water's temperature) because a warm pan of water is put in it – the opposite is in fact true. Then he seems to conclude that the warm temperature of the water will cause condensation because of the temperature difference with the air: a kind of inverse process from the one he argued for in response to question two. In fact, the warmth from the pan of water will tend to reduce condensation.

Nowhere in this or other answers does he regard the air as anything other than a passive container for water and air molecules – he does not mention anything like the variable-room-size model that *RS* described, or the exchange-of-energy model that experts hold. In fact, he seems unaware that cooler air holds less moisture than warm air. However, he does seem to have a notion in this and other answers that molecules from the air will return to the water. This notion seems to depend on what he calls "condensation" in this answer, but not so clearly in other statements he makes. We have characterized this as a recapture model of return, rather than an aggregation model. Even though he seems to say that recapture must be preceded by "condensation," it is not clear that his "condensation" involves aggregation of molecules, as in the expert model. Rather, in keeping with his intrinsic state model of the vapor–liquid transition, "condensation" may be a change in state that occurs individually to each molecule.

PC's answer to the sixth question provides the clearest example of his view of heat as an intrinsic property:

Q6: What would you do if you want to compress some water vapor into a smaller space but keep the pressure constant?

PC: Hot air rises. Vapor is air, ok. Therefore, if you have a greater amount of vapor and you want to compress it, all you do is you heat the vapor so that by heating it, one will be causing the molecules to react faster which would increase the temperature of initially some molecules of steam, which will then go to the top and which will eventually increase the temperature overall, which will all – *all* the molecules will want to go to the top of the container, and as a result one will have a level of steam at the very top of the container and a vacuum at the end of the container – now I have got to get that down. Initially, the temperature of some of the molecules of steam, which because hot air, in this case steam, will always rise above in the colder air, the hotter steam will rise to the top of the container. Eventually, all the molecules of steam will be all trying to get to the top of the container, which will cause a greater density of the gas, i.e., steam, leaving a vacuum at the bottom of the container.

Figure 10.10 represents the microscopic model *PC* constructed to answer this question. He makes a classic error: He applies a correct macroscopic rule incorrectly at the microscopic level (Stevens & Collins 1980). He has

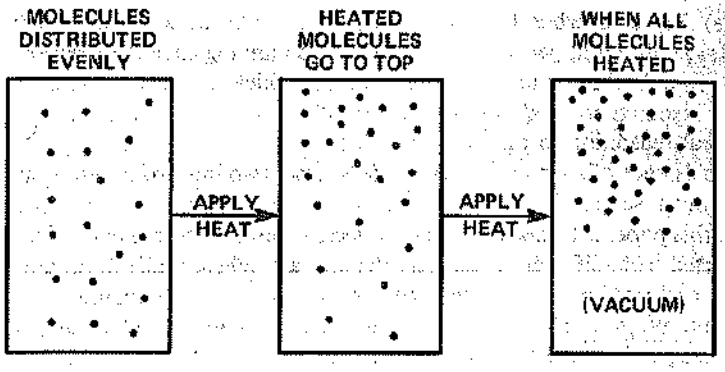

Figure 10.10. *PC*'s model of how to compress water by heating it

learned somewhere that hot air rises. The reason for this is that hot air particles have more energy, on the average, than cold air particles. This causes hot air to be less dense than cool air, and so it rises above cool air. But *PC* applies this aggregate property to individual molecules, where it does not apply. Thus, he imagines that each molecule, if it receives heat energy, will tend to rise to the top. Here, he reveals his view of temperature as intrinsic to individual molecules that underlies his heat-threshold model of escape and his intrinsic state model of the liquid–vapor transition. Eventually, in his view, each molecule will receive heat energy, and so they will all collect at the top, leaving a vacuum at the bottom. The correct answer is just the opposite. Cooling the vapor will cause each molecule to have less energy on the average, and so the same number of molecules will take up less space with no increase in pressure on the side of the container.

PC's reasoning about evaporation is much less consistent than *RS*'s. He shifts around among a variety of principles and models to reason about these questions. Not surprisingly, he is less accurate than *RS:* only three out of eight of his answers were correct, as compared to seven out of eight for *RS*.

Conclusion

This paper traces the way people construct models of evaporation processes by using analogies from other domains. Our thesis is that people construct generative models by using analogy to map the rules of transition and interaction from known domains into unfamiliar domains.

Analogy is a major way in which people derive models of new domains (Gentner 1982; 1983; Gentner & Gentner 1983; Lakoff & Johnson 1980; Rumelhart & Norman 1981; Winston 1980). Analogy can serve to transfer knowledge from a familiar concrete domain to an abstract domain, such as emotions or marriage (cf. Lakoff & Kövecses this volume; Quinn this

volume). But even when there are many observable surface phenomena in the target domain, people still rely heavily on analogies in their reasoning. Kempton's (this volume) work on people's models of home thermostats and our research on models of evaporation both show the importance of analogical reasoning in physical domains.

The existence of such analogical models raises two important questions for further research. First, how are different analogies combined? One goal of this paper is to examine how subjects combine component models constructed from different analogies. People vary substantially in the consistency and stability with which they coordinate multiple analogies for a domain. We have shown how one subject, *RS*, combined his component analogies into a relatively consistent model of evaporation and used it to reason fairly correctly about novel questions relating to evaporation processes. His model contrasts with that of another subject, *PC*, with a less coherent understanding of evaporation. *PC* invokes different principles or models for every answer. He aborts one line of reasoning when it contradicts another line of reasoning, without trying to trace the reason for the inconsistency. He uses principles that apply at one level of analysis in reasoning at another level of analysis.

A second, more basic question is, where do these models come from? Although they are partly idiosyncratic, they must be heavily influenced by cultural transmission. If these models were purely experiential, derived independently by each individual, it is unlikely that notions of molecules and temperature would figure so prominently. On the other hand, our subjects' models of such concepts as molecules differ in some rather striking ways from expert models. The interplay between scientific models and the idiosyncratic interpretations that individuals place on them is a topic ripe for serious study.

Notes

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2. It is true that, in normal outdoor conditions, warm air tends to be less dense than cool air, as in the variable-size-room model; but the difference in evaporation rate does not require this density difference. Even in a sealed container, warming the air will enable it to hold more water.

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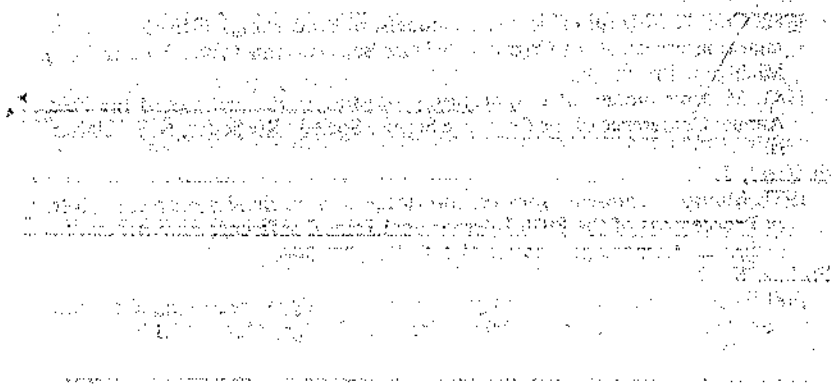

PART IV
Negotiating social and psychological realities

11

Myth and experience in the Trobriand Islands[1]

Edwin Hutchins

This chapter examines how the knowledge of a myth is brought to bear on the interpretation of experience. This topic requires an eclectic approach since the issues it raises are simultaneously part of a venerable tradition in anthropology concerning the role of myth in society and part of a new research area in cognitive science concerning the nature of the processes by which people interpret and understand their world.

The experiences to be interpreted are those surrounding an encounter between a Trobriand Island village and the spirit of one of its recently deceased members. I begin with a brief ethnographic sketch of the nature of spirits of the dead in the Trobriand Islands, which will enable the reader to make sense of the events reported. The next section describes an actual case of a spirit haunting a village. This haunting set the stage for the phenomenon we wish to understand – that is, an old woman's account of how she saw a cosmological question in these events and how a sacred myth provided her with an answer to her question. The heart of the paper is an examination of the relationship between the myth itself and the phenomena it is marshaled to explain. I argue that the myth has two kinds of connections to experience. One is an explicit link based on a belief in the power of mythic events as historical precedents. The events in the myth are seen as causes of important aspects of the experience. The second kind of connection is an implicit and unadmitted link based on a similarity of organization between the events of the myth and the experience of events of life. Although the historical link is emphasized by Trobrianders, an examination of the implicit link based on shared structure shows the myth to be a transformed description of repressed thoughts about contemporary relations between the living and spirits of the dead. That is, the myth is shown to be a cultural defence mechanism. I conclude with a discussion of how this role of myth bears on two otherwise anomalous properties of myths: the tenacity of native belief and the radical disjunction between historical time and mythic time.

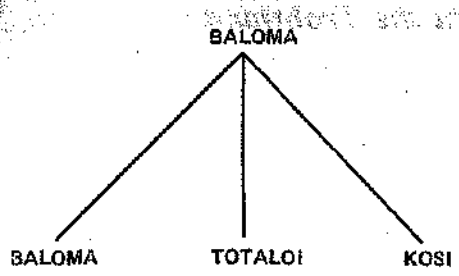

Figure 11.1. Classes of spirits of the dead

The ways of the spirits

The class of beings that are spirits of the dead in the Trobriands all fall under the generic term *baloma*. In some contexts, including the recitation of myth, the archaic term *yaluwa* may be used instead. Within the category of spirits of the dead are several subcategories that partition the world of spirits on the basis of some of their salient attributes (see Figure 11.1). Each category has a specific term associated with it. It is important to note that *baloma* occurs both as a generic term for all spirits of the dead and as an unmarked specific term that can stand in contrast to other specific types of spirits.

BALOMA

Before the marked terms can be discussed, more needs to be said about the nature of the unmarked specific category of *baloma*.[2] When a person dies, his or her *baloma* leaves the body and goes to reside on the island of Tuma, a real island located about 10 miles northwest of the main island in the Trobriand group. Arriving at Tuma, the *baloma* meets a spirit named Topileta, who "acts as a kind of Cerebus or St. Peter in so far as he admits the spirit into the nether world, and is even supposed to be able to refuse admission" (Malinowski 1954:156).

The *baloma* "live" normal lives on Tuma and return to their natal villages during the harvest season each year to partake of the spiritual goodness of harvested yams and valuables placed for them on special platforms out of doors. While they are in the village, the *baloma* sometimes indulge in mildly annoying pranks, such as making noises and moving things, but people do not find them eerie nor do they fear them the way Europeans fear ghosts. At the end of the harvest feast, the *baloma* are unceremoniously driven from the village by gangs of children who shout and swing sticks. This driving-out is called *yoba*. The *baloma* then return to Tuma, where they remain until the next year's harvest feast.

At any time of the year, *baloma* may intercede invisibly in human affairs by bringing bad luck to people who have behaved badly. For exam-

ple, a village that is constantly embroiled in petty squabbles may find a poor harvest because the *baloma* of the village feel that the people have not comported themselves with dignity.

Baloma frequently appear in dreams or even to people who are awake to announce to a woman that she will become pregnant or to suggest a course of action to an important person. In such cases, the *baloma* is seen and recognized as a person who once lived. The only other circumstances in which *baloma* are visible to the living are those near the boundary of life and death. A person on a deathbed may see into the spirit world while speaking to those in the world of the living who are keeping the death vigil. Also, the spirits of the recently deceased may appear to the living. In the latter case, the terminology of spirits of the dead is elaborated in reference to the behavior of the spirits.

TOTALOI

The spirits of the recently dead sometimes linger for a day or two after death to say good-bye to loved-ones. They may present themselves to persons either in dream or awake. These spirits are called *totaloi,* from the root *-taloi,* referring to the minor rituals of leave-taking performed by socially engaged persons when they part company. Such encounters are sad, but not at all frightening. For example, the spirit of a young girl appeared to her mother the day after her death to request that her favorite hymn be sung in church.

KOSI

Other spirits called *kosi* stay around the village longer and frighten people. They are much more malevolent than *baloma.* When a *kosi* is in a village at night, villagers say that it "rounds the village." The verb "round" describes the movement of the spirit from house to house through the roughly circular layout of the village. The literalness of this usage was not apparent to me until, on the nights of the encounter described below, I could actually follow the progress of the *kosi* as the screams of those visited emanated first from one part of the village, then from another.

The unpleasantness and the duration of visits from *kosi* are said to be related to the social character of the deceased while he or she was alive. If the deceased was a sorcerer, an adulterer, or a thief, for example, the *kosi* is expected to be malicious and will remain in the village for a long time. Some of my informants speculated, in contradiction to Malinowski (1954:156), that the reason the *kosi* of evil people stay in the village for a long time is that Topileta refuses them entry at Tuma and they then have no place to go.[3]

According to Malinowski (1954:154), *kosi* are only encountered out of doors. In the days following the death of a villager, the sound of footfall in darkness on a jungle path at night or the otherwise unexplained rustling of vegetation in the deceased's garden enclosure may be taken as

evidence of the presence of a *kosi*. In the village, a *kosi* might call out a person's name or throw a stone or slap the thatched wall of a house much as a *baloma* might do during the harvest season. Summing up the reaction of Trobrianders in his times, Malinowski called *kosi*, "the frivolous and meek ghost of the deceased who vanishes after a few days of irrelevant existence" (1954:154). Modern-day Trobrianders agree that Malinowski's description is an accurate depiction of the behavior of *kosi* in the past, but times have changed. In more recent times, in addition to frightening people with their poltergeistlike activities out of doors, *kosi* have taken to confronting people in a visible form in their homes as they lie in what we would call hypnagogic sleep. The Trobrianders call this state *kilisala* and describe it as resting with the eyes closed, but with the ears open and the mind awake. They are adamant that it is not sleep, and the events experienced in that state are real events of this world, not dreams or hallucinations. The assertion that these events are real is supported by items of evidence such as the fact that *kosi* knock things off of shelves and throw stones on the roof when everyone is wide awake. In those contexts though, the *kosi* is not seen.

Encounter with a kosi

In March 1976, Toigisasopa (a pseudonym), a prominent and feared citizen of a large Trobriand village, died. For more than a month following his death, the village was plagued by almost nightly visits from his *kosi*. Occasionally, the *kosi* appeared as the ghoulish figure of the rotting corpse of the deceased. As time went on, his reported appearance became increasingly revolting.

The following is a translation of an excerpt of an interview with a woman who had twice been visited by this *kosi*.

> He was out walking about and he came to our place. I woke and saw him come in. His face was awful – completely black, his arms and legs were like those of an undernourished child and his belly was bloated. He just came in and grabbed my legs. I lay there. My body was completely numb and paralysed. Then I kicked and the old man [her husband] felt me kicking. He roused me and I grabbed him and cried out. He asked, "What was it?" "Toigisasopa's ghost!" By then my body was recovering from numbness a bit. The stench was awful. The first time he just looked black, but this second time, you know, it was as if there were holes in his body as well. It gave the house a terrible odor.

Myth interprets life

For nearly a month, I heard reports of the activities of the ghost. Many villagers reported evidence of the *kosi*'s presence, and the village as a whole was quite disturbed by the length of the stay of the *kosi*.[4] Near the end of Toigisasopa's stay in the village, an old woman came to me with the following account.

One night as she lay in her house, she heard banging on the side of her neighbor's house and heard her neighbors yelling to drive the *kosi* away. She later reported:

I had gotten up and was sitting there. I thought, "perhaps that was a *kosi*." This one will not soon disappear because when he went to Tuma, Topileta closed [the way in]. Because he was a thief. He stole seed yams in the garden, and whatever he saw unattended in the village he would put in his basket as well. Everyone saw him do it. You see, this was his one bad habit. It was nothing of consequence; he seemed a good man except for this. Now he has died. Who knows, perhaps he was a sorcerer, perhaps . . . . Anyway, I thought to myself, "Why is it that the *kosi* and *baloma* see us, but we do not see them?"

She said that in considering this question, she remembered that it had not always been so. Long ago, the *baloma* would come into the village and sit with their kin, chewing betel nut and conversing in a pleasant way. They were generally amicable and even helpful. This old woman remembered the myth of Baroweni, and it, she claimed, provided the answers to her questions.

Myths form one of several classes of oral tradition in the Trobriands. The major distinction of importance here is between sacred myths, called *liliu* or *libogwa*, and folk tales, *kukwanebu*. Both *liliu* and *kukwanebu* are sometimes performed in the story-telling sessions that occupy many idle hours in the rainy season. The events that are depicted in both genres are placed in time long, long ago beyond the stretch of ordinary historical time. *Kukwanebu* are told largely for their entertainment value, and tend to be a bit bawdy, whereas *liliu* are thought to have a message and the events they describe are often taken as historical precedents for the states of affairs in the contemporary world. Some myths establish sociocultural precedents concerning the ownership of land and the ranking of descent groups. Others concern fundamental states of existence, such as the inevitability of aging and death or, in the myth of Baroweni, the invisibility of the spirits of the dead.

THE MYTH OF BAROWENI

A full translation of the telling of the myth as I recorded it is given below. I have included some additional commentary on a paragraph-by-paragraph basis where the telling of the myth assumes listener knowledge that is particular to Trobriand culture. By and large, these are things that from the Trobriand perspective go without saying.

Hey, Baroweni's mother had died. She had died and Baroweni was already pregnant. When she was due to give birth, another woman in the village was dying. She was on the verge of death – they had already made the mortuary preparations for her. Baroweni went to her and said, "Go to my mother. Tell my mother, 'Hey, your child is pregnant and will soon give birth. Take food to her.'"

This section establishes the relationships of the major actors in the myth to each other. The mother/daughter relationship cited is important because

Trobriand mothers have a special obligation to care for their pregnant daughters. In fact, the female matrilineal kin of the pregnant woman are responsible for feeding and caring for both the new mother and the infant for several months after birth. Asking a dying person to take messages to Tuma is a common occurrence. Trobrianders make no effort to conceal their assessment of an ailing person's chances of survival from that person, and those who are about to die provide an obvious communications link between the world of the living and the world of the dead.

So the dying woman died and went [to Tuma]. She told her companion there [Baroweni's mother], "Your child is pregnant and close to giving birth, but what shall she eat?" She said, "She told me to come and tell you, 'You should take food to her.'"

So the spirit [Baroweni's mother] got up and began cutting taro shoots. She raised the taro shoots onto her head and rose up [as a spirit rises when it leaves the corporal body]. She came. She continued on, what's it, at Tuma on the main beach at Kuruvitu, on their beach at Tuma. She came ashore and continued on there to Libutuma.

There is an interesting mixing of attributes here. The spirit carries her load on her head as all Trobriand women do, yet the verb used to describe her rising is not one used for a woman, but one used to describe the rising of a spirit from a corporeal body.

[directed to me] Shall I sing the song that you might hear it?

"Baroweni, Baroweni, Baroweniweni. I will set it down, I will set it down. Oh, my neck. Oh, my neck . . . Oh, my neck. We [inclusive dual] suppose a girl is standing with us whose name is *yaluwa*."

As we shall see, variants of this ditty are sung at several points in the story. Baroweni's mother whines her daughter's name and complains of her desire to set down her load and the pain it causes in her weak spirit neck. The last phrase in the ditty suggests a dual persona for the mother. She supposes or assumes a girl is standing with her, but her name is just *yaluwa* or spirit.

So she walked and cried, and in that way she entered a village. She just cried, she was crying for her child. Because she was a spirit she couldn't touch anything or hold it. She had already died, and there was nothing she could hold.

This makes clear the source of the mother's discomfort. She is carrying real taro, but as a spirit, she is known to be unable to carry anything. The explanation of this comes in the next sentence of the telling of the myth.

However, this is a *liliu*. This happened long long ago and for that reason [it is as it is].

Here is the first of several indications that inferences based on present-day understandings of the world are not always applicable to myth. That

it happened long, long ago is sufficient explanation of events that violate common-sense knowledge. I return to this point later.

She just continued on to – what's its name – Yalaka . . . Buduwelaka. Yes at Buduwelaka she was just the same, crying, crying for her child.

"Baroweni, Baroweni, Baroweniweni. I will set it down, I will set it down. Oh, my neck Ya! Oh, my neck. She just scoops it up the girl that stands with us [inclusive dual]. Her name is *yaluwa*. We are surely overloaded."

This because she had already died.

The ditty Baroweni's mother sings is a magic spell she uses to cause the taro to be carried. Since she is dead, she cannot carry things in a normal fashion. Notice that the mother's persona is completely confounded with that of the spirit girl whose presence she invokes. She says she herself would like to put the basket down, it is her neck that hurts, yet she refers to herself and the spirit girl using the inclusive dual form of the first person pronoun.

She just brought it and continued on to Okupukopu. At Okupukopu she chanted just the same as she was crying, crying for her child.

"Baroweni, Baroweni, Baroweniweni. I will set it down, I will set it down. Oh, my neck. Oh, my neck. Oh, my neck Ya! Oh, my neck. What is her name? What is she? Girl or person? But her name is *yaluwa*."

Because she was already dead there was nothing she could touch or carry on her head. And this: she was of the time long ago, our [exclusive plural] ancestor's time. [*then, directed to me*] I shall take it to its conclusion that you should grasp it?

The use of the exclusive plural possessive form here in referring to the ancestors makes it clear that these asides about the time of the ancestors and the special nature of events that happened then are directed at me as an outsider to the culture. I suspect she uses this form in order to say, "This is how it was with Trobriand ancestors. How it was with your European ancestors is irrelevant."

She continued on from Okupukopu to Ilalima. At Ilalima it was just the same. She went then to Osapoula.

It was night when she arrived and everyone was sleeping. She knocked on the coconut fronds [the wall of the house]. Her child woke up and said, "Who are you?"

Having the spirit mother arrive in the village at night is plausible since spirits are most active at night. It also simplifies the story because even though the mother is at this point in time a visible spirit, it is possible for her to go unseen in the darkness while the village sleeps.

She said, "I am your mother. I have brought your food. Open the house."

Her child opened up her house. She went to her and saw her mother putting down the food basket she had been carrying on her head. In the night there she [mother] told her, she said, "Hey, go prepare the area behind the house as if, wa, as if you were to plant flowers there."

She said, "Take these [the taro stalks] and bury them. They will be yours to

eat with your child. When the seed root has sprouted, cut off the side roots. Cut off the side roots and replant the seed. The side roots alone you shall eat with your son. You prepare behind the house. I shall go beside the house and sit. I shall be watching you."

This is interesting since a family metaphor is commonly applied to the form of taro propagation referred to here. The seed corm is called *inala,* mother, and the side roots are referred to as *litula,* her children (Malinowski 1965, v.2:105–106). Given the traditional importance of yams in the maintenance of descent group identity in the Trobriands, it is surprising that the mother brought taro rather than yams to feed her daughter. It is possible that the existence of this metaphor for taro propagation, which has no parallel in the cultivation of yams, made taro a more felicitous symbolic choice than yams.

Her mother spoke well. She told her she would sit beside the house and watch, but Baroweni by herself was already going on with her things. She forgot. She boiled her food and ate. Her mother was sitting there watching her. She [Baroweni] picked up that container, a coconut shell bowl, a soup bowl. Like those containers that the Lukwasisiga clan drank from. She just picked it up, drank her fill and threw it out beside the house. She threw it out and it drenched her mother's body. Her mother felt it.

She said, "Hey! Why did you dump that on me?"

She said, "Oh my! Mother mine, chieftan's wife. Mother no . . . I just forgot. I forgot about you. [Don't be angry] because it can't be a killing since you are already a *baloma.*

This event is outrageous in the Trobriand view of things. Remember that Baroweni's mother had gone to great effort and borne great pain to meet her responsibilities to her daughter. Trobriand children have a like set of responsibilities to their parents. Meeting these obligations is called *velina,* and failing to meet them has moral as well as jural consequences. When children are young and need support, parents supply what is needed. When parents grow old, the roles are reversed. Children must care for their parents in their old age. This role reversal is sometimes marked by a mother's addressing her grown daughter as *inagu,* "my mother." When parents become infirm and require constant care, this job falls largely on the grown children. It is they who must feed their aged parents, bathe them, and, if necessary, carry them on their backs away from the village so that they can defecate in the privacy of the forest. These responsibilities, burdensome though they may be, are taken very seriously by all. It is understandable, however, that parents sometimes complain about not being well treated by their children, and children sometimes come to resent the imposition of a parent's needs on their lives. Here in the myth, Baroweni has failed to meet her obligations to her mother and she has done so in a particularly offensive way. Her mother brought food, and Baroweni has thrown food on her mother. Worse yet, she has done so, she says, because she has forgotten about her mother.

She said, "You have thrown out my soup. I shall return [to Tuma]. I shall return, I shall go. You will stay here. I will split our [inclusive dual consumable] coconut, The lower half is yours. The half with the eyes is mine. [*Directed to me*] Where is that coconut? [*I produce a coconut and she demonstrates*].

She split the coconut. "This half is yours. The end with eyes we shall drink, and it will be my coconut. I will go. I will go and then I will come back and see you. You shall not see me."

This ritual performance concludes the actual telling of the myth itself. The symbolism of the eyes in the coconut is not as transparent as it seems. The end of the coconut without eyes is called *kwesibuna*, which means literally the "cold" part. So the mother has not only taken the eyes, she has taken the "hot" end of the coconut in a world where hot is potent and powerful.

Commentary on the myth

The remainder of the text is the old woman's commentary on the myth and her attempts to show the connection of the myth to the world of experience.

[*Commentary*] Look, now-a-days people die and go [to Tuma] and their *kosi* come around, but we can't see them. He [Toigisasopa's *kosi*] sees us and wakes us up, but we do not see him, and this is the reason. Our ancestors have changed things. They come and see us. Our fathers and mothers die and go away and then they come back and are watching us. We see them not. But this old woman in times long ago started this. This particular *liliu* here. Some think it is just a fairy tale [*kukwanebu*], but it is real *liliu*.

However, if that woman, Baroweni had not done that, had not thrown out the soup, our mothers would be with us now. We would die. Later we would come back and stay and be seen. But here she made her mistake. She grabbed that soup cup, drank from it and threw it out, hitting her mother who was beside the house. The old woman cast an appropriate spell. She said, "Why did you throw soup on my body?"

Notice the inference here: had Baroweni not made her mistake, our parents would be with us, that is, visible to us, now. This is a direct connection between the myth and the situation of life as it is experienced.

She said, "Oh, mother, I forgot about you."

She said, "You yourself have banished me. You have injured me. I will go back [to Tuma].

Here, the terms of the mother's interpretation of Baroweni's act has escalated. The mother has no sympathy for Baroweni's excuse. She has equated Baroweni's mistake with a grievous form of social punishment, *yoba*, banishment from one's village.

She got a coconut and told her child, she said, "I will split it in half you see. The lower end is yours. The end with eyes is mine. I will go away. When I come back, I will see you. You will not see me." So she went back and stayed.

> You see, the other day when Toigisasopa was going around the village as a spirit. We did not see him. Except those who saw him all blackened. Look, [*makes empty circles around her eyes with index fingers and thumbs*] with his eye sockets empty. His whole body was black and when he went to someone, that's what they would see. This was just sleepers, in *kilisala* of course, who saw him thus. The other day I was listening to them screaming in the village. I thought to myself, "What is the source of this? Oh, this thing from long ago." My mind went to these words [this myth].

This is what the old woman had to say by way of explanation for the perceived invisibility of the spirits of the dead. By her account, she has used her knowledge of a myth to find an interpretation of an important and puzzling aspect of life. That in itself is perhaps interesting, but not entirely surprising. It is a confirmation of Malinowski's claim that "myth is not an idle tale, but a hard worked active force" (1954:101). However, more remains to be said about how the force of myth is brought to bear on life.

The historical connection

In her commentary on the story, the old woman emphasizes the fact that the story of Baroweni is the reason for the invisibility of the spirits of the dead. Baroweni's mother declared that Baroweni would no longer see her. The relevance of this myth to the events surrounding the poltergeist behavior of the *kosi* in the village is based on the perception of the *kosi* as an (usually) invisible spirit of the dead. The connection is purported to be historical and causal, where the causality of the connection is based in the cosmological status of *liliu,* sacred myths. The actions of Baroweni's mother (as a spirit) with respect to Baroweni (as a living person) set a precedent for all subsequent relations between spirits and living persons. This causal connection appears in discourse in the form of a pervasive Trobriand metaphor. The myth is the *uula,* root or cause of the current state of affairs, which is, in turn, the *dogina,* extremity or result of the myth. According to the old woman's account, it was this causal connection that led her from her question about the invisibleness of spirits of the dead to the myth of Baroweni. On this view, the events described in the myth were identified as the cause of the salient aspect of the experience.

This connection is also the one emphasized by Malinowski in his analysis of the role of myth in primitive psychology. In considering several related myths, including another version of myth of Baroweni, which he had collected, he notes that such myths provide mundane precedents for some very unpleasant facts of life.

> What it actually does is to transform an emotionally overwhelming foreboding, behind which, even for a native, there lurks the idea of an inevitable and ruthless fatality. Myth presents, first of all, a clear realization of this idea. In the second place, it brings down a vague, but great ap-

> prehension to the compass of a trivial, domestic reality. . . . The separation from the beloved ones after death is conceived as due to the careless handling of a coconut cup and to a small altercation. (1954:137)

There are two loose ends to be attended to here. First, this tantalizing quote raises the question of the source of the great apprehension experienced in connection with the invisibility of the beloved ones after death. Malinowski is surely right that when Trobrianders consider the invisibility of the spirits of the dead they do so with apprehension. If this myth permits that invisibility to be conceived as due to a small altercation, what might it have been conceived as due to that provokes apprehension? That is, if it provides a substitute conception of the invisibility of the spirits, for what is it a substitute? What was the terrifying conception of the cause of the invisibility of the spirits that it replaces?

Second, there is something paradoxical about this historical relation of myth to the nature of life as it is experienced in the present. Things happen in myths that all Trobrianders agree could not happen in life today. The carrying of the taro by the spirit woman in the myth of Baroweni is an example, and in the telling of the myth, the old woman repeatedly reminds us in that context that this is a *liliu;* that it happened long ago. Even though the events of the myth have direct causal relations to states of affairs in the present, the time of myth is not historical time. As Malinowski puts it, ". . . the distinction between the *liliu* and actual or historical reality is drawn firmly, and there is a definite cleavage between the two" (1922:303). Myth must be closely linked to life so that the events of myth can serve as precedents and causes for the events of life; yet myth must also be kept distant from life to protect it from mundane inferences about what might and what might not be possible by present standards.

A mythic schema

When we look more closely at the myth itself and at how it is applied to the interpretation of the behavior of the spirits of the dead, we find other connections between the myth and experience. These connections have to do with similarities in organization between the concepts encountered in the myth and concepts encountered in life.

The myth of Baroweni contains a structure of relationships among things and actors and actions. If we ignore the specific identities of the things and actors and actions and concentrate instead on the organization of the relationships among them, we see a structure I call a *schema.*[5] When particular instances are plugged into the slots in the schema, we say the schema is instantiated, and the result is a proposition that is an assertion about the world. The schema underlying this myth encodes cultural knowledge about relations between the living and the dead. It is based on a set of implicit cultural theories about human motivation and

human psychology. It implicitly attributes abilities, failings, behaviors, and reactions to deceased persons and to their survivors.

The basic points of the myth can be summarized in the following simple three-term propositions.

M1.	Baroweni	threw soup on	Baroweni's mother
M2.	Baroweni's mother	became invisible to	Baroweni

These two propositions are related to each other in that the event described in proposition *M1* led to the event described in *M2*. Baroweni's mother's action in *M2* somehow "caused" present-day spirits of the dead to be invisible to the living.

M3.	Baloma	are invisible to	the living

Since each event uniquely precipitated its successor, the negations of these propositions also form a plausible sequence. That is, if Baroweni had not thrown soup on her mother, then her mother would not have been angry at her and would not have made herself invisible and, so argues the old woman who told the myth, present-day spirits of the dead would still be visible to the living. It is clear how these propositions are connected to each other and how the old woman can use the connections to make inferences about how things might have been different than they are. It is less clear how this is connected to the world of contemporary experience.

The structural connection

The question really is how one gets from the notion of contemporary spirits of the dead being invisible (proposition *M3*) to the idea of Baroweni's mother becoming invisible to Baroweni (proposition *M2*). No historical mechanism is offered in the telling of the myth or in its commentary, but both of these propositions are instantiations of the same structure, "*x* is invisible to *y*." This suggests that the relation might be analogical rather than historical. Support for the analogical interpretation requires a single schema that, when instantiated in different ways, generates the propositions of the myth as well as the propositions describing the conditions of life. Such a schema would be a structure composed of more general terms than those found in the instances to be accounted for. To discover the underlying schema, we examine the terms in the propositions of the myth and of the description of the relevant bit of life and find for them the most specific category that is general enough to contain the set of terms. For example, Baroweni's mother, the *kosi*, and our dead parents are all instances of deceased persons, whereas the living and Baroweni are instances of survivors.

INTERPRETING ACTIONS

Finding the appropriate general terms for the actions in the schema is more difficult. Baroweni's mother leaves her and becomes invisible, the *baloma* are invisible to the living, yet the *kosi* is occasionally visible while frightening people. Fortunately, there are other instances at hand and other ethnographic evidence that can help determine the more general categories of action of which the throwing of soup and the coconut ritual are instances. Within the myth itself, the throwing of the soup and the splitting of the coconut are given metaphorical interpretations. Baroweni's mother says that her daughter has injured her and has banished her by throwing the soup on her. So Baroweni's act is an instance of injury and one of banishment as well. The mention of banishment here is interesting because in one version of the myth of Baroweni collected by Malinowski (1954:133–134), the same soup-throwing incident and subsequent coconut-splitting ritual were posed as being both the cause of the invisibility of the *baloma* and the origin of the banishment of the *baloma* to the island of Tuma. In that version of the myth, prior to Baroweni's mistake, the spirits of the dead were visible to the living and resided in their natal villages after their deaths. Before Baroweni's mistake, it seems, dying was not really much of an inconvenience. In fact, being dead looks quite a lot like being alive, with the possible exception that one gains considerable magical power by dying. Seen in this light, Baroweni's mistake is an enormously important event. It is as a result of her action that death acquires its most salient and distressing features: exile to Tuma and invisibility. Because of Baroweni's actions, death comes to mean removal of the spirit from the sphere of social intercourse.

Now, in the telling of the myth and in providing commentary on it, my old informant gave several paraphrases of the conversation that took place between Baroweni and her mother. In one of those, she attributes the following words to Baroweni, *"Gala bisimamatila, pela bogwa baloma"* – "It is not a killing because (you are) already a *baloma*." Baroweni protests to her mother that she could not have killed her because she is already a spirit. Where does this talk of killing come from? After all, Baroweni might have harmed her mother by throwing hot soup on her, but killing seems out of proportion to the nature of the mistake. It is, however, in perfect proportion to the consequences of that mistake. In spite of Baroweni's urgent denial, her act is a killing in the sense that before this act, there is no death as Trobrianders now know it. True, her mother had previously died, but her spirit was visible and interacted with her daughter as a living mother would. Death to Baroweni's mother did not mean what death means now. And, in fact, in terms of the Trobrianders' current understanding of death, Baroweni's mother did not "die" until this altercation had taken place. It is as a result of Baroweni's actions that death becomes the horrible state of separation from the living. In this light, the soup-throwing incident can be seen as a metaphor for killing, accidental

to be sure, but killing nevertheless. The mother's reactions to this are the ritual splitting of the coconut and the pronouncements about how things will be henceforth. The old woman telling the myth called this a just punishment for Baroweni, but it is also the mother's act of dying. With this act, Baroweni's mother declares she will leave, that is, not help Baroweni with her child soon to be born, and when she returns she will be invisible.

Remember also that Baroweni's action occurs in the context of mother meeting her responsibilities to her daughter, but daughter, Baroweni, reciprocates by negligently failing to meet her obligations to her mother. Thus, while the story is in one sense about a trivial mistake, it is also about a daughter's inadvertently ending her mother's life through negligence. This is a theme that is probably universal. Freud, writing about his European patients says,

> When a wife loses her husband, or a daughter her mother, it not infrequently happens that the survivor is afflicted with tormenting scruples, called "obsessive reproaches" which raise the question whether she herself has not been guilty through carelessness or neglect of the death of the beloved person. (1918:80)

Freud describes the source of these thoughts as follows:

> Not that the mourner has really been guilty of the death or that she has really been careless, as the obsessive reproach asserts; but still there was something in her, a wish of which she herself was not aware, which was not displeased with the fact that death came, and which would have brought it about sooner had it been strong enough. The reproach now reacts against this unconscious wish after the death of the beloved person. Such hostility, hidden in the unconscious behind tender love, exists in almost all cases of intensive emotional allegiance to a particular person, indeed it represents the classic case, the prototype of the ambivalence of human emotions. (1918:80)

This ambivalence resonates perfectly with the Trobrianders' feelings about *velina*. We know that children often feel anxiety about meeting their obligations to their parents, and we know that in the Trobriands (as in our own culture) elderly parents often complain that they are not properly treated by their children. If the historical causal link were indeed the only link between the myth and the experience it is marshaled to explain, then there are many scenarios that could arrange events in which spirits become invisible here ever after. Yet, this mythic structure mirrors the thoughts and fears that are experienced by Trobriand children (whether in childhood or as adults) on the death of a parent. In a world in which there are no natural deaths and in which elderly parents depend on their children for their very existence, a fleeting secret wish that one's burdensome parent were dead or doubts about having met one's filial obligations can easily lead to self-reproach on the death of one's parent. In the earlier discus-

sion of Malinowski's account of the connection of myth to life, we asked, 'What could have been the original terrible conception of the cause of the invisibility of the spirits of the dead that must be replaced?' The answer for the survivors is that the dead are invisible because we killed them. This is the source of the Trobrianders' great apprehension over the separation from the beloved ones to which Malinowski referred.

Reading the throwing of soup as a gloss for wishing death on and inadvertently killing the deceased makes the dynamics of the retaliatory nature of the myth clear. According to Freud, the defence against the hostility that was felt toward the deceased

> ". . . is accomplished by displacement upon the object of hostility, namely, the dead. We call this defence process, projection. The survivor will deny that he has ever entertained hostile impulses toward the beloved dead; but now the soul of the deceased entertains them and will try to give vent to them. . . ." (1918:81)

The anger of the deceased at the survivor, then, is a projection of the survivor's hostility toward the deceased.

TRANSFORMING THE MYTHIC SCHEMA

The parallelism of these schemas is easy to show. The psychodynamic schema described in the paragraphs from Freud is as follows:

P1.	survivor	wished death to	deceased
P2.	deceased	punishes	survivor

Here, *P2* arises from *P1* when the survivor projects to the deceased the hostility that the survivor felt toward the deceased.

The myth mirrors this structure, although it is not a direct instantiation of it. The structure of the myth was:

M1.	Baroweni	threw soup on	Baroweni's mother
M2.	Baroweni's mother	became invisible to	Baroweni

where the mother's act can be seen both as dying and as punishing Baroweni. The myth is reputed to explain the facts of life. The claimed connection is that Baroweni's mother's act somehow "caused" the observable phenomenon that the spirits of the dead are not visible to the living. In particular, it was claimed that dead parents are not visible to their living children. This is experienced by all surviving children. Furthermore, had Baroweni not made her mistake, the dead parents would be visible. Instantiating the psychodynamic schema in the first person (as experienced by the survivor) yields the propositions:

T1.	I	wished death to	my dead parent
T2.	my dead parent	punishes	me

Obsessive scruples turn this active hostility, wishing death, into a passive animosity, negligent killing, and turn the punishment into a passive projected retaliation, becoming invisible and going into self-imposed exile.

L1. I	negligently killed	my dead parent
L2. my dead parent	is invisible to and leaves	me

The first proposition here is one that elderly parents sometimes voice in their complaints about the way their children neglect them. The second is a statement of the phenomenon the myth is supposed to explain. This transformation of the mythic schema, then, provides a simple explanation of the invisibility of the spirits of the deceased, which is, after all, what is in need of explanation here, but it is a very painful explanation indeed.

This is the schema that underlies the myth. It arises in the minds of the survivors following the death of a person with whom they have been involved in life. To this point, we have considered evidence about the myth and its telling as well as psychodynamic theory in order to discover the schema underlying the myth. Suppose this is the schema underlying the myth, how could the myth come to be structured the way it is?

We have already seen that the defence process of projection operates in the composition of the internal structure of the schema. It is the source of the retributive nature of the myth. The defence process of projection and two others, intellectualization and displacement, also operate in the transformation of the propositions that represent the experienced relations between the living and the dead into the myth of Baroweni. Suppes and Warren (1975) propose a scheme for the generation and classification of defence mechanisms that is directly applicable to sets of propositions such as those discussed. In their model, defence mechanisms are created by transforming propositions of the form, "self + action + object." The classification of the defence mechanism is based on the nature of the transformations applied. Among the transformations they describe are putting another in the place of self, projection; changing the nature of the act performed, intellectualization; and changing the identity of the object, displacement. The myth of Baroweni is produced by applying all three of these transformations to the original repressed propositions *L1* and *L2* as follows. Let us begin with the underlying propositions:

L1. I	negligently killed	my dead parent
L2. my dead parent	is invisible to and leaves	me

Projection changes the identity of the self, and displacement changes the identity of the object. In the case of the myth, Baroweni takes the place of self and Baroweni's mother takes the place of one's own dead parent.

1. Baroweni	negligently killed	Baroweni's mother
2. Baroweni's mother	punishes	Baroweni

Intellectualization changes the nature of the act performed. In the case of the myth, negligent killing becomes negligent handling of food, and the punishment is the experienced invisibility of the dead. This brings us back to the propositions that summarize the myth.

M1. Baroweni	threw soup on	Baroweni's mother
M2. Baroweni's mother	became invisible to	Baroweni

Having arrived at the schema underlying the myth, we are ready to return to the phenomenon that brought these issues to light in the first place – the terrifying visits of the *kosi* of Toigisasopa. By placing Toigisasopa in the role of decedent and those villagers who experienced the presence of his *kosi* in the role of survivors, substitution into the psychodynamic schema produces the following set of propositions:

K1. Villagers	wished death to	Toigisasopa
K2. Toigisasopa	punishes	villagers

These propositions, like those involving the parents, are likely to be repressed. Given that this may be an important structure for the organization of ideas about the nature of relations between the living and the dead, it is easy to see the mechanism underlying Trobrianders' assertions that if a person is bad in life, his or her *kosi* will haunt the village for a long time and will be malevolent. Those who are sorcerers, adulterers, or thieves are likely to evoke hostility in their neighbors. Those who are none of these things are less likely to be hated and/or wished dead by their companions in life. Thus, the deaths of powerful and evil persons may evoke many reactions of this sort from the community, whereas the deaths of more sociable people are likely to evoke few such reactions.

I have argued that the way the myth accounts for the invisibility of the spirits of the dead is not through the historical connection claimed by the Trobrianders, but through the fact that the myth is a disguised version of the inadmissible cognitive and affective structure experienced on the death of a loved one. We find also that a different instantiation of the same schema underlies the interpretation of the haunting of the village by the *kosi*. In each case, there is independent sociological evidence concerning the reality of the repressed propositions.

What do they know?

The application of schemas across sets of instances is a ubiquitous cognitive activity. Instantiation in conventional ways is involved in understanding, reasoning, and predicting (Hutchins 1980). Unexpected insights often

seem to arise from unconventional instantiations. Metaphors and some types of humor are also based on the assignment of new instances to familiar schemas (cf. Lakoff this volume). This same process is also apparently at work in the creation and use of myths. This myth is both a charter or a precedent for an unpleasant fact of life and a cultural model of relationships between the living and the dead. The schema it embodies is as applicable to contemporary personal relationships as it is to those of the ancestors with each other.

If what I have said is true, then there is an important problem for those of us interested in the role of cultural knowledge and belief in everyday cognition. When we turn to the complexities of cognition in real-life settings, distinctions between the realm of the cognitive and the realm of the affective begin to melt away.[6] It is clear that a great deal of knowledge used in the interpretation of everyday events is never explicitly stated. The sort of knowledge that resides in these unpleasant and unstated instantiations of the mythic schema cannot be ignored. To the extent that they may influence memory, judgments, inferences, and other cognitive processes, they are things that are "known." Yet, in a sense, they are things that are too painful to be known. Trobrianders (or anyone, for that matter) need cultural knowledge to understand the myth, and they use the schema of the myth to understand, perhaps in a more profound sense than they can admit, the events of their everyday lives.

Why sacred myths are sacred

In the telling of the myth, the old woman went to some pains to assert the truth of the myth and to impress on me that the events in myth cannot always be made sense of in terms of what we know about the present-day world. Having examined the use of the *liliu* of Baroweni in the interpretation of these modern events, we can see why it is that the sacred myths are so adamantly defended. They are formulations that from the Trobriander's perspective *must be true*. Were they not true, then experience could be exceedingly threatening. Remembering the myth must be a very rewarding experience since it allows the myth to perform its role as a defence mechanism. It allows the believer to confront the ugly subjective realities of deceased parents who can no longer be seen or a visit from a *kosi* with the sense that these are explicable phenomena. Not only can they be explained explicitly in terms of historical causality, but the process of remembering the mythic schema that explains the events also binds the dangerous, unstated, unconscious propositions to a conscious and innocuous isomorph. The situation is explained, and the disruptive propositions in the unconscious are transformed into acceptable elements of a description of an event that happened to someone else, long, long ago.

Malinowski documented the reasons that the Trobriand people gave for the legitimacy of myth and interpreted their insistence on the truth

of myth as deriving from the necessity to maintain the historical connection to the precedents of the past. That is part of the reason the *liliu* are sacred; as we have seen, however there is more to it than that. The myth as a defence mechanism must be both legitimized and protected from challenge. If the myth must be literally true to have its historical/causal effects and if, given what we all accept about how the world works now, the myth cannot be literally true, then what we all accept about how the world works now cannot be applicable to myth. The gulf between the present and the distant past (*omitibogwa*), the larger-than-life quality of the characters and their actions in myth, the unquestioned justice of their decisions, the insistence that in the past things were of a different sort than they are now, the denial that the inferences we would make today are applicable to the events in myth, in short, the whole collection of reasons people give for the legitimacy of myth, are a secondary defence structure erected to protect the primary defence of the myth.[7]

The sacred *liliu* must be true because the putative historical/causal connection of myth to life depends on the myth's being literally true, and that connection is the only connection between myth and life that can be explicitly recognized. If the myth is to be recalled and used as an interpretive resource in understanding some troubling real-world event, there has to be some connection between it and the event other than the inadmissible fact that it shares a common schema with the unconscious propositions evoked by the event. The historico-causal link provides that connection.

Conclusion

We began with a description of an actual encounter between a Trobriand village and the spirit of one of its deceased members. For one villager, at least, this raised the question of why the spirits of the dead are nearly always invisible. We saw how myth was marshaled as an interpretive resource to provide an understanding of this troubling aspect of the experience. The story of Baroweni's clumsiness and her mother's retribution are taken as an historical precedent for all subsequent interactions between the living and the dead. An examination of the myth itself, and of the putative historical-causal connection of the myth to experience, has shown that there is another, more compelling connection. That is that the myth is a disguised representation of repressed thoughts and fears concerning relations between self as survivor and the deceased. We cannot say by which link the myth was retrieved from the old woman's memory. But we can say that the way it accounts for the invisibility of the spirits of the dead is via the structural connection rather than the historical connection.

The schema instantiated by the myth is the same schema unconsciously instantiated by survivors following the death of someone important to them. It embodies the anxiety about possible responsibility for the death and the projection onto the deceased of the repressed hostility of the sur-

vivor toward the deceased. But the mythic version is a safe version. It is not about self. It is about someone else – a special someone else whose actions long ago caused all spirits to be invisible. The myth, as a transformed instantiation of this schema, is a culturally constituted defence mechanism. Furthermore, even though the *kosi* is sometimes visible, the underlying schema also describes the relationship of living villagers to *kosi*. We expect the hostility that is projected onto the deceased, and therefore the severity of the deceased's punishment of survivors, to be all the more intense when the deceased was hated in life. This appears from the Trobriand perspective as the observation that the *kosi* of evil people haunt the village for a long time. So, the schema that underlies the myth of Baroweni and explains the invisibility of the spirits also appears to be the schema that causes villagers to experience the *kosi* as well.

This chapter shows that there is a living connection between myth and experience in the Trobriand Islands. By its structural connection to life, the myth provides a way of thinking about things that are too painful or too threatening to address directly. By way of its historical connection to life, it is both a causal precedent for the current state of affairs and a story that exonerates the living from culpability in the disappearance of the dead.

Notes

1. Earlier versions of this paper were presented at the Conference on Folk Models held in 1983 at the Institute for Advanced Study, Princeton, New Jersey, and in the symposium organized by Dorothy Holland and Naomi Quinn for the 80th Annual Meeting of the American Anthropological Association and entitled Folk Theories in Everyday Cognition. Field research during which the data reported here were collected was supported by a grant from the Social Science Research Council. Text processing facilities were provided by the Navy Personnel Research and Development Center, San Diego. I am grateful to Roy D'Andrade and Laurie Price for reading and commenting on an earlier draft of this chapter. Whatever errors it contains are my own. My greatest debt is to Bomtavau, who told me the myth and provided her own rich commentary on it.
2. See Malinowski's paper, "Baloma: Spirits of the Dead in the Trobriand Islands," for a more detailed discussion of the nature of *baloma* and *kosi* and of their relationships to the living.
3. I also collected a supposedly historical story in which a woman encounters a more horrible fate. The woman converted to Christianity and married a native pastor. After a few years of marriage, she fatally poisoned her husband, moved to a different village, and remarried. When her second husband died, she moved back to her own natal village, where she eventually died. Her *kosi* plagued the village for months, and it was finally determined that Topileta had closed the doors of Tuma to her, and God had closed the doors of heaven as well.
4. Unfortunately, I do not know just who (or even how many) among the villagers actually claimed to have seen the *kosi*, nor do I know what relationship those few I talked to bore to the deceased.

5. Current approaches to implementing cultural knowledge representations include schemas, frames, scripts, and more. For our purposes, it is not important which approach is used so long as it captures the structural relationships of the terms of the propositions.
6. D'Andrade (1981:190–193) argues the importance of cognitive scientists' looking at cognition and affect together as related parts of meaning systems.
7. This device is not unique to technologically primitive societies. Consider, for example, the following testimony given by a creation scientist in a recent court hearing,

   > We cannot discover by scientific investigation, anything about the creative process used by the creator because He used processes which are not now operating anywhere in the natural universe. (Lewin 1982:144)

   In order to assert the literal truth of accounts which, by our present criteria of truth and falsehood, cannot be literally true, the claim of the special nature of that time must be made.

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12
Goals, events, and understanding in Ifaluk emotion theory[1]

Catherine Lutz

I have three goals in this paper. The first is to represent formally the knowledge about emotions held by the Ifaluk people of Micronesia. That knowledge can be seen to be structured in two fundamental ways: The first is in terms of salient events in everyday life, and the second is in terms of the culturally constructed goals held by the Ifaluk. The second aim is to address the question of the actual status of ethnotheory in social interaction; I stress the idea that the emotional understanding this ethnotheory allows is, in actual practice, an understanding that is negotiated between individuals. Third, I reject the view that ethnotheoretic models of emotion are aptly characterized as involving "cognition about emotion" or "thinking about feeling."

Introduction

I would like to tell two stories here. To understand each story, it is necessary to present the underlying cultural and cognitive model that structures the understanding of the characters in them. The first story is a simple one because it merely involves narration, an assertion made by one character and left unanswered by others. The complexity of the second story arises because it tells a more fully social tale; the characters not only theorize, they also attempt to convince others that their theory is at least plausible, if not the only possible route to proper understanding of the events at hand.

The first story occurs on the atoll of Ifaluk in the Western Pacific. I am sitting outside the house of a sick person whom I have come to visit. The illness does not appear to be very serious, and I am idly chatting with the woman sitting next to me. We pause for a moment and a girl of about 4 years of age approaches us. As she nears, she does a little dance, makes a silly face, and waits. "She's cute," I think, and smile at her antics. The woman sitting next to me has observed this, and she reprimands me, saying, "Don't smile at her – she'll think that you're not justifiably angry." In that statement, the woman is telling me much more than she explicitly says. Some of the inferences she would have had me draw are presented

below in the process of outlining a formal model of Ifaluk theories about emotion.

The study of ethnotheory involves the identification of the knowledge structures that underlie speech, and more generally, understanding. This knowledge is largely below the level of explicit awareness and generally remains unverbalized. One special circumstance that permits the recognition of both one's own and others' tacit knowledge is the crossing of cultural boundaries. The (at least partial) nonsharing of knowledge across those boundaries encourages the identification and verbalization of taken-for-granted realities. Thus, one special methodology that anthropology provides for the study of enthnotheories,[2] is the immersion in environments that maximize the possibilities for *mis*understanding. In the process, the mechanisms of understanding become more apparent.[3]

In their concern with cultural belief systems, anthropologists share the desire of cognitive scientists to make explicit what it is a person needs to know to come to appropriate understandings of people and events. These two perspectives also share a concern with representing the knowledge people have in the most accurate way. The goal has been to construct representations that are both general, or able to describe knowledge in many domains, and efficient, or able to process information quickly, accurately, and with minimal moves (Winograd 1977). The inability of the anthropologist to go beyond a literal understanding of the discourse going on around him or her in the early days of the field experience finds its analogue in the failure of the computer to be able to process information with a program that is flawed or incomplete in particular ways (although there are obvious and important ways in which this analogy is limited).[4] The formal modeling advocated by many cognitive scientists has been used successfully by Hutchins (1980) to represent Trobriand knowledge about land tenure and land transfer. This chapter uses his approach in modeling some aspects of the ethnotheory of emotion among the Ifaluk.

Events and emotions in Ifaluk ethnotheory

Ethnotheories of emotion describe a fundamental and ubiquitous aspect of psychosocial functioning. They are used to explain why, when, and how emotion occurs, and they are embedded in more general theories of the person, internal processes, and social life. As they play a central role in the organization of experience and behavior, an examination of the structure of emotion ethnotheories can contribute to both cultural and psychological models of emotion and social action. In addition, the existence of dense networks of connections between this domain and other knowledge systems among the Ifaluk gives this ethnotheory wide ramifications in their social life.

Although ethnotheory may be an explicit and abstract body of knowledge, it is more often pragmatic, being used as implicit assumptions in

daily discourse and understanding. The investigation of Ifaluk theories of emotion reported here thus includes the collection of several thousand instances of the use of emotion words in everyday talk and of natural definitions (Boehm 1980), as well as interviews that elicited more generally stated propositions about emotions.

The most fundamental unit of any theory, implicit or explicit, is the concept. The central elements of Ifaluk emotion theory are the concepts of emotion that are represented in linguistic form by (among other things) words for discrete emotions. There are almost 100 words in at least occasional use that represent these concepts; a core group of 10 to 15 words can be heard in daily conversations, where they are used in the descriptions of striking or salient events.

The Ifaluk define, explain, and understand emotions primarily by reference to the events or situations in which they occur. This aspect of their ethnotheory of emotion contrasts with our own emphasis on the internal and private, rather than the social, nature of emotion. For example, definitions of emotion terms collected on Ifaluk relatively rarely contain reference to the physiological feeling tone associated with a particular emotion; American English emotion concepts, on the other hand, are often defined by reference to the physical and/or private mental state of the person experiencing the emotion (Davitz 1969; also see Averill 1974; Izard 1977).

The kinds of situations that are related in theory to emotions are depicted by informants at several levels of generality. They include the more specific, such as "Someone gets drunk and comes to your house every night," or "Your children are adopted to another village and don't come to visit you for a long time," or "The pig eats your food," as well as the more general – "Something happens that we want to happen," or "There is something we don't know [or understand]," or "Something bad happens that we don't expect to happen." Which level of generality is chosen by informants depends on, among other things, the kinds of contrasts and comparisons being drawn in any particular case.

Thus, although the emotion concept can be considered the primary element in this domain of Ifaluk ethnotheory, it is also evident that the definitions of these or any words are in fact themselves propositions of a particular type (Casagrande & Hale 1967). It is useful to look at the underlying structure of those propositions in terms of the modeling used by Hutchins (1980), who succinctly outlines the relationship between the terms of such formal modeling; using the example of land use rights in the Trobriand Islands, he states that a

> relation always links one instance from the range of concepts that are people to one instance from the range that are economically appropriatable units of land. When a relation is stated in terms of such variable ranges as these, it is a *schema*. When the ranges are replaced by concepts (a process called *instantiation* because it is the assignment of specific instances to the

relation), the schema becomes a *proposition.* A schema is then a form or a template from which an arbitrarily large number of propositions can be constructed. (1980:51)

The definition of each Ifaluk emotion concept is an instantiation of the following general schema:

(1) If Event *X,* then Emotion *Y.*

or

Ev [ ] =====> Em [ ]

Here, as in further schema and proposition representations, broken arrows indicate that the causal relationship is a probabalistic one (e.g., If someone violates a rule, it is likely he or she will experience *metagu,* or fear/anxiety); solid arrows indicate a more deterministic relationship, in the sense that the proposition's first condition necessarily leads to the second condition.[5] Although the understandings that Americans have about emotion can also sometimes be found to be organized in the same kind of structure as (1), at least as common would be a schema of the general form, "If Internal Feeling *X,* then Emotion *Y.*"[6]

Some examples of propositions, evident in everyday Ifaluk discourse, that instantiate this schema include the following:

Ev [Illness]
Ev [Travel from the island]
Ev [Lack of food] =====> Em [*Fago* (compassion/
Ev [Nurturance] love/sadness)]
Ev [Gentle or calm behavior]

Ev [Rule violation by self]
Ev [Spirit present] =====> Em [*Metagu* (fear/
Ev [Call to eat by someone unfamiliar] anxiety)]

Some emotion words in the Ifaluk language share situational definitions, including both those that can be described as general and those that are more specific. Determining which emotion term will appropriately apply in any concrete situation involves a determination of some other characteristics of the individuals involved in the situation. These characteristics include particularly their social status ranking relative to each other, the history of their relationships with each other, and the possible influence of third parties on the actions of those involved.[7] The process whereby these forms of knowledge are applied to a particular case can be examined both as a cognitive and as a social process. In the extended

example of emotional negotiation examined later, these other factors in understanding that are secondary to the general event–emotion schema are treated in more detail.

In summary, emotion concepts on Ifaluk are the fundamental units of an ethnotheoretical system that informs the understanding of salient events. These concepts are not conceptual primitives but rather are complex in meaning and schematic in form. To utter an emotion word on Ifaluk is not primarily to evoke an image of internal churnings or of particular ways of hotly thinking; rather, it is to evoke an image of a particular kind of event, a particular relationship between a person and the world. More generally, we can expect culturally variable ethnotheories relating to any topic to be evident in equally variable word meanings. Central concepts or key words, then, are not simple insertions into the schematic relations of an ethnotheory but are themselves ethnotheoretic and schematic.

The Ifaluk use at least three other central schemas in the process of emotional understanding. One schema states:

(2) If we experience Emotion *X*, then we may perform Act *Y*.

or

Em [ ] =====> A [ ]

This schema is familiar to us as it is a framework for emotional understanding in American ethnotheories of emotion as well. From both the American and the Ifaluk ethnotheoretical perspectives, emotions and action are closely linked.

It is important to note, however, that the causal link between action and emotion is much more probabalistic in American ethnotheory, where an emphasis on the control of emotions means that a situation of "unexpressed emotion" very commonly occurs. For the Ifaluk, on the other hand, control becomes an issue only in special circumstances (which particularly include cases in which the potential action is physically aggressive). In fact, one action commonly linked to virtually all emotions in instantiations of the above schema is "Telling someone about the emotion." It is expected, as a sign of maturity and intelligence, that a person will declare an emotional stance in appropriate situations (of which there are many).

Notwithstanding the similarity in the general form of this schema in both American and Ifaluk ethnotheories, examining some specific propositional examples reveals several culturally distinctive instantiations of the schema.

Em [*Ker* (happiness/ excitement)]	=====>	A [laugh] A [talk a lot] A [misbehave] A ["walk around," i.e., neglect work, show off]

		A [give food]
Em [*Fago* (compassion/ love/sadness)]	=====>	A [cry]
		A [talk politely]
		A [don't speak]
		A [talk impolitely]
Em [*Song* (justifiable anger)]	=====>	A [reprimand]
		A [don't eat]
		A [pout]

For example, one culturally standard expectation is that people who are justifiably angry might refuse to eat. Alternately or additionally, they might speak to others without common politeness markers, such as the use of the term "sweetheart" before a request. People thus use particular behaviors as signs of specific types of emotional understandings in others.

All the listed instantiations of schema (2) are not equivalent, however, in terms of either their frequency of occurrence or cultural salience. A frequently occurring proposition is likely to be one that is particularly useful (for reasons that can be ethnographically described). In addition, each proposition evokes ethnotheoretical corollaries and semantic associations of differing degrees of richness; for example, the laughter that accompanies *ker* (happiness/excitement) is a relatively impoverished instantiation of schema (2) when compared with the idea that "happy/excited people walk around." The later notion is frequently evoked in condemnatory gossip about others; its links the emotion to amoral behavior; and it justifies the generally unspoken idea that people ought to stay close to their homes unless an errand calls them elsewhere. A rich and useful model of any cultural knowledge system specifies the density or weight of each proposition enumerated.

Another schema the Ifaluk use in discussing and understanding emotions is of the form,

(3) If we experience Emotion *X*, then another person should or might experience Emotion *Y*.

or

Em 1 [ ] =====> Em 2 [ ]*

Propositional instantiations of this schema include the following:

Em 1 [*Song* (justifiable anger)]	======>	Em 2 [*Metagu* (fear/ anxiety)]
Em 1 [*Ker* (happiness/ excitement)]	=====>	Em 2 [*Song* (justifiable anger)]
Em 1 [*Chegas* (romantic pride/self confidence)]	=====>	Em 2 [*Lugumet* (discomfort/guilt)]

*The numbers are used to distinguish the different actors involved in an emotion event.

Em 1 [*Tang* (frustration/ grief)] =====> Em 2 [*Fago* (compassion/ love/sadness)]

Schema (3) can be termed a basic level schema on the basis of the frequency of explicit statements and implicit, necessary inferences that would instantiate it in everyday Ifaluk discourse. On the other hand, propositions of this sort may be formed through a chain of inference linking together propositions of types (1) and (2). For example, the statement that *song* (justifiable anger) in one person leads to *metagu* (fear/anxiety) in another person could be formed in the following way (note that one person's actions become an emotion-producing event for another person):

(2) Em 1 [*Song*] =====> A [reprimand]

(1) Ev [reprimand] =====> Em 2 (*Metagu* (fear/anxiety)]

Propositions of type (3) probably are formed sometimes in this latter way and in other cases formed directly on the basis of a schematic structure of type (3). The more common and frequent dyadic links between emotions, such as that between *song* (justifiable anger) and *metagu* (fear/anxiety) likely are learned by children in the direct form of schema (3). Knowledge of these dyadic links, in fact, is evident in children at a very early age and in children who seem simultaneously unaware of some of the particular propositions of types (1) and (2) that form part of the chain of inference necessary to link conceptually emotions in two different individuals. In other words, children who do not demonstrate understanding of the link between, for example, *song* (justifiable anger) and rule violation are yet able to predict that *song* (justifiable anger) in one person will produce *metagu* (fear/anxiety) in the other. On the other hand, many statements about the relation between emotions in self and other are created *de novo* on the basis of schemas (1) and (2) alone. Whether a chain of propositions of types (1) and (2) or an instantiation of schema (3) is involved in any particular case is an empirical question; however, it can be assumed that cognitive operations of the latter sort are more likely when the more common emotion pairs are involved.

Other evidence for the schematic nature of the structure underlying propositions of this type is also available. In talking about the emotions, the Ifaluk treat them as fundamentally social phenomena rather than, as in the case of American ethnotheory, as predominantly internal psychophysiological events that are simply correlated with social events. A proposition of type (3), if generated by an American, probably more likely would have been made on the basis of inferences about the likely correlations between environmental triggers of an emotion in the first person and an emotion in the second. Among the Ifaluk, on the other hand, people are conceptualized as more directly influencing one another. This means that emotions in one person can lead in a more immediate way to emotions in another. People on Ifaluk believe that they hold important re-

sponsibility for the emotions of others; they may be held responsible for causing an emotion in another (as in the statement "He is needy," which is literally, "He causes me to feel compassion") or for responding with the correct emotion to another's. The expectation of an important degree of emotional symbiosis between individuals is implicitly outlined in Ifaluk emotion theory and lends meaning and schematic form to propositions of type (3).

The dyadic linking of emotions in Ifaluk theory is also informed by the social roles and situational positions of the two individuals involved. The *role structure* that White (unpublished data) has identified as an important aspect of emotion attribution among the A'ara of the Solomon Islands is also involved here; the *speaker, agent,* and *affected* within an event may necessarily have different stances and hence different emotional responses. Although propositions of type (3) do not specify the position of the actors involved, such information is efficiently stored in the definitional propositions that are nested within them.

For example, the pragmatic information encoded in the term *song* (justifiable anger) includes the notion that judgments about whether a particular act constitutes a rule violation are more aptly made by people of higher social status, including the chiefs and older individuals. Someone who claims to be "justifiably angry," therefore, is simultaneously claiming to be in a relatively superior position vis-à-vis the person who has erred. Conversely, the individual who asserts "fear/anxiety" appeals to that term's definitional schema, whose instantiations include a correlation between that emotion and events in which the individual is in a weak (and, hence, often dangerous) position in relation to others or the environment.

A fourth and final schema underlines the Ifaluk view that the situations associated with emotions are not static. This schema represents the recognition that these situations develop in ways that are often predictable, thereby creating expected sequences of emotion in an individual involved in that situation.

(4) If we experience Emotion *X*, then we may later experience Emotion *Y*.

or

Em [ ] =====> Em [ ]

Sequences of events that are of high frequency underlie many instantiations of this schema. Some examples include:

Em [*Ma* (shame/embarrassment)] =====> Em [*Song* (justifiable anger)]

Em [*Rus* (panic/fright/surprise)] =====> Em [*Song* (justifiable anger)]

Em [*Pak* (homesickness)] =====> Em [*Nguch* (sick and tired/bored)]

Em [*Ker* (happiness/excitement)] =====> Em [*Metagu* (fear/anxiety)]

Em [*Filengaw* (incapability/discomfort)] =====> Em [*Mà* (shame/embarrassment)]

As with propositions of type (3), it is not necessary to postulate a single schema that necessarily generates all of the propositions of type (4). Rather, some of the propositions, in fact, can be generated as composites of other schemas. The sequence of *ker* (happiness/excitement) and *metagu* (fear/anxiety), for example, follows from these three propositions:

(2) Em 2 [*Ker* (happiness/excitement)] =====> A [misbehavior]

(1) Ev [misbehavior by other] ======> Em [*Song* (justifiable anger)]

(3) Em 1 [*Song* (justifiable anger)] ======> Em 2 [*Metagu* (fear/anxiety)]

or, in more expanded form:

(2) Em 2 [*Ker* (happiness/excitement)] =====> A [misbehavior]

(1) Ev [misbehavior by other] ======> Em [*Song* (justifiable anger)]

(2) Em 1 [*Song* (justifiable anger)] =====> A [reprimand]

(1) Ev [reprimand] ======> Em 2 [*Metagu* (fear/anxiety)][8]

This returns us to the story of the prancing little girl and the witless anthropologist with which this chapter began. I had interpreted the girl's antics with an ethnotheoretical framework in which happiness is the ultimate good (as well as being "inevitable" in children), but our adult companion viewed the child's behavior in light of the link that, in her view, holds between *ker* (happiness/excitement) and misbehavior. In an effort to head off the disruption that "happiness/excitement" is expected to bring, the woman asked me to stop smiling to open up the possibility of appearing *song* (justifiably angry). This justifiable anger was expected to produce "fear/anxiety" in the young girl. This fear would, in fact, constitute a recognition of the error of her ways; in Ifaluk ethnotheory, the experience would be a positive one that would help her mature into moral awareness.

Goals and schematic range

Schemas are, by definition, very open and abstract knowledge structures. It is clear, however, that in practice only a limited number of instantiations of particular schemas are found and/or acceptable in any culture. Some mechanism must be posited that operates to restrict the range of variables that can be inserted into the terms of schemas. One important factor contributing to the cultural construction of that range as well as to the overall coherence of the ethnotheoretical system is goals.

Goals have a central place in Schank and Abelson's theory of knowledge structures (1977:101–130); in this, goals parallel the traditional position of values in many anthropological theories that attempt to account for the organization and motivation of behavior. According to Schank and Abelson, understanding of events is enabled by the knowledge people have about the goals typically held, both by people in general and by particular types of individuals. Both the prediction and the production of behavior is predicated on detailed knowledge of the plans that can be used for achieving particular goals (1977:70–71).

It is necessary to add that both knowledge about goals and the goals themselves are culturally constructed. Thus, knowledge about the goals of others allows for prediction of behavior, and goals assist in the construction, in the first place, of ethnotheoretical knowledge systems. This relationship between goals and knowledge can be stated more abstractly as a dialectical one between direction (goals or values) and structure (knowledge) in human meaning systems.

Not all goals are created equal. In the first instance, goals exist on several levels from (in Schank and Abelson's example) the most general, such as "Eat," to the more specific, such as "Eat steak at The Steak Pit" (1977:109). At all levels of generality, however, cultural factors work to produce many of the goals held. The question of whether these various types of goals are hierarchically arranged is important. In anthropological discourse, the related question has been raised as to whether or to what degree the general goals entailed in cultural values actually order more specific day-to-day goals and behavior. On the other hand, it may be more apt to characterize things in the converse way (i.e., it may be that the more specific, grounded goals are the dog to the tail of more general goals). Although this issue cannot be dealt with here, it is important to link emerging cognitive science frameworks on the relationships between various types of goal-related knowledge structures with the trail of this traditional anthropological debate.

Each goal also has differential weight or salience. Description of an ethnotheoretical system requires a treatment of the degree of emphasis on a particular goal within a cultural system; thus, although both the Ifaluk and Americans may have the goal of avoiding violence, rates of physical

aggression in the two societies and beliefs about those rates are in dramatic contrast, in part due to cultural differences in the importance attached to that goal.

With the notions of goal generality and goal salience in mind, it is possible to discuss the kinds of goals that operate to constrain and construct the Ifaluk ethnotheory of emotion. At the highest level in any system are culturally constituted goals that apply across many or all domains of knowledge. A general goal such as "Be first" can motivate behavior in a supermarket line, in the classroom, or in discussions with one's spouse. In the Ifaluk case, some of the most important higher-order goals include "Avoid confrontation," "Share food with others," "Comply with the demands of those more highly ranked than oneself," and "Avoid aggression."[9] These goals help structure emotion ethnotheory as well as other theoretical domains. Compare these goals with such central middle-class American goals as "Assert yourself," "Control yourself," "Get ahead," "Know thyself," and "Stand on your own two feet."

Are there not goals that are more general than these latter examples in ethnotheoretical systems? It may be only social scientists and philosophers whose theories attempt to model human goals on a level more abstract that those of the sort just mentioned.[10] In social science theorizing, it is frequently the case that one master goal is posited as the structure behind all or most behavior. Thus, all cultural goals, including those found on Ifaluk and in the United States, might be portrayed as examples of the goal of "Being identified by others as a good person" (e.g., Cancian 1975) or as subserving the goal of acquiring protein or maximizing cash inflow.

At another level, there are goals that are specific to, or of much greater importance in, particular domains of knowledge. In the area of emotion, some Ifaluk goals can be stated in the following terms: "Understand the event" (this in contrast to attempting to understand the internal feeling state or the emotion's role in one's own psychohistory), "Avoid illness by communicating one's emotional stance to others," and "Present oneself as a mature and intelligent person by disclosing many of one's emotional perspectives."

Finally, there is the most specific level at which goals exist – the level of the element or emotion word, where the degree of detail expands greatly. What I am claiming here is that emotion words entail goals; that is, when a case of anger or guilt, *fago* (compassion/love/sadness) or *ker* (happiness/excitement) is identified in a particular person, relationship, or situation, a goal is simultaneously and necessarily identified. Quinn (1982) has argued that goals are also implicated in what she terms *key words*, and that such words "generate" goals. What remains to be done is specifying the process whereby emotion words and key words are linked with goals. A preliminary suggestion is that emotion words do more than just signal the presence of a goal; they may also actively produce goal directionality. By

saying that I am angry, I in fact, may produce a motive, or more likely deepen and clarify an existing motive.[11] This additionally suggests that all understanding (including the emotional) is enabled or enhanced by social discourse; in hearing what we ourselves and others say about emotions, we come to understand better (or create) our goals and other perceptions.

Two types of specific goals are encoded in Ifaluk emotion words, including action goals and disclosure goals. An action goal is a motive to act, an inclination, a directional impulse. By many definitions, emotions are intrinsically motivational (e.g., Izard 1977), and hence goal-laden. Action goals for some of the most commonly used emotion terms on Ifaluk include the following.

Song (justifiable anger): "Change the situation by altering the behavior of the offending party."
Fago (compassion/love/sadness): "Change the situation by filling the need of the unfortunate party."
Ker (happiness/excitement): "Make use of the resources in the situation. Maintain situation."
Nguch (sick and tiredness/boredom): "Persevere, or, If no rules would be broken, change the situation by breaking off the pattern of repeated noxious stimuli."
Waires (worry/conflict): "Seek further information. Seek assistance in decision making."

The action goals for these emotions differ in varying degrees from the goals embedded in similar but nonidentical English emotion words. "Anger," for example, might entail more aggressive goals than does *song* (justifiable anger). Compare the goals embedded in any one of the three American English terms needed to translate *fago*.

Disclosure (or attribution) goals are the second type of goal embedded in each emotion word, and they arise by virtue of the degree of social acceptability connoted by each word. The disclosure goals related to Ifaluk emotion words are affected first by the general domain goal of expressing emotion verbally. As noted, statements of one's emotional posture are generally considered a sign of maturity and intelligence, and people frequently make statements of the form "I am (emotion word)" or "We are (emotion word)." The disclosure value of each emotion is somewhat different, however. *Fago* (compassion/love/sadness) and *song* (justifiable anger), for example, follow the general domain goal very closely; that is, it is considered good to attribute these emotions to oneself and to others. Both emotions are considered moral judgments about the world that people should make.

Two emotions in particular entail nondisclosure goals; these are *gasechaula* (hate) and *ker* (happiness/excitement). The action schema (number 2 above) for *gasechaula* (hate) includes intentionally harmful acts; to disclose hate, therefore, is to disclose the intent to harm, which violates

the fundamental Ifaluk injunction against aggression. As the logic of the meaning of *ker* (happiness/excitement) outlined earlier indicates, an action schema for this emotion includes misbehavior, another act that by definition incurs negative public reaction. In addition, several emotion words, including *baiu* (romantic love/happiness) and *gas* (happiness/pride/confidence), are taboo in mixed gender conversations, primarily due to the terms' sexual connotations.

These latter examples raise the more general problem of the multiplicity of disclosure goals attached to single emotion words. Although a single predominant or overall disclosure goal can be identified for each emotion word, at least as important is the proliferation of goals based on a large number of pragmatic considerations. Ethnotheories may identify which emotions are acceptably attributed in four different kinds of circumstances – when the attribution is (1) to the self, (2) to others, (3) to particular kinds of others (for example, chiefs vs. commoners), and (4) when it occurs in particular kinds of situations (for example, in "crisis" vs. normal situations or in the presence of diverse audiences, such as "mixed company"). Thus, a particular emotion word may entail the goal of nondisclosure vis-à-vis the self, disclosure vis-à-vis others, attribution to relatives and not to nonrelatives, and nonattribution in "mixed company" but disclosure in single-gender groups.

In sum, it is impossible to talk about ethnotheory without talking about the goals it serves and articulates. This is particularly the case in relation to emotion ethnotheories, as emotions are motivational by definition. To separate cold cognition from hot motivations in delineating ethnotheories is to follow the lines of an American ethnotheory about the dichotomous relationship between the categories of "emotion" and "thought," an issue to which I return in conclusion.

It has been suggested that a relatively limited number of general goals constrain the creativity of ethnotheories. Goals place limits on the number and kinds of concepts that can be inserted into the framework of ethnotheoretic schemas. As knowledge about aspects of the physical and social world is developed in the context of attempts to attain particular culturally constituted goals, it is necessary to examine ethnotheoretical knowledge in the context of those aims it was developed to satisfy.

The negotiation of understanding: an example

Up to this point, Ifaluk ethnotheory has been described as if it were a transparent and exhaustive model used to interpret and respond unambiguously to the statements of others. In actual fact, the model is ambiguous enough to allow for both confusion and negotiation of meaning in actual interactions. The inherent ambiguity of all human messages is due not only to their telegraphic nature but also to the fact that ethnotheories are incomplete, not entirely internally consistent or coherent, in

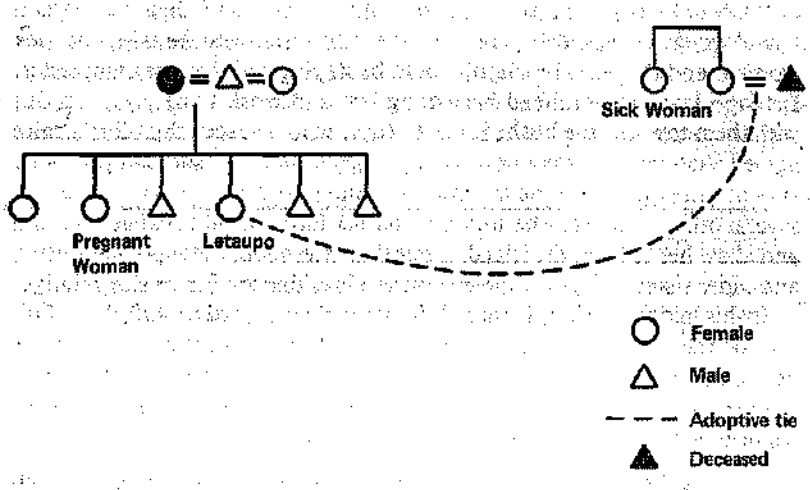

Figure 12.1. Relations among principals involved in the event

process of construction by individuals, and not universally shared in all details among the members of a culture.

This section presents an example of the use of Ifaluk emotion ethnotheory in interaction. The example illustrates that ethnotheories find their meaning in use and in the process of negotiation that occurs each time a situation is linked with an emotion word. This negotiation occurs primarily over whether the case at hand is prototypical of the emotion concept; what is negotiated is the meaning to be assigned to events.

The principal individuals involved in this case are a 32-year-old woman in her 9th month of pregnancy, her father, an older and a younger sister, two younger brothers, and her husband (see Figure 12.1). Word reached this family that a relative, through adoptive lines, of the younger sister Letaupo (a pseudonym) had fallen seriously ill on another island. On hearing this, Letaupo told me and another young woman that she was *waires* (worried/conflicted). She explained that her worry and conflict occurred because she wanted both to be with her pregnant sister and to be with the ill woman, who stood in the relation of "mother" to her.

She did not have to explain that she held the goal that is strongly and universally subscribed to on Ifaluk, which is to be with a relative at the precise moment of death (people have threatened suicide at the prospect of being absent at such a time), nor that she assumed it to be a possibility that her sister might die in childbirth. She also did not have to affirm explicitly her belief that it is very important to be with a female relative during labor and to provide assistance in the seclusion period that follows for mother and child. By asserting her *waires* (worry/conflict), she declared herself to simultaneously hold those two, now conflicting, goals.

Soon after her remark, Letaupo's father came to tell her that he and her older sister would be going to the other island to be with the sick woman, and that she, Letaupo, would be staying with her pregnant sister. Letaupo leapt up, grabbed her young son and work knife, and ran out with them towards the bush. Several people who had seen this all transpire agreed that she was *song* (justifiably angry), and that she had probably run into the bush with the intention of killing herself. She was chased by several other relatives, who told her that her father would change his mind and allow her to leave the island. Later that afternoon, Letaupo, her father, and older sister all left for the distant atoll residence of their sick relative.

By his initial decision, Letaupo's father had attempted to shift the definition of the emotional situation from one of value conflict in Letaupo's position to one in which obedience (rather than any emotional stance) was required of her. By her dramatic behavior, Letaupo had attempted to negotiate the use of the schema that is instantiated as:

Ev [Rule violation] ═══> Em [*Song* (justifiable anger)]

She did this symbolically by her behavior; running into the bush in that manner was interpreted by other people as an instantiation of schema (2), whereby justifiable anger may lead to suicide.

Em [*Song* (justifiable anger)] ═══> A [Suicide]

Negotiation continued after Letaupo's departure, however, because not all parties concerned would agree that her father's telling her to stay constituted a rule violation. Negotiation would also continue over the extent to which the father's leaving the island itself constituted a rule violation, thereby justifying *song* (justifiable anger) in others.

After news of the travel plans of their father and sisters reached them, the adult brothers of the pregnant woman arrived at her household to lend support and to express their views of the behavior of the departing family members. Each man stated several times in the prolonged stay at the sister's home that he had come to tell her about his feelings and thoughts so they would "go away" in the process of being verbalized. Each brother's description of his position was different, however; the older brother said he was *nguch* (sick and tired/bored) while the younger (who was very drunk on coconut toddy) declared he was *song* (justifiably angry). At several points during the afternoon and evening, each man said he had cried over the incident earlier in the day. Afterward, several people told me and others of their concern that other men in the village would *gama* (cause shame and embarrassment to) the elder brother in the days to come.

This series of events is only explicable on the basis of some of the goals and ethnotheoretical propositions held by the Ifaluk. Island men should ideally play an active role in problems and decisions affecting their sisters. A woman's husband should in fact defer in matters such as the one at hand to the wishes of her brother(s). Within the group of a woman's brothers,

as within most groups on Ifaluk, primary responsibility devolves upon the eldest. In the present case, the brothers should have attempted to force one sister to stay on the island to care for their pregnant sister. Thus, the sisters' leaving constituted a "failure" (rather than a rule violation) for the elder brother. The fear that the brother would be ashamed is based on the definitional schema for shame in which:

Ev [being observed in failure] =====> Em [*Ma* (shame/embarrassment)].

Given that it is also believed that excessive shame can lead to suicide,

Em [*Ma* (shame/embarrassment)] =====> A [Suicide]

people expressed sensible concern over community reaction to the elder brother.

It is also interesting to note the difference between the two brothers' definitions of the situation. In general, the events and action goals associated with *nguch* (sick and tired/bored) are more appropriate to a relationship among relatives than to one among nonrelated individuals. Although *song* (justifiable anger) occurs among relatives, the goal of maintaining interpersonal harmony and avoiding confrontation is even more important for kin. In comparing the following two series of propositions associated with *nguch* (sick and tired/bored) and *song* (justifiable anger), it should be evident that the goals associated with kin versus nonkin relations determine which action is more condusive to achieving each of those two types of goals. Given the knowledge structures involved in the Ifaluk ethnotheory of emotion, it is often necessary for individuals, like the elder brother, to declare *nguch* (sick and tiredness/boredom), where others would declare *song* (justifiable anger).

(A) Ev [noxious social obligations] =====> Em [*Nguch* sick and tired/bored)]
Em [*Nguch* (sick and tired/bored)] =====> A [tolerate, persevere]

(B) Ev [rule violation] ========> Em [*Song* (justified anger)]
Em [*Song* (justified anger)] =====> A [reprimand]

Finally, the brothers' statements that they had cried entailed implicit ethnotheoretical propositions and constituted an attempted negotiation of the definition of the situation. Of the several emotions whose action shemas may be instantiated by "crying," the most common is *fago* (compassion/love/sadness). Given that several propositions relating to *fago* (compassion/love/sadness) include the following,

Ev [Neediness] =====> Em [*Fago* (compassion/love/sadness)]
Em [*Fago*] =====> A [Nurturance]

and given that the concept also entails the notion of rank, with more highly positioned individuals being able to experience *fago* (compassion/love/sadness) by virtue of their "nonneediness," it is likely that the brothers were asserting both their compassion for their sister's situation (as well as for their own embarrassing position) and their intention to take care of her needs through the birth, as well as their superordinate status relative to their sister.

The story continues. Let me pass over the long and involved sequence of events in which the principals who remained on the island continued to make creative use of emotion ethnotheory to present themselves and their goals to each other. In particular, discussions about the incident centered around the issue of responsibility and *song* (justifiable anger), with the pregnant woman sometimes expressing the latter, but more often allowing others to declare that emotion in themselves on her behalf. Approximately two months later, the woman had had a healthy baby, and the child's grandfather had subsequently come back to the island.

One evening several weeks after his return, the father arrived unexpectedly at the household of his offended daughter. It was obvious that his purpose was to clear the emotional air. He said he had been thinking about the incident continually and had felt "bad inside." Saying that he had come to ask his daughter to "speak her *nguch* (sick and tiredness)," he proceeded to explain his actions to her; he had gone because he had *fago* (compassion/love/sadness) for Letaupo's adoptive mother, but, he said, "I came right back" (referring to the fact that he had returned to Ifaluk before the death of the ill woman). He told his daughter he had called on the shortwave radio to ascertain her condition, and he had, before he left, asked his sister to take care of her during the birth and postpartum periods. He asked if his sister had in fact done what he asked her to do. If she had, he said, *"Iwe"* (O.K., enough), meaning that there was then no reason for his daughter to be *song* (justifiably angry). If she did not take care of the daughter, *"Ye toar mele i be ser"* ("There is nothing I will say"), meaning he would have no rejoinder to her condemnation of him.

The situation is one that can be defined as creating either *song* (justifiable anger) or *nguch* (sick and tiredness). The father came to his daughter compelled to negotiate a resolution to the emotional impasse at which they had arrived. Even though he might have liked to define the situation as one in which no emotion was even recognizable, his family's general displeasure continued over a long period and required a countermove or response on his part. By asking her to "speak her *nguch*," he placed the event into a category less serious than that of *song* (justifiable anger). He also left the door open for further negotiation by expressing his willingness to listen.

Implicit in his argument is that leaving the island when he did was not

a rule violation if the people he instructed to take over his responsibilities had carried out their duties. He also implicitly acknowledged, however, the possibility of a rule violation, and hence *song* (justifiable anger). The father's discourse constituted a "thinking out loud" about the problem of defining the appropriate emotional description of the situation. This discourse occurred within the general constraints of the ethnotheory of emotion he shares with his daughter, but its specific content reveals the goals the father had – goals of maintaining, if possible, the definition of his behavior as moral while reaching a more harmonious state of affairs with his daughter. The evening ended with the father's visit having been taken by his daughter as an apology, and relations between them returned to normal.

In sum, negotiation within and by use of ethnotheory occurs on at least two levels. The first is semantic and involves motivated discussion over the extent to which an event is a prototypical or good example of a particular emotion. The questions people ask of each other here are of the sort, "Is this *song* (justifiable anger) or *nguch* (sick and tiredness/boredom)? Is this a rule violation or simply a noxious but unavoidable situation?" These semantic questions are framed in terms of the underlying schemas that organize knowledge in the particular domain at hand. Thus, whereas negotiation occurs in these Ifaluk examples by use of the event schema, in the American case it would be at least as likely that the physiological or internal feeling state schema would be used; the questions then might be of the form, "Is this anger or am I just tired? Is he sad or is that just a frog in his throat?"

The second level at which negotiation occurs is pragmatic. People discuss whether it is appropriate to use a certain emotion concept with particular other people in particular contexts. Underlying much of the preceding incident, for example, is the question (not explicitly, rigidly, or absolutely answered by Ifaluk ethnotheory) of whether it is appropriate to associate a set of circumstances with *song* (justifiable anger) if relatives (and particularly older ones) are involved.[12]

Conclusion

This short outline of Ifaluk ethnotheories of emotion only suggests the extent and coherence of this knowledge system. It demonstrates, however, that the role of the emotion word is central for the storage and structuring of ethnotheoretical knowledge in this domain. Emotion concepts have embedded in themselves crucial cultural propositions and in turn are nested in larger networks of knowledge about persons, roles, and goals. The various culturally constructed goals that many Ifaluk share are coded in their emotion words. These words frame particular groups of events as similar and meaningful, and they organize action and role taking within

that frame. This paper suggests that an understanding of how individuals interpret events and of how they plan their total response to them can be built on an understanding of emotion ethnotheories.

I conclude by rejecting one possible interpretation of the structure of this analysis. It is *not* meant to be a model of how the Ifaluk "really feel," nor is it intended as a model of how the Ifaluk "think about their feelings." I have argued elsewhere that the concern with "true, underlying feeling" is a local cultural preoccupation and that the dichotomous categories of "cognition" and "affect" are themselves Euroamerican cultural constructions, master symbols that participate in the fundamental organization of our ways of looking at ourselves and others (Lutz 1985a; 1986), both in and outside of social science.

These categories and their ramifications are neither universal nor do they appear particularly useful in their current unexamined state for several reasons. Our ethnotheories of the nature of the person, of the social, and of the mind lead us to bifurcate our studies into the cognitive and the affective, to conceptualize ethnotheories as involving primarily or exclusively the former, and then to perplex over how emotion can be "attached" to ethnotheories so dispassionately defined. Thus, the questions that must continually arise (and remain unanswerable) include, "Does any particular ethnotheoretical model have an effect on the way people feel and behave (for we know that thought, being not-affect, is thereby not motivational)?" and, more generally, "How does the structure of ethnotheory acquire direction and force (the latter being, we know, provided by the definitionally excluded emotion and its energy)?" In talking about ethnotheories, we play with the relations between the elements of cognition and affect but maintain the elements themselves as conceptual primitives.

The dichotomy of thought and emotion is all the more powerful and seemingly irresistable as it is integrated into a large number of other basic cultural themes and dichotomies; thus, we talk about the naturalness of emotion and the culturalness of cognition, the uncontrollability of emotion and the controllability of thought (or rather the need for control of emotion and the lack of such need for thought), hidden and dangerous emotion and more overt and safe thought. One of the most powerful cultural distinctions in which the thought–emotion dichotomy is enmeshed is between facts and values. The alienation of emotion from thought in our explicit theories has its parallel in the perceived irreconcilability of facts and values and represents another disadvantage to maintaining the former dichotomy.

The current ideology and practice of science no doubt underline the importance of the distinction between mental activities (thought) and bodily activity (physical labor as well as emotion), between the judgment of matters of fact (primarily executed in the realm of thoughts) and the judgment of good and bad, or matters of value (often associated with the emotional). It would perhaps be surprising if we did *not* tend to model

the world on the basis of our own activity and values as social scientists; if we did not find our informants also maintaining a time and a place for rational, cognitive thought and a time and a place for emotional experience, with ethnotheory then clearly representing their efforts in the former field. If the concepts of emotion and thought were more integrated in analyses of ethnotheories, it might be less tenable to maintain the position that social science develops independently of its social and cultural milieu. As an overly rigid distinction between facts and values is predicated on there being an objective distinction between how we think about something and how we feel about it, a breakdown of the latter would undermine the former and, with it, the view that it is possible to do social science independent of one's socially and culturally constructed interests.

This paper, then, represents my motivated representation of how the Ifaluk passionately model a selected aspect of their psychosocial world. In calling this the Ifaluk "ethnotheory of emotion," I do not mean to imply that they, like us, habitually separate cognitive from affective functioning (Lutz 1985b). Their ethnotheory of emotion is, in both their own and my views, a theory of the whole. Rather than an ill-fitting overlay of cognitive understanding on inchoate emotional experience, what is described here is a set of Ifaluk propositions infused with goals and meaning, interest and intentions.

Notes

1. An earlier version of this paper was delivered at the Conference on Folk Models held in May, 1983, at the Institute for Advanced Study, Princeton, New Jersey. A still earlier version was presented at the 80th Annual Meeting of the American Anthropological Association in Los Angeles in 1981, in a symposium organized by Dorothy Holland and Naomi Quinn and entitled Folk Theories in Everyday Cognition. I would like to thank Edwin Hutchins, Bonnie Nardi, and John Kirkpatrick as well as Dorothy Holland and Naomi Quinn for their helpful comments on earlier drafts. The field research on which this paper is based was conducted in 1977 and 1978 with the kind assistance of the people of Ifaluk and with the aid of NIMH Training grant # MH 5-T-2-14088 to Beatrice Whiting.
2. *Folk theory, cultural theory,* and *ethnotheory* are often used synonymously. The latter term is used in this paper to avoid the connotations of the word *folk* (in the American Heritage Dictionary, it is defined by use of the terms *unsophisticated, unrefined,* and *common*), which implicitly and unnecessarily posit a hierarchic relationship between this type of theory and others.
3. It is interesting to compare two of the major directions taken by people pursuing the long-standing anthropological interest in belief systems. Cognitive anthropologists have been interested in examining belief systems as systems of elements or concepts and as a set of relations between those elements (e.g., Casagrande & Hale 1967; Colby 1975; D'Andrade 1976). Another group of individuals has been interested in the simultaneous examination of the belief systems of the anthropological observer and of the observed (e.g., Dumont 1978; Riesman 1977). Despite their interest in the process of understanding and their concern with questions of validity, cognitive anthropologists have

tended to be relatively uninterested in examining the anthropological research act itself as a process of constructed understandings. The positivist tradition within which cognitive anthropology has developed has meant that its methodological task has been construed as one of "eliminating" observer bias rather than illuminating it.

4. The analogue between computer and human subject is one with obvious limits. To maintain a perspective on those limits, it seems useful to conceptualize this particular analogical exercise as a cultural task. As we model the computer in our own image (and as our image of ourselves is affected by the presence of that technology in our midst), and as that image is a culturally constructed and culturally specific one, it follows that the computer's "failure" to process information in the correct manner represents a cultural judgment that we make about the proper or dominant goals, nature, and content of mental activity.
5. This usage follows D'Andrade (1976). In some cases, the indeterminacy noted may be on the part of the ethnographer, but in most cases it represents indeterminacy in observed use of the emotion terms. This indeterminacy of use often reflects the existence of important and specifiable pragmatic considerations; for example, a severe illness in a close relative will definitely call for *fago* (compassion/love/sadness), whereas a minor cold in a stranger would not (the latter marginal case of illness might call for a marginal case of *fago* 'compassion/love/sadness'). Or, frequent requests for tobacco from a beloved friend would not call for being *nguch* (sick and tired), whereas those same requests from a mentally retarded neighbor would. In other cases, the indeterminacy reflects the fact that people can choose from an array of ways of thinking or acting on the basis of their own *tip-* (will/desire/feeling), which may be unpredictable; for example, in a proposition of type (2) described below, a person may choose to "walk around" but not laugh in conjunction with feeling *ker* (happy/excited). Thus, neither of the latter two behaviors has a determinate relationship with the emotion.

   Although there are many other potential sources of indeterminacy in this model (e.g., it is an aggregate model, which should reflect the fact that some individuals hold to particular propositions with more certainty than do some other individuals), these three are the major factors leading to the use of the probabalistic broken arrow. It would be important, in a more detailed model that space will not allow, to distinguish among them.
6. Preliminary analysis of transcripts from interviews on emotion with middle-class adults in urban upstate New York reveals that many definitions of emotions are of the latter type. For example, for one man, "[Annoyance is] a sort of a buzz that you have which sort of prevents you from really experiencing things and trying to understand them in some sort of perspective. It's like a narrowing of perspective." And, for another individual, "Boredom to me I guess is having energy and you don't know what to do with it."
7. G. White (unpublished data) presents a framework for examining the emotional discourse of the A'ara people of the Solomon Islands that includes many of these factors. The assessments made by A'ara include (1) moral evaluation of an action, (2) role structure, (3) social relations, (4) responsibility, and (5) intentionality. The notion of "sadness," then, for example, points to a rule violation with a focus on the "lack of intention or on social ties between Perpetrator and Affected." As seen below, when the Ifaluk stress social ties in such a negative situation, they tend to minimize the moral aspects of their emotional judgments and frequently use the term *nguch* (sick and tired/bored) to describe the situation. Comparative contrasts such as these point to the usefulness of an analysis of what White characterizes as "backwards inferenc-

ing" in emotion-word use and to the importance of such understanding for dealing with the problem of translation.

8. Diverse chains of inference may be involved with some of the other propositional examples. For example, *pak* (homesickness) often leads to inactivity (schema 2) brought on by the desire to sit and think about missing loved ones (schema 2). A situation of inactivity often produces *nguch* (sick and tired/bored) (schema 1). Thus, *pak* =====> *nguch*. As another example, *rus* (panic/fright/surprise) is often caused by sudden, unexpected noise, including particularly noises that are thought to be those of a spirit (schema 1). If *rus* (panic/fright/surprise) is found to be caused by an intentional human agent (if, for example, a child has secretly made the noise in order to frighten another), then it is expected that *song* (justifiable anger) might follow, as intentional frightening would be considered misbehavior (schema 1). Thus, *rus* =====⇒ *song*. The Ifaluk have come to expect that one sort of event (e.g., spirit encounters) may sometimes turn out to be an event of another sort (e.g., spirit imitations or misbehavior). In sum, there are a variety of links between and among events, actions, and emotions that may be evoked in understanding sequences of emotion in an individual.
9. For any ethnographic observation, it is almost always possible to object that the description offered could equally well apply to one's own or other contexts and thus cannot be evidence for cultural difference. These objections nearly always arise, it seems, when the question of differential salience or emphasis in goal structures across cultures is ignored.
10. This type of thinking can sometimes be observed in laypersons whose goal it is to characterize, as simply as possible, the behavior of people whose "otherness" is being emphasized. Ethnotheories about women generated by men in many cultures, for example, often appear to describe women as "single-minded," that is, as motivated by a single (and often unworthy) goal. In general, the singleness of the other's supposed purpose is often a sufficient critique in comparison with the more multifaceted goal structure with which the self is theoretically endowed. Thus, it is important to question the social contexts in which goal descriptions, both academic and lay, are generated.
11. See Hochschild (1979), whose notion of emotion work is useful for modeling this creative aspect of emotional response.
12. I am not suggesting here that the Ifaluk are working with an implicit semantic/pragmatic split in their thinking about emotional meanings. In the absence of the referential emphasis that exists in the Euroamerican ethnotheory of language (Good & Good 1982; Rosaldo 1982), the Ifaluk are more likely to recognize implicitly that they are engaged in the process of simultaneously using and constructing their language and their emotional meanings.

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13

Ecuadorian illness stories

CULTURAL KNOWLEDGE IN NATURAL DISCOURSE[1]

Laurie Price

The theme of illness occurs frequently in conversation the world over. Illness stories, set apart from the conversational flow by certain structural features, encode cultural models of causation, extensive situation knowledge (Holland 1985) about appropriate behavior when someone is sick, and a vast amount of cultural knowledge about types of treatments and health specialists. Because the tasks of coping with illness fall heavily on family members and friends of an afflicted individual, there is a general need for access to cultural knowledge about ways to respond to different illnesses. Through hearing illness stories, individuals expand the cultural models they use to think about and interpret illness.

During the course of conversation in the highland city of Quito, Ecuadorians often tell one another about health problems that they or others have suffered. Many different cultural models can be discerned in this discourse, but it is situation knowledge of social roles that is most dramatically and exhaustively encoded. Ecuadorian illness stories often transcend their topical focus and express general models of the family, of neighbor and friend relationships, and of social hierarchy in Ecuadorian society. Before discussing these models, this paper briefly summarizes the ethnographic context of illness story-telling and the structure of illness stories.

Ethnographic context

This analysis is based on one year's field research in a marginal, largely Mestizo neighborhood of Quito, Ecuador. Residents of the barrio, here called Las Gradas, tell numerous stories that can be broadly labeled *misfortune tales*. In addition to illness narratives, some of these stories concern car accidents, domestic conflicts, and presidential assassination. This discussion refers only to accounts of illness. Data are "extensive stretches of naturally situated talk," to use Michael Agar's phrase (1982:83). Even though I listened to many stories, I cite examples here only from the recorded narratives of 14 individuals discussing 4 cases of illness. As described in Appendix 1, 3 of the afflicted individuals are children; the fourth

is a middle-aged woman. The 14 narrators are all people who played an active role in the illness situation they describe. In addition to hearing conversation about these cases, I observed some of the events and relationships pertinent to each case. Such ethnographic observation promotes more valid analysis of narrative material. For instance, observation reveals aspects of a situation that narrators downplay or omit from their accounts; such omissions often suggest underlying assumptions about shared cultural knowledge on the part of the narrator.

A NATURAL FORM OF DISCOURSE

Evidence that illness stories are a natural form of discourse, rather than a task imposed by the investigator, comes from participant observation in the social life of the neighborhood, from the form of the recorded narratives, and from the many references to other stories that informants say they heard from other people. Friends in the barrio told me illness tales before I showed any special interest in them. Once begun, narrators typically continue their stories with little or no prompting. In some of the transcripts, the same information is presented two or three times in the same basic form and even in many of the same phrases. This suggests that certain narrative sections are remembered by the narrator in chunks, perhaps with particular phrasings or key terms attached. Probably, the same chunks had been related before to other listeners. Few of the storytellers refer to being in an *interview frame* in Tannen's sense (1979).

Most compelling of all the evidence for natural occurrence of this discourse is that about half of the 14 recorded narratives refer to *other* illness stories that narrators had previously been told and had remembered. These "stories within stories" demonstrate that not only do people communicate vital information about illness in story form, but they also remember and apply stories they have heard to situations that arise in their own or others' lives at a later date. For instance, in the narratives about Isabel, the child's mother and grandmother retell stories they had heard about two other individuals with similar disabilities and their treatments.

ILLNESS STORIES IN SOCIAL CONTEXT

Illness stories occur most often in conversation among good friends and among barrio residents and relatives living elsewhere. Women tell the most illness stories, and they tell them mainly to other women in settings of semiprivacy. Some individuals are especially adept at telling this type of story, and such "specialists" tell them more often than others.[3] Barrio residents derive a number of cognitive and social benefits from telling and listening to illness stories, although these benefits are generally not consciously sought or recognized.

First, conversation about illness has problem-solving value because it transmits useful technical information about such things as home remedies, disease symptoms, health care specialists.[4] Even if this information is not

immediately relevant to the listener's current problems, it enlarges his or her fund of cultural knowledge with which to meet future illnesses.

Second, through exposure to the many causal propositions in illness narratives, listeners expand and refine their own theories about disease. Such propositions constitute the raw material from which people weave "folk systems of interpretation" (Bohannan 1957). In actual illness situations, a viable cultural model helps individuals locate problematic experiences in a framework of meaning and allays some of the anxiety associated with the situations.

Third, many illness stories focus attention on the caretaker role of the narrator. The narrator frequently asserts in an implicit way: "I did the right thing." This public declaration constitutes a way of negotiating the meaning of the illness events and may be an important source of social validation for the narrator. Finally, it may be hypothesized that sharing illness stories reinforces bonds of mutual support among individuals and intensifies friendships, much as sharing life stories appears to deepen social relationships among middle-class North Americans (Linde this volume).

Structure of illness stories

The illness story follows rules for internal coherence and can be regarded as a *speech act* in the sense of a component of a speech genre. It is an unlabeled speech act, though, and Ecuadorians do not as clearly acknowledge it as a distinctive unit in the way that North Americans acknowledge, for example, a therapeutic interview, lesson, or court case as distinctive units (Hymes 1972; Linde this volume).

Several features set the illness narrative apart from the rest of the conversation. The beginning of the narrative is anchored in a particular time and place, the *orientation,* to use Linde's term (this volume). Typically, the orientation describes how the illness started, its earliest symptomology. Sometimes, however, the narrator begins the story further back in time with description of what caused the illness. In a few cases, the narrator's particular role in the events may lead to his or her anchoring the story at the point at which he or she entered the action. Finally, if the narrator has already told the audience at some other time about an on-going illness, he or she may begin subsequent segments of the story at a time and place appropriate to the new installment.

From the beginning time and place, the narrative moves forward chronologically, describing various events along the way that are pertinent to the illness, such as attempts to treat the malady, struggles to get funds to pay for specialist care, and family interactions about the illness. For an illness story to be coherent, the narrator must at some point discuss cause. This usually occurs at or toward the beginning of the story but may recur throughout the narrative, as the unfolding events are associated with changing notions of cause. Like life story segments, many illness narratives

contain a *coda* or end phrase. Common ones are: "And, so, that is what happened," or "And now, she is as you can see." Appendix 2 points out the structural features identified in one illness narrative used in this analysis.

Cultural models in illness stories

Stories told among Las Gradans acquaint listeners with entire episodes of illness that they have not personally experienced. As evident in the retelling of such stories, the entire episode often gets stored in listeners' own memories of events, in streamlined form. Such discourse plays a dynamic role in the construction and refinement of shared cognitive models pertaining to illness. Second-hand episodes contribute to development of schemas, particularly schemas for situations that do not occur very often. Furthermore, natural discourse about illness transmits factual information about treatment and specialist alternatives, causal notions, situation knowledge about social roles in illness, and a picture of the narrator's feelings about the events he or she describes - the *affective propositions* expressed in a narrative (Labov & Fanshel 1977:105).

Although notions about the causes of health problems are usually more explicitly stated, situation knowledge (Holland 1985) about appropriate behavior when someone falls ill constitutes the pith of what these narratives communicate and is the primary focus of this analysis. Such situation knowledge is organized within more broadly applied cultural models of the family, of extrafamilial social support, and of social hierarchy and biomedicine in Ecuador.

ANALYSIS OF ILLNESS STORIES

Just as a life story reveals the cultural knowledge by which an urban addict survives (Agar 1980), and interviews with North Americans reveal cultural models of marriage (Quinn 1982), so do Ecuadorian illness stories contain numerous "traces" of cognitive models that bear on interpretation of illness. Because tacit (understood) knowledge shapes natural discourse to such a large degree, important traces are found not only in what is said, but also in what is left unsaid.

In telling illness stories, narrators take for granted that listeners share many of their assumptions about how the world works. The missing "shared knowledge" must be filled in, if outsiders are to understand the logical connections among utterances, and the cultural models that underlie them. For example, Passage A in Appendix 3 forms part of a narrative by Olivia about her little sister Susana's acute illness at the age of 1. Olivia describes the treatment and says: "We did that and it helped her." Her account does not mention the fact that, at the time, Olivia was quite young (12 years of age) to be taking an active role in the treatment and care of her sibling. If a similar story were related in North America, the speaker

probably would have included her age as a salient fact. In contrast, among marginal Ecuadorians, young girls are typically expected to carry grave responsibilities in the care of younger sisters and brothers. The Ecuadorian narrator might lose the audience if he or she emphasized this feature of the action. By *not* making a special point about such behavior on the part of a 12-year-old, such a narrative both reflects and reinforces cultural expectations that such behavior is "normal and natural."

What are, from the outsider's standpoint, omissions of information (due to narrators' assumptions about shared cultural knowledge) tell us a great deal about cultural differences between North America and Ecuador. We must also assess parts of the narratives that seem unusual to us as outsiders in the opposite way: that is, why some facets of a story are presented with what seems to us to be overelaborate detail.

Often, elaborations indicate a deviation from the standard expectations for role behavior. For instance, one narrator delivers a lengthy, detailed description of events that prevented her father's presence when her brother died. Clearly, this section of her story constitutes an apology for deviation from the Ecuadorian schema for dying. Narrative passages may also be elaborated not because they represent *deviation* from expectations but because they depict events that are in themselves highly salient to speakers and listeners in highland Ecuador. An example of this is the description of wakes and funerals in Ecuadorian illness stories. The elaborate detail accorded these events no more indicates deviation from the situation schema than does the elaborate detail accorded the dress of the bride and bridal attendants in traditional accounts of weddings in the United States. To understand discourse, we must first determine what the culturally salient actions in a given domain are. Second, we must pay careful attention to narrative context in order to discover how a particular section of highly elaborated discourse relates to the cultural model in question.

Illness stories contain many other traces of cultural knowledge beside the inclusion/exclusion of detail and elaboration patterns. Some other traces explicitly used to analyze discourse include repetitions, key words, generalizations, metaphors, false starts, evaluative statements, and hedges (Bohannan 1957; Labov & Fanshel 1977; Lakoff & Johnson 1980; Quinn 1982; Tannen 1979). Many other discourse analysts undoubtedly base their conclusions on some of these linguistic patterns but are less explicit about doing so. An important question to consider is how each of these traces relates to the underlying knowledge structures that are generating the utterances. E. Hutchins (personal communication) puts the question this way: "By what connections can we claim that generalizations, repetitions, key words, counterexamples, and evaluative statements (and inferences) are traces of knowledge structures in discourse?" A related question concerns the choice of which particular indicators or traces to use in an analysis. With analysis of key words, for example, is it implied that the knowledge structures behind that discourse are primarily organized by way

of key words? The following analysis emphasizes patterns of omission and elaboration to show how illness stories transmit cultural information about social roles in illness situations. Evaluative statements and a narrative device I call the *counterexample* are also shown to be important vehicles for ideas about what is inappropriate or unexpected behavior within the Ecuadorian cultural model of illness.

Situation knowledge, organized within particular cultural models, consists of generalizations about the parts people play, the usual activities these entail, and the *role-identities* associated with a particular kind of situation (Holland 1985). Without exception, illness stories encode significant cultural knowledge about the role the narrator played in the events of an illness. Whether husband, neighbor, mother, or sister, the storyteller always focuses considerable attention on action in which he or she took part. The following discussion of cultural models and schemas must necessarily be limited to consideration of these knowledge structures as they relate only to the interpretation of illness. Although it is suggested that the cultural models described here are more broadly applied to other kinds of interpretations and other kinds of tasks, this analysis does not encompass those broader applications.

CULTURAL MODEL OF THE FAMILY

Responsibilities and activities of mothers occupy a distinct and central place in the Ecuadorian model of the family. The mother is the core of the family, as conceived by marginal Ecuadorians. Mother also constitutes an extremely powerful symbolic entity in cultures that, like Ecuador's, are shaped by Hispanic Catholicism. The symbolic power of the mother image derives from associations with the Virgin Mary, "Mother of God," and with numerous miracles attributed to her – miracles that have detailed histories, concrete locations, and tangible commemorative events associated with them. Since motherhood is modeled after Mary, it symbolically entails that peculiar mixture of ravishing but saintly beauty made somehow more beautiful through suffering the pain of love and death. Motherhood as an image embodies the ideal of love that is superhumanly strong but that nevertheless offers practical help and is gentle and approachable.

Motherhood in illness narratives. A striking example of cultural assumptions about mothers' roles is found in the narrative Sra. Maria tells about her crippled daughter, Susana. The assumptions are revealed not only by what she says but also by what she does not say. In her story of the events, Sra. Maria never mentions that for months she daily carried her 6-year-old daughter (in a cast from waist to ankle) down a 200-step flight of public stairs and 4 blocks to the nearest bus stop so the girl could go to physical therapy. This constitutes an extreme example in that the father of the child drives a bus parked near the house every night. During the many months

of this grueling routine, the couple never made arrangements to shift some of the responsibility for Susana's transportation to the father. Also, people talking about the child's condition take for granted this herculean effort on the part of the mother; such efforts are the unmarked case for mothers. General statements about mothers and counterexamples in the stories reveal cultural knowledge about the significance of the mother's role. Narrators say, "Only God knows the mother's heart," and "the pain of a mother is like that." Explicit general propositions about husbands or daughters or other roles or role-identities do not appear in these illness narratives.

Counterexamples, or narrative descriptions of individuals who are not fulfilling their roles adequately or in expected ways, throw into sharp relief the role expectations attached to mothers in illness situations. Passage B of Appendix 3 describes the behavior of mothers who leave their children in the public hospital and do not participate actively in their care during hospitalization. The emotionally charged tone of the passage should be evaluated in light of knowledge about hospitals in Ecuador, with their inadequate nursing attention and risk of death. Both the tone and the repetition of "She didn't come, she didn't come . . ." reveal not only that the narrator is making a statement about a deviation from her cultural schema for the mother's role but also that she has strong feelings about such a deviation. This passage and others like it reveal feeling and thought as "parallel systems of processing" (D'Andrade 1981; Zajonc 1980). The mother is saying, in effect, "Mothers are supposed to be near their children and take part in their physical care, especially if they're in the hospital, because they will probably die otherwise." The emotions attached to this counterexample can be paraphrased as, "I feel bad about these sick, abandoned children and good about myself for not being a mother like that." Affective propositions are so central to most of these illness narratives that it can be said that if cultural models of social roles drive the narratives, emotional propositions are the fuel that empower them.

More counterexamples about motherhood occur in the narrative told by Elsa's neighbor, Mercedes. In fact, Mercedes's account of Elsa's condition is one long counterexample; it thoroughly dramatizes a number of instances in which Elsa failed to meet her responsibilities as mother of a family. Passage C exemplifies counterexample material in Mercedes's illness story. The same facts also appear in accounts of the illness given by other individuals but are not presented to imply personal fault. For instance, Elsa's daughter Rosa mentions the multiple miscarriages as a possible cause of her mother's illness but does not imply that these could have been avoided. The point here is that counterexamples can easily be constructed out of facts pertaining to an illness, but narrators who present counterexamples usually have an affective point to make.

A corollary proposition to the one that the mother is the vital core of family life is that marriages that produce no children are in trouble. In the

Las Gradan model of the family, children not only bring fulfillment to the mother, they are also what "glues" (*pegar*) a man to his wife and conjugal home over the long run. All of this logically fits given the initial premise that a family unit must have a mother to flourish; children are what turn a wife into a "real" mother.

Gender differences, collective responsibility. The cultural model of family revealed in these illness stories shows clear gender differentiation in expectations about decision making, economic arrangements, nursing, and other role activities associated with health problems. Female family members (e.g., wives, mothers, sisters, daughters) are expected to bear the main burdens of nursing the ill at home and making forays into the specialist health-care system on behalf of their families. Although the prototypic family role for a woman is that of mother, the cultural model prescribes that the burden of caring for the ill be borne collectively by related females within a household compound. (Ethnographic observation confirms this as a general behavioral pattern.) Expectations of collective female responsibility for therapy management and caretaking of children are reflected in narratives about 3-year-old Isabel. The child's mother, grandmother, and aunt reside in the same compound. In talking about attempts to cure the child, each of them uses the plural pronoun "we" rather than "I." Context shows that the "we" refers to the three women. Males make cameo appearances in the accounts but are always clearly identified when they play a part.

Cultural knowledge about male roles. What do accounts of illnesses convey about Ecuadorian folk theory concerning male roles in such situations? The male head of a household may be described as *padre de la familia* (father of the family) or just as frequently as *jefe de la familia* (chief of the family). This is partly an administrative position but also involves financial support of the family unit. All adult males in the household are expected to earn money and contribute some of their earnings to the family. Apart from this expectation, male roles in family life at home are not as clearly defined as are female roles – there is no single prototypic male role identity nor set of usual activities within the home as there are for females. The model accords males the freedom to come and go, with their primary responsibility being to support the family financially. Even though pain is manifestly and prominently part of cultural expectations about the mother role, male roles within the family are not associated with suffering or pain. It appears that the Ecuadorian cultural model of the family allows, indeed encourages, women to feel fully the anguish of a calamity that befalls a family member but does not prepare men either psychologically or socially to acknowledge that kind of anguish.

Illness narratives indicate that men have, or know where to get, cultural knowledge about seeking therapy and about home treatments. The nar-

ratives also indicate, however, that no one expects men to get involved in those activities if women in the family are available to assume the responsibility. In Passage D of Appendix 3, Carmen (the mother of the toddler who fell on the public stairs) recounts events at a moment when the child's condition worsened. She mentions Ramiro's reluctance to wake up and help care for the child but does not evaluate his behavior negatively. Rather, she excuses it by pointing out the hard work that led to the father's fatigue. His refusal to get up does not indicate lack of affection for the child according to his wife's story. She later describes him as desperately wanting to obtain good specialist treatment for Lucia. While at home, however, he sleeps, secure in the knowledge that the mother will do everything she can do to care for the child and in the knowledge that he is not necessarily expected to get actively involved at home.

What happens, given the Ecuadorian model of family life, when the mother of a family becomes chronically ill? Clearly, this kind of situation would be likely to generate different interpretations than the same condition suffered by a child or a male member of the family. Among other things, this type of situation can produce serious role strains within the family, which will be reflected in illness narratives. In Case 4, which is summarized in Appendix 1, Fernando takes an active part in managing his wife's therapy. His 17-year-old daughter is too young to take on full responsibility for this, although she does do all the primary caretaking of her invalid mother at home. (Neither she nor her father point to her full-time devotion to her mother's care as anything worthy of praise; such a role for the eldest daughter at home is the unmarked case.)

Themes of money and treatment costs pervade Fernando's account of his wife's affliction. He talks at length about the expense of various consultations and treatments, giving precise figures, and also about his personal efforts to obtain funds to finance specialist care. Overall, men's narratives show more concern with the economic dimension of illness situations. In addition, female narrators often make a special point of noting the participation of men in the economics of health care. An example of this is found in Passage E, in which Isabel's mother and grandmother give credit to the child's grandfather, her mother's father, for playing a vital role in financial decision-making about treatment. This and other passages reveal that the cultural model of illness situations prescribes an active role for males in matters of money, especially in negotiation with formal financial institutions. (The primary source of commercial loans for marginal Ecuadorians is at their place of employment. Men are more likely than women to hold structured employment. So, men's greater responsibility for this aspect of coping with illness derives from both economic contingencies and cultural ideals.)

Sra. Maria also emphasizes male participation in certain decisions made about surgery for her daughter. She describes her early attempts to get help for the child. The third doctor she consulted told her the child needed

an operation immediately. Her story continues, as noted in Passage F, in which she shows that her husband has the final say about treatment. A few years later, Sra. Maria took her daughter to traditional curers, and then, following her mother-in-law's advice, she consulted a physician. First, she says that *she* went to see the doctor. Then she amends this and specifies that she and her *husband* went to see him. Passage G, like many of the narratives, indicates the special recognition given to a man for playing even a minor part in the management of an illness in the family. Narratives reinforce the cultural expectation that women automatically assume major responsibility for caretaking and seeking therapy, while the final authority lies with men to make decisions about treatment that involves more than incidental expense.

Fernando's story about his wife's problems demonstrates abundant knowledge about certain aspects of the specialist health care systems; the majority of this account centers on his efforts to get effective treatment for his wife. The narrative also reveals a cultural bias in favor of including women, even young ones, in efforts to manage the therapy of a sick family member. On most of his forays to seek specialist care, Fernando took along one or more of his older daughters. His grown sons who live at home did not participate actively in the illness situation. Their behavior elicits no special criticism, just as the daughter's caretaking behavior elicits no particular praise; both the sons and the daughters are conforming to the cultural expectations in a case of this sort.

Folk "physics" of health behavior. Narratives reveal the cultural notion that a special impetus is needed to "get moving" on health problems. A key concept in the "physics" of motivation is embodied in the phrase *hacer empeño*. This phrase means "to get someone (or oneself) moving to accomplish something." Even though people take for granted tremendous ambivalence about acknowledging a health problem as serious and about "moving" into action to seek specialist care, they also expect family members to monitor each other's health and push for specialist consultations. In Passage H, Sra. Maria credits her mother-in-law with pushing her (putting her in motion) to see another surgeon about her child's infirmity. Isabel's mother and aunt discuss their efforts to get a cousin "moving" toward treatment. Illness narratives suggest that the typical "motivator" is a member of one's family network, but not necessarily of one's immediate domestic group. In addition, narratives reveal that pushing for action on a health problem does not necessarily entail expectations of follow-up help with the mechanics of finding or financing specialist care.

MODEL OF EXTRAFAMILIAL SOCIAL SUPPORT

Ecuadorians hold distinctly different notions concerning roles and social support within the family and roles and social support characteristic of extrafamilial relations. Many illness stories implicitly address this ques-

tion: "How do you mobilize other people to help with an illness in the family when they have expertise or access to assistance that you don't have?" A counterbalancing and equally important component of this model consists of propositions to the effect that help available outside the family circle is quite limited and should not be depended on except in certain rare circumstances.

The proposition that only family is expected to help constitutes tacit knowledge and is expressed when illness story narrators simply omit comment on help that is not forthcoming from friends and neighbors. However, when asked about social support, many Las Gradans do not hesitate to state the proposition directly. They say, "neighbors don't help each other here"; "the only ones you can really depend on are family"; and "nobody (neighbors) really knows each others' problems here." This proposition is further embodied in other cultural representations that are part of the Las Gradas verbal tradition, in particular, proverbs. Proverbs such as those cited below reinforce the cultural model of extrafamilial social support by reminding people to keep their distance from others, to think in terms of reciprocity, and to beware of giving or receiving too much kindness, especially outside of a standard reciprocal exchange context.

"Too many visits make you less welcome."
"Give the hand, get grabbed by the elbow."
"Every burro with its own saddle."
"Today for you, tomorrow for me."
"Hands that give, receive."
"If you give bread to a strange dog, you'll lose the bread and lose the dog."

Explanations of these proverbs by Las Gradans indicate that people interpret them primarily as advice to use caution in conducting relationships outside the family. Ethnographic observation shows that neighbors and friends do, in fact, help one another considerably in coping with various problems. But this fact in no way detracts from the authenticity of the cultural propositions that they do not, or the admonition that one should not depend on them to do so.

Another counterexample reveals the proposition that only family will help. A neighbor of the toddler's family describes how doctors regard her supportive behavior in that family's crisis as quite unusual. She describes events at two institutions where she accompanies the child's mother to seek treatment. At both locations, staff members ask her: "Who are you? Are you the child's mother? If you aren't, why are you so concerned and involved in this?" Here, the narrator presents her own behavior as a counterexample. By elaborating on the surprise of the medical personnel, the narrative shows that the neighbor interprets her own behavior as an exception to the standard cultural model.

Even while the cultural model of extrafamilial social relations leads

marginal Ecuadorians to limit expectations of aid from nonrelatives, it also embodies knowledge about culturally appropriate strategies for developing the kind of extrafamilial relationships that most likely will result in instrumental and other social support. People obtain much of this knowledge from descriptions other people give of how they managed to build these connections. Isabel's family recount how they pursued the ideal strategy for marginal Ecuadorians faced with serious illness. They found benefactors. As described in the narrative, the primary benefactor was located on the advice of a friend and a salesclerk. Isabel's mother and grandmother credit this female doctor (*doctora*) with saving the child's life and curing her infirmity.

CULTURAL MODEL OF SOCIAL HIERARCHY AND BIOMEDICINE

Many different terms exist by which people in highland Ecuador place one another within a distinct social hierarchy. As Stark (1981) demonstrates, how people use these terms in one highland town varies systematically according to the social category in which the speaker fits. However, social classifications are organized in a very clear-cut way on the basis of *palanca* (literally, "lever," or "handle"). Degrees of *palanca* ranging from "no access to goods and services" to "high access to goods and services" are interpreted as the distinctive features that differentiated people from one another within the social hierarchy. As such, they were used as implicit markers, rather than as explicit labels, of social categories (Stark 1981:391).

Las Gradans also conceptualize the social world as a place in which various categories of people have greater or lesser amounts of *palanca*. This term comes up in a number of the illness stories in connection with biomedical institutions. For instance, a friend of Isabel's family talks about their attempts to get assistance with medical expenses: "[The Patronato] is an organization that helps poor children, sick children, and like that. But you know the bureaucracy, no? If we have no 'leverage' (*palancas*), they don't help us." The cultural model of social hierarchy found in Las Gradas conceptualizes people as possessing different amounts of *palanca*. It also divides them in a dichotomous way according to wealth. This division is represented in the terms *pobres* (poor people) and *ricos* (rich people). Residence in certain barrios of Quito almost automatically certifies one as a pobre or a rico. It is tacitly understood that biomedical institutions belong to and are staffed primarily by people belonging to the latter category. Models of wealth and *palanca* together form the cognitive landscape that pervades schemas of biomedical health care.

Physicians in illness stories. In their illness tales, Isabel's family describes a greedy, unethical doctor who lied to the family during the early stages of their attempts to get treatment for the child. Their descriptions of this physician were constrained and understated, partly because the narrators

were uncertain about where I stood with relation to doctors and other professionals, but more because lack of ethics is nothing remarkable in a doctor from their standpoint. A narrative about a different case shows the ramifications of the proposition that physicians are, as a rule, not to be trusted. The mother of the toddler who suffered fatal head injuries says, "I imagine, frankly, that the doctors gave her a poisonous injection so she would die right away." In effect, this narrative proposes that it is not out of the question to suspect doctors of hastening the death of an ill child.

In contrast, narrators from Isabel's family describe the female doctora who befriended them in glowing and elaborate detail. She is transformed into another counterexample. By emphasizing and elaborating the doctora as a character in their stories, the narrators again reveal that expected behavior on the part of physicians does not include real affection for patients, genuine sympathy, "vows of poverty," or being willing to wait for payment. Their effusively grateful language communicates knowledge about how they expect the typical doctor to act.

Because the doctora's behavior constitutes a surprising deviation from the cultural model of social interactions with professionals, Isabel's family attempt to explain this exception to the rule. They do this through references to person theory (Holland 1985). Passage I expresses their proposition that the doctora is kind and compassionate toward poor children because she is pretty and an unmarried woman with no children of her own. Many other passages in the accounts of Isabel's illness also reveal person theory at work, including direct quotes of the doctora's explaining her own unusual behavior as due to "conscience" and other personal factors.

How do counterexamples relate to knowledge structures concerning social roles in illness? First, narrators who present counterexamples are talking about "exceptions to the rule" that are usually highly salient to them. The exception matters because the rule matters. For instance, counterexamples concerning mothers and doctors indicate that these roles are pivotal ones in the domain of illness behavior. Second, this material throws into sharp relief the cultural model of social roles by capturing the essence of what a mother or doctor does not act like, in the usual course of events. By definition, counterexamples pinpoint the "difference that makes a difference" (Bateson 1972; Hutchins, personal communication) from the emic point of view. Thus, from the two counterexamples discussed here, we find that a standard entailment of the mother role is that, "A mother tends her children, whatever happens." A standard entailment of *doctor* can be embodied in this proposition: "A doctor expects his fee immediately, whatever happens."

Nurses in illness stories. The Ecuadorian model of biomedical institutions clearly distinguishes doctors from nurses in terms of their interac-

tional style with pobres. Before specific cultural propositions about nurses are identified, it should be noted that *enfermeras* (nurses) is a category that marginal Ecuadorians use to refer to practically all the nonphysician practitioner roles women play in biomedical treatment systems; in other words, Las Gradans do not generally distinguish between the Ecuadorian equivalents of registered nurses, licensed practical nurses, and nurses' aides. The differences in licensing and education between these practitioner types are not salient to most Las Gradans.

Medical doctors are thought of as typically greedy and not compassionate, but at least they can be approached by pobres. As Sra. Maria says, "Oh the doctors, yeah, they're nice enough. They answer when they are greeted." While you may not get good treatment from a doctor, at least they are 'civil.'" Marginal Ecuadorians put a great deal of emphasis on respectful interaction styles, particularly on greeting and leave-taking rituals. In contrast to physicians, nurses (particularly nurses who work in hospitals) are widely described in natural discourse as *groseras*. This term can be roughly defined as "rude, uncivil, brutal." One narrator says:

> There are children who can't move [in the hospital]. They can't move and the nurses come and throw their food on the bedside table, [saying] "If you can eat, eat; if not, then don't eat." That's how it is. That's how this type of Señorita is – they have no heart, we could say a word. There was one child that couldn't eat, bedridden like this, they had him with a weight attached to his little leg. I fed him when I came. But, the nurse said to him: "There it is. You have to eat it. What do you want me to do, put it in your mouth? If you can eat, go ahead and take it, go on, eat," she said.

Two things should be pointed out about the proposition that nurses are *groseras*. First, not all illness story narrators communicate that proposition, although they would certainly all recognize it as a common idea in their neighborhood. Second, the cognitive model of social hierarchy as applied to biomedical systems in Ecuador dramatically differentiates hospitals (and hospital nurses) from private clinics (and clinic nurses, by extension). Thus, cultural propositions about nurses may not have as much to do with categorizing the type of person who works as a nurse as with categorizing the typical behavior of nurses who work within a certain type of institution.

Clinics versus hospitals. Private clinics in Ecuador are like small-scale hospitals, with their own surgical facilities and patient accommodations. Clinics are expensive and are associated with ricos (rich people). Hospitals, on the other hand, are public and are supposed to charge nothing, by a recent act of national law. Hospitals are associated with pobres and with inadequate, uncaring treatment. Passage J is profoundly shaped by cultural knowledge about how to maneuver as a "marginal" in urban Ecuador. It reveals a proposition that doctors and nurses, with few exceptions,

should not be trusted to give adequate or compassionate care if one is poor. A concrete expression of this proposition is found in references to "tipping" hospital personnel. The reference to "tips" in Passage J reveals the assumptions on the part of barrio residents that hospital staff expect to be paid directly for giving good service to patients and that inadequate care will be given to patients who fail to observe this custom.

Schemas of therapy management in getting biomedical treatment are profoundly shaped by the distinction people make between clinics and hospitals and encompass a behavioral routine that guides Las Gradan interpretation of efforts to get biomedical care. It is considered important that therapy managers at least attempt to get private clinic treatment before resorting to hospitalization. Only after inquiring about the expense of clinic treatment and finding it too expensive do they turn to hospitals. Not only is this a behavioral routine, but it also constitutes a highly salient element in illness narrative. Many of the 14 narrators gave attention to the clinic-first, hospital-second pattern. As explained in a later section, when narrators describe their efforts to obtain treatment at private clinics first, they are making a social and affective statement that they "did the right thing."

A cultural model of social hierarchy informs schemas concerning biomedical treatment among marginal Ecuadorians. These 14 illness narratives show that biomedical practitioners are associated with higher social status; a distinction is made between doctors and nurses based on interpersonal interaction styles; private clinic and public hospital treatment facilities and personnel are regarded as dramatically different, partly on the basis of social class factors; and, on the whole, their cultural model of biomedicine guides marginal Ecuadorians to be wary and mistrustful, unless they manage to develop a personal relationship with someone who has palanca in the biomedical system.

As the analysis presented in this section shows, illness tales communicate extensive cultural knowledge about social roles in illness situations, including expectations of male and female kin, neighbors and friends, and physicians and nurses. Communication of such information through conversation and narrative both augments and reinforces shared cognitive models used to interpret illness situations. These models constitute a subset of cultural models of social relations in general, as held by marginal urbanites in the highlands of Ecuador. However, illness narratives do more than encode situation knowledge. The following sections show how narrative communication also acts as a dynamic vehicle for subtle negotiations about illness causation and about feelings associated with illness situations.

Theories of causation in illness stories

Illness narratives reveal much greater fascination with the causes of an affliction than with its symptoms or diagnosis; stories present numerous theories about what caused this or that health problem. A preference for

problems of cause has been documented in other cultures as well. For instance, North Americans have been shown to think more about "the consequences and preconditions of illnesses" than the attributes or features that define disease (D'Andrade 1976). Ecuadorians take seriously the task of identifying causes of a sickness, especially in cases of serious or chronic affliction. During informal discussions, people evaluate the truth value of the causal propositions of others. Cultural consensus emerges as participants in a conversation work out the relationships between different beliefs and so refine their explanatory models.

Narratives put forth three kinds of instrumental, or immediate cause. These include physical factors (e.g., temperature), emotional factors (e.g., anger), and behavioral factors (e.g., "She was playing on the stairs.") (Glick 1967). Some narratives also suggest "ultimate" causes, notions that involve some degree of moral judgment of the ill person or family.

MULTIPLE NOTIONS OF CAUSE

It is striking that many narrators put forward a number of different causes for any given illness. Sra. Elsa's daughter, for example, attributes her mother's disease to at least six distinctly different factors: too many miscarriages, anger (*iras*) at children and husband, anger held inside, her son's death, drinking hot medicinal teas prescribed by a curer but not staying in bed afterward, and doing laundry too soon after giving birth to her last child. The daughter's narrative also cites other causes for the disease that have been identified by various health-care specialists and other family members. Sra. Elsa and her husband refer to many of the same causal notions independently of their daughter and each other. The family has obviously discussed the problem of causation, and family members are aware of each others' theories, although no consensus has been reached. Intrafamilial verbal communication about illness is another way in which individuals refine cultural models of illness.

Some narratives demonstrate not only multiple notions of cause, but also an effort to judge the truth of various causal propositions, particularly those promoted by other people. Susana's sister first states that the child's hip malformation was caused by her mother's work as a weaver when pregnant with Susana. Later in her narrative, she returns to the question of cause, presenting a causal notion she has heard from her mother and rejecting it. In Passage K, we see an individual striving for logical consistency between various body notions and propositions about illness causation. Several narrators take such a logical and "constructive" approach to causal theories bearing on illness. In telling illness stories, some individuals are also striving to clarify relationships between different causal notions.

Moral cause and situated social purposes. Relatively few of the 14 recorded narratives express the proposition that an illness or accident was due to someone's immoral behavior. When these propositions are expressed,

it is usually by a speaker who is not related to the sufferer. A neighbor of Carmen and Ramiro's attributes their child's accident and subsequent death to moral shortcomings of family members. The father drinks and abandoned his wife temporarily; the mother does not pray enough. The narrator notes that the child's grandmother had actual caretaking responsibility for the toddler when she fell and yet does not place any blame on this person for negligence. What might seem to us as North Americans to be guilt is not evaluated that way by the neighbor. She is operating with a different set of assumptions about family role responsibilities and about what kinds of actions bring punishment from God and what kinds do not.

A neighbor of Sra. Elsa's traces her illness to many different causes, a number of which consist of irresponsible or immoral behavior. The neighbor, Mercedes, frames her most extreme proposition about moral shortcomings in a way that allows her to get the idea across but dissociate herself from proposing it:

> They say that when an illness can't be cured by doctors, it's a thing caused by the devil. . . .

Dice que, or "they say," is an oft-occurring linguistic device in these stories; it functions to allow the speaker to say something without taking a stand on the truth value of the statement.

When propositions about moral causation are expressed in stories, they reveal a great deal about Ecuadorian models of proper role behavior. The extent to which these notions are openly asserted depends on the narrator's social relationship to the person who is ill and on the narrator's purposes in conversation in a given social context. However, whether narrators openly express such notions, they probably often have these in mind as interpretational possibilities.[5] Thus, social context factors should be taken into account in assessing illness beliefs as a distinctive body of cultural knowledge. How would the system of beliefs about illness that can be distilled from analysis of illness stories compare with the sets of interrelated propositions about illness resulting from a more formal elicitation approach in the same population? This question cannot be answered here since a formal elicitation of illness beliefs was not carried out in Ecuador. However, it seems likely that many illness narratives would reveal more causal propositions of the moral type than would an elicitation study. People tend to think of and talk about moral causes in the context of particular, on-going social relationships. Moral causation probably most often comes to mind in atypical cases of illness – very serious or chronic afflictions. Formal elicitation procedures, on the other hand, may access beliefs only on a general and rather abstract level: Respondents focus on the unmarked case that is largely detached from knowledge of specific people and is irrelevant to the normal social purposes of the respondent in talking about illness.

The point here is that cultural knowledge can best be conceptualized as a system of ideas that people use according to their needs and purposes, rather than as a deterministic grid that directs their thinking. The next, and final, section considers natural discourse from the standpoint of people's social and emotional needs in conversation about illness. Not only do narratives communicate situation knowledge and causal notions, but they also dramatically communicate the narrators' feelings and purposes in the situations they describe.

Communication of feeling in illness narrative

Affect powerfully influences how people apply cultural knowledge to cognitive tasks, as Hutchins shows (this volume). His analysis identifies the affective (in this case, subconscious) connections that lead a Trobriand villager to use a particular myth to explain a seemingly unrelated phenomenon of malevolent spirit visits. It is not surprising that affect also influences the task of formulating interpretations of illness and that many illness narratives make important statements at the affective level.

Most of the recorded narratives analyzed here express feeling in a powerful way, while ostensibly only describing events. The pattern of using narrative to communicate strong feelings indirectly has been documented in other cultures and conversational genres, most dramatically by Labov and Fanshel (1977) in a study of North American psychotherapeutic discourse. In a classic example, they show how a client expresses angry rejection of a therapist's request by telling a story about her aunt. The expanded meaning of the client's story was inferred partly from the authors' knowledge of the client's life (revealed in other therapy sessions) and from such physical factors as the speaker's intonation, pauses, repetitions, and movements. The affective propositions in these Ecuadorian illness narratives have also been inferred partially through contextual information and nonverbal cues.

"I DID THE RIGHT THING."

Many of these illness stories dramatically encode the affective proposition that "I did the right thing" (i.e., "I am a good mother/daughter/neighbor/husband"). The more caretaking responsibility a narrator has for the afflicted person, the more pronounced this affective message tends to be. The more distant the teller is, socially, from the events and the individuals involved in them, the less pronounced this affective message is. Logically, the "I did the right thing" proposition appears in its most distilled and dramatic form in stories mothers tell about their children's illnesses. The Ecuadorian schema associated with "mother" very clearly incorporates an affective component. Just as the term *hot* fuses together a representation of the "factual external condition" and how we feel about that (D'Andrade 1981), so the term *mother* among marginal Ecuadorians

automatically entails a large potential for pain. People are aware of this component of the role and even point it out with general statements. Part of this cultural knowledge is directly experiential. The personal experiences, however, are shaped and reinforced by cultural representations, particularly religious representations.

A mother describes her second round of struggle to get treatment for her child (Case 1). The public hospital to which Sra. Carmen wants the child admitted tries to get her to take the girl to another hospital across town. In Passage L, the woman asserts implicitly that she did all she possibly could to ensure the child's recovery by struggling to keep her in what she thought was the safest hospital available. The same mother presents a second variation of the proposition "I did the right thing" when she describes her resumption of normal life after a long period of incapacitating grief. First, she recounts the events in which a female acquaintance advises her not to cry any more. She describes how friends urge her to moderate her grief, reminding her that the child is in heaven and is watching over and praying for her mother and the rest of the family. Even more central to Sra. Carmen's narrative is description of a dream she had in which her deceased daughter appeared as an angel. In the dream, the child asks her mother not to grieve any more, because the mother's tears are keeping the child from entering a beautiful paradise. Both sections of narrative implicitly assert that the narrator is "doing the right thing" by overcoming depression about her child's death and going on with life.

In his story about his wife's disease (Case 4), Fernando communicates two major affective propositions. The familiar "I'm doing the right thing" assertion is embodied in his repeated and detailed accounts of the many hospitals, clinics, doctors, and religious healing specialists he has taken his wife to see for diagnosis and treatment. The second proposition is the less common, "This illness (ill person) makes me angry and frustrated!" Fernando communicates this proposition through detailed description of how his wife accuses him of being unfaithful, makes unreasonable demands on his time, and does not "really try" to get well (see Passage M).

Another account of Elsa's illness, by her caretaker daughter Rosa, contains the complete and spontaneously included narrative of how Rosa's brother died from cancer. As part of her narrative, she recounts her brother's dying words:

> My aunt told me, "Your brother said this to me. He told me to tell you that he is going to take care of you, to keep watch over you, in order that you go on caring for her." Because I am the only one [of us in the family] that takes care of my mother, that takes care of her, that has the strength to take care of her.

The affective point of this segment of narrative can be paraphrased: "I am struggling, and afraid of this burden, but I am proud of the strength I have shown so far." Of all the illness situations, that of a disabling chronic

disease for which many treatments have been tried and failed provokes the most thought and feeling. Just as the situation is complex and emotionally charged, so are the stories told about it.

WHY SAY IT WITH NARRATIVE?

People often express affective propositions implicitly, rather than explicitly, precisely because making these assertions directly in conversations violates rules of social interaction. Because illness experiences that are worth talking about tend to be highly emotionally charged, feelings may be what narrators most want to communicate to their listeners. Affective propositions that are prominent in many Ecuadorian illness stories can be paraphrased as follows: "I did the right thing"; "My part in these events was important"; "I care deeply about this (ill) person and am upset by his or her suffering"; and "This situation makes me very angry and frustrated." One other affective proposition that many illness narratives clearly express concerns specialist health care, particularly biomedical health care. This emotional theme can be paraphrased along the lines of: "We resent being deceived and treated disrespectfully by medical personnel without compassion; we feel bad being so powerless." Since Ecuador offers no recourse to victims of medical malpractice, illness stories constitute one of the few ways to air grievances and warn others of especially hazardous health-care facilities.

Although documentation of this pattern awaits further research, illness stories suggest that Ecuadorians prefer to exchange information about emotions by means other than emotion words. The recorded narratives analyzed here contain very few direct statements about feelings (statements of the sort: "I was very sad about that"; or "They have been very anxious and worried"). We can imagine that in the United States someone telling a story like that of Elsa's daughter Rosa would include direct statements about emotion states, such as "I feel so frustrated, but determined, in this situation." In Ecuador, however, the narrative description of events implies the emotions of the narrator, and native listeners are enculturated to be sensitive to this dimension of the communication. In addition, some social negotiation about the interpretation of events may occur when the story is told. Often, this negotiation is itself implicit rather than explicit, as, for instance, when a listener responds to a narrative about a child's accident with the comment, "those public stairs are certainly a menace to children," or with a personal story about medical mistreatment.

Discussion

As this analysis of 14 recorded narratives shows, Ecuadorian illness stories encode a great deal of cultural knowledge; some of this knowledge is expressed directly, but much of it is expressed implicitly. In the task of interpreting and talking about illness, Las Gradans draw on cultural models

of the family and of extrafamilial social support, a cultural model of social hierarchy (with associated schemas of biomedical institutions), and a set of interrelated notions about illness causation. Narratives show that most of the cultural knowledge Las Gradans bring to bear in interpreting illness episodes is situation knowledge. References to person knowledge (e.g., values and attitudes, general character, person "types") are rare. The elaborate personality trait model to which North Americans often resort when interpreting behavior does not appear to be part of the explanatory tool kit Ecuadorians use in talking about illness.[6]

Two kinds of roles are thrown into sharp relief in illness narratives: roles played by close family members and roles played out in interactions between the poor and biomedical personnel. Some family roles, such as that of mother, are seen in these stories to entail many obligatory activities in illness situations; other roles allow for more leeway and personal choice. Illness sets in motion superhuman efforts by mothers that are, typically, taken for granted. It may also set in motion superhuman efforts by men; but, if so, these efforts will be highlighted in the narratives. The cultural model of family also specifies the feelings that are predictably and acceptably attached to each particular role. For instance, it is accepted that male relatives may feel and express resentment about the demands of being a caretaker for someone who is ill, whereas women, typically, may not.

Expectations about family roles in illness situations, as reflected in illness discourse, can be regarded as a subset of a broader model of roles in everyday family interactions. Likewise, much of the cultural knowledge encoded concerning interactions with medical personnel and institutions is also used to understand encounters with other nonmedical professionals and institutions. Much of the social role knowledge discussed here is not restricted to interpretation of only illness situations but should also show up in narratives about other kinds of situations. On the other hand, the same cultural models may be used somewhat differently in accomplishing other "tasks," for instance advice-giving or actual treatment-choice.

Hearing illness stories can influence knowledge structures in several ways. Individuals gain information about entire illness episodes without having personally experienced those events. Such secondhand episodes are integrated with those the person has directly experienced and become part of his or her current scripts concerning illness. Since illness situations are quite variable, no one is likely to experience enough episodes firsthand to develop robust scripts. Verbal transmission of the outlines of other episodes also affects development of general cultural models. Because illness stories occur in the context of conversational exchange, they contribute to "socially generated knowledge" (Clement 1982). Cultural models are carried by individuals, but they are partly constructed and refined through conversation and reflection. Nowhere is this more clearly seen than in the discussions of causation in illness narratives. As demonstrated here, there is a fascination with causal propositions, and narrators not

infrequently turn their attention (and that of listeners) to the truth value of various propositions.

Finally, it is argued here that many illness narratives have an important affective dimension that must be taken into account in analysis of this discourse. Propositions such as "I did the right thing" are often what people most emphatically communicate in telling an illness story. Ecuadorians rely on narrative communication more than do North Americans to express feelings they are not allowed to express directly in conversation. Furthermore, feelings as well as thoughts and accounts of particular events are socially negotiated through exchanging stories and assessing responses to them.

To sum up, the illness story as told among this population of marginal urban Ecuadorians may be regarded as a culturally identified (although unlabeled) way of talking about illness, with certain structural features that set it apart from ordinary conversation. This type of discourse encodes multiple cultural models, most importantly, situation knowledge about social roles in illness. The discourse also implicitly encodes affective propositions made by narrators about the events and provides a vehicle for social negotiation about thoughts and feelings. Verbal communication of this type supplies both raw material and a forum for the refinement of cultural knowledge bearing on illness. For all of these reasons, the verbal traditions concerning illness that exist in Las Gradas are important in the transmission and generation of cultural models.

Appendix 1

ECUADORIAN ILLNESS STORIES – CASES AND NARRATORS

1. **Lucia** – toddler who suffered head injuries in falling on the public stairs in front of her house; taken to hospital, released; condition deteriorated; taken back to different hospital, died there.
   Narrators – mother, female neighbor, another female neighbor.
2. **Isabel** – 3-year-old born with foot deformity; treated at private clinic for long period of time with no improvement; ultimately received operation in a different private clinic thanks to intervention of a doctor who befriended the family; considerable community involvement in helping this family.
   Narrators – mother, aunt, grandmother, male neighbor, female community leader.
3. **Susana** – 6-year-old who suffered severe hip malformation, starting at the age of about 1 year (possibly due to polio); many different health care specialists consulted and therapies tried to bring about cure; ultimately received operations on both legs in the public children's hospital, then physical therapy, then spiritual curing after physical therapy proved less than totally effective.
   Narrators – mother, child's older sister.
4. **Sra. Elsa** – middle-aged woman with degenerative nervous system disorder of about 5 years' duration; mother of nine children, youngest age 2; many different health care specialists consulted, diagnoses made, and therapies tried; family under great strain in trying to cope with the illness and the recent death of the oldest son in the family.
   Narrators – husband, caretaker daughter, female neighbor, and Sra. Elsa.

Appendix 2

STRUCTURAL FEATURES OF A TYPICAL ILLNESS NARRATIVE

(Case 1, Mother Speaking)

Initial events of illness [Orientation]	Susana walked normally at 1 year of age. Then she got an infection. We took her to a clinic.
Causation	At the clinic, they gave her IV and four injections. We believe the injections created little "pellets" or balls in her hips.
Chronology of events [Some of these segments may be "explanations," in Linde's sense (this volume), but they occur in chronological order within the narrative.]	From then on (after the injections), she began to limp, sway from side to side like a duck. When she was 2, I took her to a doctor in Ambato; he said we had to operate immediately. My husband raised objections and there was no money. Then, I consulted a bone specialist in Latacunga. He said there was no reason to operate, that she would be an invalid all her life. That caused me so much pain, I didn't have her examined by anyone else. Then we came here to Quito to live. My mother-in-law was the one who "got me going" to go consult Dr. G. in the hospital to see if he could operate. Before going to see him, I took her to Conocoto for treatment from a "bone-setter"; but that took too much time and I couldn't keep doing it; besides she wasn't getting better. At this time, she wasn't in pain. Then I [correction] we, my husband and I, went to see the doctor; he gave us hope and said "Bring her in." The doctor operated on the first leg. In physical therapy, the doctor said it wasn't so good. I massaged the bone here at home with a remedy I know, and the bone began to move bit by bit into place. Then they operated on the other one. The outcome still isn't known. After 6 weeks, they will look and see how it is. For the first one, they called me after 4 weeks to see how it was; it was 3 months before they took the cast off. I believe it will be 3 months for this one, too.
Coda	I am praying to God that it will all come out OK, whatever happens after that.

Coda (*cont.*)

[*Questions by investigator lead to further narrative segments.*]

Interview with social worker at the hospital concerning possibility of reduced charges.

Remedies used and care of Susana in recent past.

Stories of two children in the hospital, the nurses' interactions with them, and her own role.

Final coda

I hope that God's will is to cure her. There is no [other] help, nothing to do but bear the pain of a mother.

Appendix 3

PASSAGES FROM ECUADORIAN ILLNESS STORIES

A. *Narrator:* Olivia, older sister of Susana, child with hip malformation (Case 3).
"The neighbors said she had eaten something, maybe, something that stayed in her intestines and couldn't get out. So they said we had to give her an internal bath with camomile, lemon [and glycerine] in order to clean everything out of there. We did that and it helped her. Then we put grape leaves on her stomach with almond oil, you see, curing her on the outside. We put that on her and she got better. . . ."

B. *Narrator:* Maria, mother of Susana, child with hip malformation (Case 3).
"I have seen mothers go to leave their children in the hospital there. They [the children] are forgotten there and the mothers don't go to see them again. One Señora left a little boy about 2-years-old. He was there, he was there 15 days. They had already operated on his little leg, and his mother didn't come, she didn't come. I don't understand that. She didn't come. I don't know how it turned out, since my daughter was discharged. I don't understand it. [*Pause.*] The poor little thing just stayed right there. I didn't know if she would come get him or not. Another Señora from Santo Domingo did the same thing."

C. *Narrator:* Mercedes, neighbor of Sra. Elsa (Case 4).
"She went to events like soccer games, outside [*al aire*] almost unclothed. To dances, in that air, can you believe it? And, on the second or third day after miscarrying [the same thing]. . . . One should take care of oneself, and the Señora, note that in one month it's said she had three miscarriages, in one month. That is, neither she nor her husband were taking care [of her health] to conceive again right away. . . . [Elsa does not take her medicine] because she doesn't want to. She's irresponsible. Doesn't it seem so to you? If she were a responsible person, she would try to get better, strive to overcome it. The way I see it, overcoming things in order to keep the home together is the essence of the "mother." And she doesn't like any of that, no. So there it is. And that's why her family doesn't love her."

D. *Narrator:* Carmen, mother of toddler who suffered head injuries in a fall (Case 1).
"My daughter started to have convulsions, to shake. I saw it and tried to wake my husband up because he was sleeping. I told him that the child was getting worse. He had gotten up at dawn and worked until late at night. So I told him, 'Look, the child's getting worse.' He didn't answer me. Then he said, 'Let me sleep.'"

E. *Narrators:* mother and grandmother of Isabel, child with foot deformity (Case 4).
Mother: Then we came to our senses about my child, who was crippled in the same way. . . . She wanted to talk and she couldn't and she cried. So in view of that, we took the risk of trying to find someone who would operate.
Grandmother: But, on the other hand, my husband said: 'My dear daughter,' he said, 'and the money, the money? Where are we going to get it? Where

are we going to get it from?' And he applied [for a loan] in order to be able to do it, because he works at the utility company. But, the loan was refused. It looked like everything had gotten messed up and we couldn't obtain the money, we just couldn't. We had no place to get it."

F. *Narrator:* Maria, mother of Susana, child with hip malformation (Case 3). "But, my husband told me that it couldn't be that, all of a sudden, like that, she had to be treated, to be operated on. And, at that time, there was no money. So she stayed like that. . . ."

G. *Narrator:* Maria, mother of Susana, child with hip malformation (Case 3). "I went to the doctor. [correction] *We* went, my husband and I, to his office. He gave us such hope. He said, bring her, we will operate – in the clinic if you want, or in the hospital, if you want. My husband said, 'Doctor, how much would it cost us to do it in the clinic?'"

H. *Narrator:* Maria, mother of Susana, child with hip malformation (Case 3). "My mother-in-law was the one that 'got me going,' the one who gave me the impetus to go and consult Dr. G., there in the hospital, about doing the operation."

I. *Narrators:* mother and aunt of Isabel, child with foot deformity (Case 2).
Mother: She is so wonderful, the doctora!! She charges so little, and she really got things going to get the operation done fast.
Aunt: That's why we finally did take the risk enough to do it. And she's really fine, really pretty. She helps the poor more than anything. And, above all, she's attached to children. It's because she's an unmarried woman.

J. *Narrator:* Maria, mother of Susana, child with hip malformation (Case 3). "I don't know what it is with hospitals. There's a lot of favoritism shown toward some people and nothing for others. . . . I think it's because one doesn't have money, that's why they don't take care of you. People who give them their tips get the attention."

K. *Narrator:* Olivia, older sister of Susana, child with hip malformation (Case 3). "We thought the crippling must be due to the injections they gave her in the clinic. But, no. I believe that an injection won't move a bone, no. The injection was right here, but the bone is over there. I think the cause was the dehydration she suffered [during her illness at 1 year of age]. The dehydration affected the bones. That is, she was cured of the illness, but it affected the bones."

L. *Narrator:* Carmen, mother of toddler who suffered head injuries in a fall (Case 1).
"I wasn't daunted because a woman had told me, she said, '*Don't* take her to Ortiz,' she said. 'You will never be able to take her out of there; she would die there,' the woman said. 'It's much better to take her,' she said, 'to Espejo.' So that's how it is my little child died in Espejo."

M. *Narrator:* husband of Sra. Elsa, woman with nervous system disease (Case 4). "I am currently waiting for some insurance money [from his son's death]. With that money, I *have* to get her diagnosed, whether she wants it or not. I must

put her in the hospital. . . . She will for sure get better if we put her in the clinic, keep her in there. We will avoid a lot of frustration and hassle that way, for me and my daughters. And for me, too, in order to be able to get out again. Right now I have no way to go anywhere. I have to be here doing whatever [make-work], just so she can see that I'm here. It irritates her so much if I go out anywhere. . . ."

Notes

1. Thanks go to the National Science Foundation and R. J. Reynolds, for financial support of this research project. Much appreciation also to Dorothy Holland, Ed Hutchins, and Wendy Weiss for their valuable contributions to the development of this paper. Earlier versions of the paper were delivered at the "Conference on Folk Models" and at the 80th Annual Meeting of the American Anthropological Assocation in Los Angeles in 1981, in a symposium organized by Dorothy Holland and Naomi Quinn and entitled "Folk Theories in Everyday Cognition."
2. There are two primary types of natural discourse about illness between nonspecialists in Ecuador: illness stories and therapeutic recommendations. Therapeutic recommendations pertain to ongoing health problems and may be solicited from, or offered spontaneously by, family members, friends, or neighbors. Even though the structure of this discourse is conversational, it does not follow the pattern of chronological narrative that characterizes illness stories. Therapeutic recommendations lead rather naturally into narratives, however, if a story exists to be told, if time permits, and if the social context is appropriate.
3. For Ecuadorian women, the genre of illness storytelling constitutes what we might call "shop talk" because one of their special gender role responsibilities is management of family illnesses. Such conversations have immense problem-solving value, and women tend to launch into conversation about illness much more readily than men. One exception occurs when men are known to be carrying out direct therapy-managing roles in an illness situation; these men will be the recipients of therapeutic recommendations from friends and family and will be told pertinent illness stories, just as female caretakers are recipients of such communication.
4. Although illness stories do transmit information about specific remedies and home-treatment principles, there is less of it than might be expected given the widespread use of home therapies in Las Gradas. Why do cognitive heuristics such as home treatment sequences (Mathews 1983) not figure more prominently in this discourse? A plausible explanation is that home treatments are less valued than those prescribed by specialists and so receive less attention. Another probable explanation is that narrators deemphasize or omit these details from their accounts because they assume their audience already possesses that information or will ask for it specifically if they need to know. Just as a storyteller in the United States would assume that listeners know the heuristic of drinking plenty of fluids and taking aspirin for a cold, so do Ecuadorian narrators take for granted that everyone knows the more common herbal remedies and specialist treatment options. This cultural pattern also affects ethnographic data collection. To obtain detailed information about such treatments, the ethnographer must usually ask about them directly.
5. Reasons for not openly acknowledging propositions about moral causes for

a particular illness include family loyalty, self-implication by such an interpretation, and inappropriate audience.

6. Whether North American narrators instantiate propositions about personality traits in telling illness stories is a question that requires further research. Only with documentation of the illness storytelling genre cross-culturally can analysis be made of differences between the models that shape the discourse, and of the social or historical reasons for such differences.

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14
Explanatory systems in oral life stories[1]

Charlotte Linde

This chapter defines the *explanatory system* using oral life stories of middle-class American speakers as a source of data. An explanatory system is a system of beliefs and relations among beliefs that provide the environment in which one statement may or may not be taken as a cause for another statement. More specifically, an explanatory system of the type discussed here is a system of beliefs that occupies a position midway between *common sense,* the beliefs and relations among beliefs that any person in the culture may be assumed to know, if not to share, and *expert systems,* which are beliefs and relations among beliefs held, understood, and used by experts in a particular domain. An explanatory system is a system of beliefs derived from some expert system but used by someone with no corresponding expertise or credentials. Note that the term *common sense* as defined here closely corresponds to the notion of *cultural models* or *cultural theories* as used throughout this volume. The term *expert system* or some close equivalent is similar to the usage of Kempton, and Collins and Gentner (this volume). The term *explanatory system* represents an intermediate level that, to my knowledge, has received relatively little attention.

To clarify the definition of explanatory system, let us turn to two (constructed) example pairs. The first (1) gives a reason that relies on commonsense beliefs to account for professional choice.

(1a) How did you come to be an accountant?
(1b) Well, I guess I have a precise mind, and I enjoy getting all the little details right.

In contrast, in order to understand (2b) as a relevant answer to (2a), the hearer must know if not share the popular Freudian explanatory system which locates the real causes of events in early childhood.

(2a) How did you come to be an accountant?
(2b) Well, my mother started toilet training me when I was six months old.

Using this notion of explanatory system, this paper first discusses the methodological background and data for the study of explanatory systems,

then examines in detail the explanatory systems that have been found, and finally discusses the historical relation between common sense, explanatory systems, and expert systems.

The life story

This section first defines *life story* as a technical term and then discusses the types of data and methodology necessary for its study. This discussion is necessarily brief, as the present study forms part of a larger study of the creation of coherence in oral life stories (Linde n.d.).

THE LIFE STORY

The definition of life story used in this study is an attempt to render precise and accesible to analysis a notion in common use by speakers of English. Intuitively, we believe that we "have" a life story and that any normally competent adult has one. This nontechnical sense of life story is something like, "What events have made me what I am"; "What you must know to know me."

Technically, the definition of a life story is: All the individual stories and the relations drawn between them told by an individual during his or her entire lifetime that satisfy the following criteria:

1. The stories contained in the life story make a point about the speaker, not about the way the world is.
2. The stories have extended reportability. That is, they are tellable over the course of a long period of time.

The first point in this definition is that an entire life story is constantly added to and changed in the course of a lifetime, so that to have a record of an entire life story would require all of the talk ever produced by a given speaker. This is in principle possible, in practice impossible. Nonetheless, it is possible to study the life story by using a small sample of the stories that comprise it, since the interest of the present study is not the specific form of the entire story but rather the principles by which it is constructed.

The next point is that not all stories told by a speaker form a part of the life story. One criterion for the inclusion of a story as part of the life story is that its evaluative point is directly about the speaker or some event framed as relevant to the speaker, as opposed to a story that makes some evaluative point about the world in general. That is, I would want to consider as part of my life story a story about what happened to me when I was in the hospital, but not a story about the same events told to show what's wrong with hospitals.

A further criterion for inclusion is that the story have extended reportability. This means that the story can be retold over a long period of time. Thus, the story of a career decision, or a divorce, or a major illness are

relevant and reportable over a major portion of one's life. In contrast, a story about the funny thing the guy in the health food store said is reportable for a day or two at most as a story about what happened to me (although it may retain extended reportability as a story about what people in health food stores are like).

A final point is that the life story is not defined simply as a particular subset of stories but as the relations the speaker draws among them as well. Thus, as new stories enter the life story, old ones may have to be dropped or revised to maintain coherence. It is this form of relation among stories that permits the life story to express our entire sense of what our life has been about without ever necessarily forming a single narrative organizing our entire lives.

Note that *life story* defined here is related but not identical to *autobiography* and *life history*. Both the life story and the autobiography are produced by a person presenting his or her own life in a form that will make sense to other people. They differ, first, in their medium – spoken versus written language. The life story also differs from autobiography in being a temporally discontinuous, ongoing account, whereas an autobiography is a crystallization at a given time of what has happened to the author and what it means. Finally, autobiographies are subject to the economic process of publishing, and so published autobiographies tend to be by people either socially defined as important or interesting, or by undistinguished people what can be taken as typical members of a class of interest – cancer victims who survived, or housewives who have found God, for example.

In contrast, every adult is entitled to and indeed required to have a life story. The notion of *life story* also contrasts with *life history*, a term mainly used in anthropology, although also somewhat current in psychology. The life story in anthropology is usually presented as a form of autobiography of someone in another culture, a presentation of his or her experience and sense of self that is the collaborative product of the subject and the anthropologist. The major difference is that the presentation of self in this form may not be at all a natural discourse form for the subject; indeed, the whole notion of *self* present in the subject's culture may be quite different from that of the anthropologist. (For an extended review of the notion of *life history*, see Langness & Frank (1981:ch.4)

THE DATA OF THIS STUDY

The data of this study come from oral interviews on choice of profession. Fourteen people were interviewed; they were chosen because they all had professions that were important to them and that could be expected to form a major part of their life stories. The interview began with the question, "What is your profession" and went on to ask "How did you arrive at that," or "How did you become a _____." When the speaker had

apparently finished, I probed for more, either by a further question or by an extended silence.

The interviews focused on the choice of profession since, at least for middle-class professional speakers, it is a necessary part of one's account of oneself. One need only recall how often one is asked, "What do you do?" to verify this. Another demonstration of the centrality of profession is to consider the case in which one is acquainted with someone but does not know that person's occupation; this is anomalous, and after some time, sinister. One's occupation is a publicly available piece of information, from which many inferences may be drawn as to what sort of person one is.

Note that profession is public knowledge in just that social world in which it plays a major role in the definition of the self. This is, of course, not true for all societies, nor even for all classes of our own society. However, with that restriction, we may note that professional choice works excellently as an interview topic because it is so relevant to self-presentation and because it forms a relatively public portion of one's biography.

The data are then analyzed using the methods of discourse analysis. For a full discussion of discourse analysis, see Linde (1981; n.d.). In brief, the component discourse units are identified – in the case of the life story, they are narrative, chronicle, and explanation. The internal structures of these units are then analyzed. Of particular relevance for the study of explanatory systems is the analysis of the evaluative structure of these units, that is, the portions of text that comment on what has been said, informing the addressee of how this is to be understood.

The construction of coherence

An important property of the life story, both linguistically and psychologically, is that it must be coherent. Its coherence is not a property of the life, but rather an achievement of the speaker in constructing the story.

Coherence in this sense is a property of texts; it is one set of relations by which we may understand a text. Specifically, the coherence of a text consists of the relations that the parts of the text bear to one another. A text may be described as coherent if its parts, whether on the word level, phrase level, sentence level, semantic level, or level of larger units, can be seen as being in a proper relation to one another and to the text as a whole. Thus, a narrative will be heard as coherent if it is clear for the hearer what relation its parts bear to one another – that is, given that *A* and *B* were said, why *B* follows *A* (Becker 1977).

We can recognize at least three different levels of coherence in these texts. The first level is the basic linguistic level of text structuring devices. The devices of this level are widely used across an entire language and are dependent on the obligatory morphological and syntactic categories of that language. An example of a device at this level is this narrative

presupposition: the rule of interpretation stating that the order of past-tense main-clause verbs shall be taken as the order of events. The second level of coherence is the level of implicit philosophical categories, such as, in English, causality, accident, continuity, and discontinuity. These categories depend on the coherence established by the previous level and in some sense represent an elaboration of it. The third level of coherence is the level of semiexplicit explanatory systems, the level of interest for this paper. The systems at this level all presuppose the categories of the previous level. That is, they all assume the existence of causality and then give different answers to the question of what a possible cause might be.

We turn now to a more detailed discussion of these levels.

THE LEVEL OF MORPHOLOGY: THE NARRATIVE PRESUPPOSITION

As mentioned in the previous section, the narrative depends on the fact that tense is an obligatory category in English – all sentences have a main verb, and this main verb has some tense. Further, speakers of English take tense to be iconic; that is, we assume there really is such a thing as time, and that it naturally consists of past, present, and future. This belief permits the narrative presupposition: the assumption that the order of a sequence of sentences or main clauses matches the order of events. The following examples illustrate the automatic character of this assumption.

(3) I got flustered and I backed the car into a tree.

(4) I backed the car into a tree and I got flustered.

In (3), getting flustered is assumed to precede backing into the tree; in (4) it is assumed to follow backing into the tree.

These examples further illustrate the relation of tense and the beginings of the assumption of causality. The natural logic of English is *post hoc, ergo propter hoc;* in (3) we assume that getting flustered caused the speaker to back into a tree, in (4) we assume that backing into a tree caused the speaker to get flustered. More complex forms of causality are built on this foundation.

COHERENCE PRINCIPLES: CAUSALITY AND CONTINUITY

We have seen that at the morphological level, the temporal order of clauses, or narrative order, represents the major resource for the creation of the implication of causality, since any temporal order is likely to be understood as a causal order as well. We turn now to the level of the major coherence principles used in organizing life stories, which are primarily causality and continuity, both of which are based on the previous establishment of order.

In telling a life story, one major task for the speaker is to establish that the causal sequence of events is an adequate one. We define *adequate causality* as a chain of causality that the hearers can accept as a good reason for some particular event or sequence of events. For the data of this study, establishing adequate causality for the choice of profession means estab-

lishing that there are obvious good reasons for the speaker's choice of profession, or showing that even if the reasons do not seem at first glance to be acceptable, actually there are reasons for accepting these reasons.

Establishing adequate causality for a given professional choice, or for any sequence of events, is both a social and an individual achievement. Part of the social aspect is the fact that there are cultural and subcultural beliefs about proper lives, proper sequences, and proper reasons for professional choice. For example, one socially sanctioned and very strong form of adequate reason for a career choice is ability or character. If a speaker can claim, "I like that sort of thing," or "I'm good at it," a standard form of adequate causality has been established and no further reasons need be given. Similarly, we have beliefs about what would be inadequate or frivolous reasons for choosing a career; for example, "I was in love with a girl who was enrolled in premed, so I decided to become a doctor."[2]

In addition to this store of common-sense beliefs about adequate causes, there is also a strong element of individual creativity in the creation of adequate causality. The individual speaker's adroitness or ineptness in framing his or her story can also determine whether a given sequence will be heard as adequate or inadequate.

To establish adequate causality, not only must the reasons be adequate, but the chain of reasons must also be neither too thin nor too thick. Too thin an account suggests that one's life has proceeded at random, discontinuously. Too thick an account suggests that the speaker implicitly accepts a deterministic or fatalistic theory of causality. Neither of these extremes is generally acceptable, and both are subject to correction. The correction may be made by the speaker, following a deterministic account with an accidental one, or vice versa. That is, the speakers often perform a sort of philosophical wobble around a socially determined equilibrium point, which carefully avoids taking any position to its logical extreme. If the speaker does not maintain this equilibrium, the addressee may correct the story in the direction of equilibrium.

In studying adequate causality in the interview situation, we may recognize an account as adequate by the fact that its speaker treats it as sufficient; that is, the speaker does not follow it with another account and holds to the same account even if challenged by the interviewer. In this set of data, I found two forms of adequate accounts of the reason for a professional choice: those based on character traits and those based on multiple noncontradictory accounts.

One of the most powerful accounts possible for choice of profession is character. Speakers appear to take character traits as a primitive, referring to them as obvious causes for career decisions, with no need to account for these traits. We thus find examples like (5) given as an account for a career as an English professor, and (6) as an account for a career as an editor.

(5) I seemed to be very good in reading and analyzing books and writing so I became an English major and from then on since I knew I would go as far in whatever I chose as I could possibly go, getting a Ph.D. became a necessity.

(6) I always was nitpicky, I was always good at grammar, um I like to correct things rather than create them. And I'm interested enough in reading and I like to spend the time reading, that at least now that I'm on journals that are even vaguely interesting, it can be a lot of fun.

Both of these are given as adequate and final reasons for the choice of profession.

Another very strong form of adequate causality is richness of account. An account may be rich because it covers a long period of time; that is, the reason for the choice of profession is located far back in the speaker's past. Of course, one form of temporally well rooted account is the explanation by character trait. But citing ambition, family interest in some sphere of activity, schooling, or childhood hobbies may equally permit a professional choice to appear well-rooted in time. Another way an account may be rich is by containing many noncontradictory reasons for a choice. In one such example, a speaker who is a professor of English studying science and literature gives the following accounts for her profession: She was at a university that was trying to bring together academic disciplines and medicine; she had good verbal skills because of her family's interests; she had an interest in science but not the aptitude for it; in her undergraduate career, she had encountered one noted scholar with a similar blend of interests; her quarrelsome family led her to be a peacemaker, which led to some attempt to reconcile science and literature. Such multiple noncontradictory accounts provide adequate causality because they show that a choice was not random or insufficiently motivated.

In addition to adequate causality, there are accounts that must handle the fact that the speaker perceives the causality or the ordering of events to be in some way insufficient or problematic. These can be divided into accounts structured in terms of accident and accounts containing a socially recognizable discontinuity. In the context of a life story, accident means the absence of sufficient, socially recognized causality. When an event has been presented as an accident, a common pattern is to narrate that event as an accident and then follow it by a demonstration of how it was not really an accident, since there were multiple routes to the same point in life. Thus, although the particular route was an accident, the goal was not.

In telling a story, the narrator may perceive and present the events as discontinuous. A (constructed) example of such discontinuity is, "I was a banker until I was 35, and then I dropped it all and became a potter." As members of the culture, we recognize that this is a conventionally discontinuous sequence of professions. One of the clearest patterns in these data is that this form of discontinuity must be managed in some way; some

evaluation or explanation of the discontinuity must be given. Among the forms of management of discontinuity found in these data are:

1. Discontinuity as Apparent Break. Discontinuity is seen as only apparent, not real. That is, a later state appears to be very different from an earlier one, but they can be seen as having characteristics that make them continuous.
2. Discontinuity as Temporary. An apparent break is shown to be due to a temporary discontinuity; for example, an early interest was abandoned and then resumed.
3. Discontinuity of Actor. The speaker may distance himself or herself from the protagonist of the story. Such distancing focuses the blame of discontinuity, so to speak, on some other person than the present speaker.
4. Discontinuity as Continuity. In this logically more complex strategy, the speaker uses a series of discontinuous events to establish that discontinuity forms a continuity for him or her. An example of this strategy is, "I think I could be a dilettante all my life as long as I could do it with some intensity."

EXPLANATORY SYSTEMS

Moving up from the level of the management of causality, we turn to the level of the explanatory system. We have defined the explanatory system as providing the conceptual environment in which something may or may not a cause of something else. Thus, within a Freudian explanatory system, the course of development of childhood sexuality may be a cause of adult character, whereas in other systems, one would look elsewhere for the cause of character, or might not seek it at all.

In later sections, we see that the explanatory systems present in these data are popular versions of expert systems. However, not all explanatory systems are expert systems. We may view the ordinary system of common sense as the most pervasive explanatory system and the most unnoticed. As defined, common sense is the system of beliefs assumed to be shared by everyone and requiring no special circumstances or standing for its use. Thus, a speaker who said, "I quit banking because I didn't like it" would be invoking an explanatory principle from common sense. In contrast, a speaker who said "I quit banking because my father was a banker, and I've always had a love-hate thing with my father" would be invoking a psychological explanatory principle.

In later sections, we explore some of the explanatory systems present in these data. We do not, however, consider the elements of the system of common sense, as this is a task beyond the scope of the present study.

Definition and function of explanatory systems

This section gives a fuller definition of explanatory system and attempts to sketch its function for speakers.

One view of the explanatory system is that it not only guides the construction of a story but also provides an evaluation of what the story means and what its value is. When a life story is analyzed by an analyst other than the speaker, a number of evaluation principles might be used. The most obvious is factuality: Do the events narrated correspond to reality? If the analyst is a biographer or a district attorney, this is an appropriate criterion. However, since my interest in this entire research program is how speakers construct life stories as coherent, it is possible to work entirely with the internal relations of the text, bracketing the question of relation to some postulated real world. However, there also is a more sophisticated form of evaluation by an analyst. The analyst may subscribe to some system that gives a principled basis for deciding whether the speaker's account is one that could possibly be valid, using the organization of the account, its coherence, and its choice of topics. Such a system may be a political theory, a psychological theory, or a religious theory, and so on. For example, for a Marxist analyst, none of the accounts of career choice given by these speakers could possibly be valid since they are not based on, and indeed give no account of, social class or economic circumstances. Within this explanatory system, real explanation lies within the domain of economics, and so all other forms of explanation represent surface phenomena or false consciousness. Similarly, a Freudian analyst can claim to have resources to determine whether an explanation given by a speaker is a correct product of genuine insight or whether it is the result of one of the deceptive complicating processes the mind uses to hide from itself. (See Frank 1981 for a discussion of the basis of such validation.)

As these examples show, an explanatory system is a system that claims to give a means for understanding, evaluating, and interpreting experience or accounts of experience and usually, as a consequence of that understanding, also gives, either explicitly or implicitly, a guide for future behavior. Presumably, this definition would include such local explanatory systems as theories of the right kind of food to maintain optimal health, or the best way to win at roulette. However, the interesting examples of explanatory systems are those with some reasonable claim to completeness, those purporting to explain most or all realms of experience, not merely local areas of life. The most obvious current examples are Freudian psychology, or more generally, psychoanalytic theory, Marxism, and most religious systems. An understanding of much of experience as the product of a worldwide conspiracy of the Bavarian illuminati or the unrecognized influence of higher plane entities would equally qualify as explanatory systems, albeit less widely held ones.

This definition of explanatory systems is not equivalent to any concept in general use. It is related to the term *belief system* or *cultural system* as used, for example, in Geertz (1973) but differs in that the explanatory system is specifically a semiexpert system, related but not equivalent to either belief systems shared by an entire culture or belief systems exclusive to some class of experts.

We now turn to the question of how these explanatory systems function for their users. If we look at the social conditions under which expert systems are used to evaluate experience, we find that such a system is often used by a person with special status, trained in its terms and argument forms, to criticize some nonexpert account of experience. One obvious example is the use of case history material by a psychologist. The subject produces a life story, or this life story is summarized, and then the psychologist can use expert knowledge to demonstrate what is really going on. Depending on theoretical persuasion, the psychologist may use the array of psychoanalytic techniques and arguments, or the armamentarium of diagnostic psychology, including personality tests, and projective tests. In either case, these implements of expertise have primacy; they confirm or invalidate the correctness of the speaker's own account of his or her life.

It is not experts alone who have theories that offer the "real" reasons for people's behavior and hence can be used to evaluate the correctness of any explanation given. Any adult has a wide variety of theories available that can be used to make sense of his or her life. These theories may be explicit systems requiring formal subscription, such as a particular religion or political philosophy. Or, they may be extremely inexplicit belief systems implicit in the culture, which require no formal recognition or allegiance and which, without careful analysis, pass unnoticed as theories, appearing to be just one further example of how we speak about these things.

When we examine how explanatory systems are used, we find that because they are all popularized versions of expert theories, they permit the speaker an extra level of distance, allowing him or her to be an expert, to step back from the personal account to give a deeper, or apparently more objective, or truer account than can be conveyed in a common-sense narrative. To clarify the nature of the distance created by the use of an explanatory system, note that all first-person narration has an implicit distance between the narrator and the protagonist. This distance permits us to tell a story about some bad or ill-judged or embarrassing action we took, since even though the protagonist acted in this way, the narrator knows better and so is able to tell the story in a way that indicates present allegiance to the norm that was in the past broken. However, the use of an expert explanatory system introduces an additional layer of distance beyond that of narrator and protagonist. Although the narrator may know better than the protagonist, they are still the same order of being, operating by the same rules, with the same type of knowledge. In contrast, the expert is different from the protagonist, possessing different and superior knowledge of why the protagonist acts and how he or she should act.

THE SET OF EXPLANATORY SYSTEMS IN THE DATA

The theories I have found thus far in these data are versions of Freudian psychology, behaviorism, astrology, Zeitgeist theory, and Catholic theory of sin and confession. Each theory has its associated expert – a practicing psychoanalyst, an academic psychologist, an astrologer, a sociologist, or a priest. This paper explicates the first three theories, since they are most clearly represented in my data.

This list of explanatory systems raises a number of questions. Is the list exhaustive? How many more explanatory systems would be discovered by doing more interviews, or interviews on another topic? How many such explanatory systems can be present in a culture at a given time? It would take a different research program and a rather extensive one to answer these questions. However, my estimation is that this list is not at all exhaustive; other interviews and particularly interviews on other topics would undoubtedly produce further examples. However, the number of explanatory systems would not be very great. There is a necessary limit on the number of such explanatory systems that will be present in a given culture at a given time, since one's addressee must at least recognize if not share any explanatory system one choses to use.

Certain absences in the list of explanatory systems in these data are particularly striking. For example, no one cites economic opportunities or class limitations as factors in professional choice; the speakers all appear to assume that professional choice is dictated by personal abilities and by degree of psychological adjustment, which either permits or prevents one from seeing and talking advantage of opportunities. This view of a world without politics and without social class appears to be particularly American (Lasch 1979; Schur 1976; Sennett 1977).[3]

Another striking absence is the lack of invocation of race or ethnicity to explain available opportunity. Since all the speakers are white, it is perhaps understandable that race is not dominant in their understanding of the factors that shaped their professional lives. However, the sample does include people from a variety of ethnic groups and religious backgrounds, only one of whom mentions this as a factor influencing his personal psychology. This is in strong contrast to a previous generation of speakers, for whom ethnic origin, and more specifically, generation of immigration were crucial in understanding anyone's life story.

Explanatory systems in these data

Of the explanatory systems in these data, the most common appears to be that of Freudian psychology. I thus begin with it, give the fullest discussion of it, and use it as a detailed example of the relation between the expert and the popular versions of an explanatory system.

POPULAR FREUDIAN PSYCHOLOGY

To get the flavor of this explanatory system, consider the following example, which comes as the conlusion to a story about how the speaker took a banking job that he did not like and that did not last very long.

(7) . . . so I didn't really make much of a decision there. I think that's one way of looking at it. I made a decision. It was the decision that I didn't like at the time, so that's why I have the sense that I was forced into it, but there are all kinds of psychological things that make you do things at various moments in your life.

From a common-sense point of view, this seems to be a rather weak justification of a bad decision. That is, common sense suggests that one should be in control of one's action, or if one is not, that one should be forced into making decisions by strong external forces. However, further analysis suggests that this text implies an explanatory system that gives a way of making sense of the phenomenon of doing things that one does not like or approve of.

The speaker himself gives the clue to the system he is invoking by the phrase "psychological things." This system is a psychological model, more specifically, as we see, a popular version of Freudian psychology. A number of components to this popular version show up in the present data. These are:

1. The splitting of the self into component parts, which are in disagreement.
2. The notion that real causes are to be found in childhood and childhood experiences.
3. The notion of levels of personality, some of which are deeper than others.

Let us begin with the split of the self into component parts in disagreement. The speaker of (7) feels that he was "forced" into a decision and attributes this to "psychological things that make you do things." This fragmentation of experience and the identification of the speaker with the fragment that is not in control is a strong component in popular Freudian psychology. Another related notion at work in this example is the idea that one can act for reasons of which one is unaware or does not understand. Thus, we hear statements like, "I was in Paris at the time and I thought I was happy, but really I wasn't." A more extended example of this phenomenon is (8).

(8) I married someone who was older than I was, who was a bit of a self-centered tyrant, and for that I got, uh, to whom I was not very, even sexually attracted,

and was very temperamentally different than I am, and uh although I was in a certain way attracted to him sexually I was not, really.

Here, again, we have an example of someone telling about acting because of feelings which she felt, or thought she felt, but which were not real.

Both of these assumptions about the nature of action are based on a complex form of distancing. The first is the distance the speaker maintains from the protagonist of the story. As discussed, this is part of any form of narration. However, in stories containing this additional element of a Freudian explanatory system, the speakers, in achieving this distance, are able to place themselves in the position of an expert, commenting on their own life.

A further form of distancing, buried more deeply within the story, is the distancing between the component parts of the person. The part that feels or believes it feels is not the part that causes action. As the speaker of (7) indicates, this permits a curious paradox in which one is simultaneously active and passive, forced into action by oneself.

Another, perhaps more familiar, tenet of popular Freudian psychology is the notion that real causes are to be found in childhood and childhood experiences. We see a version of this belief in (9), combined with the metaphor of splitting oneself into component parts. The speaker, who is also the speaker of (8), is explaining her combination of literary and scientific interests. She has already told a number of stories about how she arrived at these interests, which have to do with the opportunities were available to her in the course of her education. She then steps back, as it were, from this historical presentation, to give what the language interestingly allows us to call a deeper reason.

(9) Another idea that, well, in my more – uh I often wonder why I have this need to make, to write, to kind of split myself off in two directions or to try and take on many, to take on what might seem to be warring, I see what I do as, as reconciling things and why do I need to reconcile things? I came from a family that was very conflict-prone. And I was the peacemaker in the family. And I don't like conflict. And I, or rather, I, I am really very upset by it.

The assumption of this explanation, which permits the speaker to offer it as an explanation, is that one's childhood emotions and actions are crucially relevant in providing an explanation of any further developments. It is important to note that I am not claiming that only Freudian psychology admits childhood experience as important and that no other explanatory system admits it. Rather, the claim is that Freudian psychology gives it a primacy, which means that any adequate explanation within this system is likely to include it.

A further theme of this explanatory system, which is related to the splitting of the individual into component parts of the personality, is the

metaphor of levels, the notion that some of these parts are deeper, or further down than others. We get an oblique reference to this notion in (10):

(10) And I think that the source of one's power professionally comes from some deep s-, deep thing. And if you don't tap that, you're sunk.

The idea here seems to be that the components of the personality are ordered vertically, with the higher ones being more accessible to consciousness and the lower ones being out of the reach of ordinary self-inspection. A further part of this metaphor is that the deep components have a certain amount of autonomy and can, in unseen ways, motivate actions, which may or may not be in agreement with the desires and plans of the more conscious surface components.

The foregoing discussion has presented a sketch of a semiexpert theory of the mind, which contrasts both with a common-sense theory of the mind and with the professional Freudian model. D'Andrade (this volume) provides an explication of the common-sense or cultural theory of the mind, which is clearly quite different from the Freudian model in both its expert and semipopular form. The most interesting locus of difference lies in causality – the cultural model treats conscious mental states as having central causal powers, whereas the Freudian model treats unconscious mental states as the causal center.

The popular Freudian explanatory system also differs from a professional or expert Freudian model in a number of ways. These differences are discussed in detail in the section on the synchronic relation between popular and expert systems. In brief, like all cultural models, the popular Freudian system represents a considerable simplification of the original model, reducing both the number of themes and concepts it uses and the complexity of the connections between them.

BEHAVIORIST PSYCHOLOGY

The Freudian psychological explanatory system is quite familiar because of its pervasiveness in the culture. In contrast, let us now turn to behaviorist psychology, a rare system, represented in these data by only one speaker. More specifically, one speaker presents her life in behaviorist terms, taking the role not of the conditioner but of the subject of conditioning, not Skinner but one of Skinner's pigeons.

Three themes in her account of her life lead one to an analysis of her explanatory system as behaviorism. These themes are:

1. The need for reinforcement, and reinforcement as the cause of action.
2. The separation of the self from emotion.
3. Nonagency – the self described in such a way as never to be an active agent in causing events.

Reinforcement is the most obvious component of the behaviorist explanatory system, and it is the factor this speaker uses explicitly in explaining her history. After college, she worked as a social worker and then went back to school to get a master's degree of computer science. At the time of narration, she worked as a computer programmer. The two major focuses in her account of her career history are the change from social work to programming and the fact that she has held a number of programming jobs at different companies. She feels that both of these facts need accounting for, and she accounts for both of them as arising from her need for reinforcement.

(11) I like concrete results. I, I need to be able to see what I've done. I need that kind of reinforcement. If you get me out of that mode, I'm just, I have little tolerance for it. I, I need the strokes of seeing what I'm doing as I'm doing it.

(12) So when I was doing social work, and I did that for five years, I need to have, I need results. I'm a result person. OK. I need to, I like to manipulate symbols, I like those kind of machinations in your head. And I like to see what I've done. OK? If I, I can not go extended periods without that, I don't have the tolerance for it and it was, I came to that realization while doing social work, that I had to find something that was, that gave me that kind of concrete kind of [unclear].

(13) I guess my chief feeling about XYZ Co. [where she formerly worked as a programmer] was that it was very, there was no point in working. Because it didn't matter whether you did or whether you didn't. There were no strokes for working, there were no punishments for not working.

This notion of reinforcement as the motive for behavior is identical to Skinner's views, with the additional specification of her personal need for a reinforcement schedule with a very short time delay. Although the terms *reinforcement* and *strokes* have become part of the common vocabulary, this account of one's life is not coherent within the commonsense explanatory system but only within the expert system of behaviorism.

Another similarity to Skinner's thought lies in this speaker's treatment of her emotions and mental states. In her stories about her professional history, the speaker frequently mentions that she must have had certain emotions, but does not claim them directly. For example:

(14) And it began to be very demoralizing to me. Uh so I left and whatever I, and I had at that time decided that I really wanted to get to, I guess somehow I had decided I wanted to get serious again about working.

The correction from "I had at that time decided . . ." to "I guess somehow I had decided . . ." is a perfect example. Most psychologists would regard this as a small but pathological form of distancing oneself from one's emotions. However, from a behaviorist point of view, the belief in autonomous mental states that act as determinants of behavior is an

error, indeed the fundamental error in understanding human psychology. However, it is an error that nontechnical language almost forces one into. The speaker here denies any actual belief in or sensation of decision as an autonomous mental entity, while indicating some loyalty to the ordinary forms of discourse and understanding, which require them.

Closely related to the nonexistence of mental states is the third theme: nonagency. What this term is intended to convey is that this speaker does not use personal agency in the way most speakers do. Normally, speakers describe their experiences in such a way that they are active agents in their stories: "I did so and so"; "I decided such and such"; "I solved the problem facing me." This speaker does not construct her stories in this way: The active agents are either abstract motivations or other persons, not herself. The following story is an example of both kinds of agency. The situation is that the speaker was working as a social worker, which she did not like, and was investigating the possibility of becoming a computer programmer by speaking to a professor of computer science.

(15) I spoke to Dr. *K* a long time. He decided, oh yeah, I had really gone over there, wasn't asking to go to graduate school. I was asking to take a course in the evening. And I figured I could qualify because I had graduated from *U* and it wouldn't, what big deal would it be for him to let me take a course. I, by the time I was out of there, he had me enrolled in this whole program, and he says, "Oh you have to do it this way." And it must have appealed to me, because I went ahead and did it.

In this story, Dr. *K* is the agent, not the speaker. It is his somewhat surprising actions that move events along. The speaker had intended to take a single course, but as a result of Dr. *K*'s actions, finds herself enrolled in a master's program, and a simultaneous BS in mathematics. Even in the smaller level details of sentential construction, we find that she is not the agent. For example, note the nonagency of the phrase "By the time I was out of there" as compared with the possible "By the time I left there."

The theme of nonagency is extremely strong, so much so that even when it is directly challenged, it is still maintained. As part of the interview procedure, after I had obtained the speakers' own accounts of their professional history, I attempted to reframe the questions, using explanatory systems different from those the speakers had used. I did this in an attempt to see to what extent the speakers were willing to adapt their explanatory systems to my apparent beliefs and to what extent they would maintain them in the face of a proposed alternative conceptualization. Answer (16) represents a response to such a challenge. I had asked the speaker about choice points in her life, a formulation that implies choices as relevant entities. Although the speaker does not explicitly deny the existence of choice points, or the possibility of choice, the story she tells, apparently using this vocabulary, is completely consistent with her previous system of nonagency.

(16) *Speaker:* I chose to flunk out of a masters program in psychology. Uh huh. That was a choice point.
Interviewer: What do you mean, you chose to flunk out?
Speaker: I got one too many C's.
Interviewer: Why?
Speaker: Because I just didn't know that I w-. I wasn't interested. I just couldn't bring, I had this big struggle with myself as to why I was doing what I was doing and I decided well I, I just have to do this because I'm supposed to do this, and it just didn't, it was, well, there wasn't any rewards in it for me. And uh it's an interesting choice because I could have picked myself up and left, which I didn't do, I just sat there and waited for it to all come crashing down on me until "Oh jolly!" So, but that, but definitely a choice that I made somewhere in that, in that interim.

To speak of choosing to flunk out of a program by doing nothing until one is thrown out is clearly a subversion of the ordinary sense of choice. For a speaker operating within a psychoanalytic belief system, such a formulation might represent a recognition of personal responsibility for events that might ordinarily be taken as beyond one's control. In this case, however, I believe the speaker is denying my formulation of life as motivated by choices that occur at choice points. It would be extremely difficult, both conceptually and in terms of etiquette, to make explicit and then deny my presupposition that choices exist and are relevant; rather, she has implicitly redefined the sense of choice until it can be used in a story that does not conflict with her system.

Comparing this speaker's explanatory system to the popular writings of Skinner (1948; 1979), the two are in agreement. The one striking difference is that Skinner's model provides a place for the agent, the force that arranges the contingencies of reinforcement. In the laboratory, of course, this is the experimenter. In the ideal community, it is a planner, or a board of planners, who experiment with various social and physical arrangements that will produce happy and good people. In the ordinary state of affairs, the environment rather haphazardly supplies positive and negative reinforcement, which, in Skinner's view, would be better supplied by a more conscious agent.

In the examples we have seen, and in the entire life story given by this speaker, there is no sense that reinforcements are provided by a particular agent. She speaks of the reinforcement process as something sought by the person to be reinforced, but in a rather passive way, something like Skinner's notion of shaping a behavior.

(17) . . . and the whole process of finding what it is that gives you your strokes OK? is not an easy one.

(18) So that's what you're asking about, the process of finding out what is positively reinforcing to you OK? is not an easy thing to do and I don't know how people hit upon . . . .

This is related to Skinner's notion of the environment as agent, except that she has not formed any notion of the environment as an entity that acts on her.

A number of questions remain. One concerns the rarity of this explanatory system. Since only 1 speaker out of 14 in the sample uses this behaviorist explanatory system, is it justifiable to posit it as an explanatory system present in the culture, or should it rather be considered an idiosyncracy of this speaker alone? This system is unique in the data of this study, and I believe that even in a considerably larger sample, it would be quite rare. However, although this explanatory system sounds somewhat odd, its relation to a known expert system is recognizable.

Furthermore, it is comprehensible; we may be surprised by the sorts of things the speaker cites as reasons, but we understand why they count as reasons. This is in strong contrast to fully idiosyncratic explanatory systems, whose connections are incomprehensible. We may also ask how this speaker came to use such a rare system. This is a tantalizing question, but if it is answerable at all, it requires psychological and biographical information that lie beyond the scope of this study.

ASTROLOGY

Another explanatory system present in these data is astrology. This system is used only jokingly and only in the relaxed later part of the interview as it modulated into a flirtation. This is not surprising. Since astrology is a less respectable explanatory system than the others we have examined, it is less likely to turn up at all in an interview situation. Therefore, only traces of the system are present; it is impossible to give a listing of all the themes present in the system.

The most striking use of astrology is to give an explanation of character and character differences. It is used, both in the examples below and in casual uses I have heard, to provide an understanding of why an incomprehensible or obnoxious character trait cannot be changed, or why two otherwise reasonable people cannot get along with one another. Unlike psychological explanations of character types, astrological types are not presented as pathological and, therefore, there is no demand or expectation that the person of a particular type could or should change that type by becoming better adjusted or more mature.

The following examples of use of an astrological explanatory system are taken from an interview with a single speaker.

(19) *Speaker:* Yeah. The one thing that I don't miss from the East Coast are the arguments.
Interviewer: (*Laughs*) Yeah.
Speaker: OK. (*Laughs*) Talking, yeah, uh but the arguments, and almost the creation. It's sort of like, my mother does that too. She's really beautiful. She called me up one night and she said "How are things?"

And I said "Fine, you know, kind of beautiful, right in the middle." Which is where I like things, being a Libra. And she says, "Oh, I can't stand them when they're that way." She says, "I gotta have some *excitement* in my life." She says, "I noodge your father a little bit to get." So she creates an argument just to get a little stimulation. Yeah. I, that's not for me. That's for my m–, who's a Scorpio, my mother is a Scorpio, so.

(20) *Speaker:* What's *your* sign?
Interviewer: Uh, Capricorn.
Speaker: Perfect. Methodical. They like it to go right. Intelligent. Yeah.
Interviewer: I'm not methodical.
Speaker: You're *not?* Your mind works that way.
Interviewer: Hm. (*Laughs*) You should see my drawers.
Speaker: The hell with the drawers. (*Laughs*) Your mind works very methodical. I have a very close friend that's a Capricorn. And he uh, you know, he, everything is, he does it *right* the first time. He can't do a half-assed job. It'd bug the shit out of him. He figures, you know, and I agree with him, too, that the easiest way is the right way.
Interviewer: Capricorn has always struck me as one of the more *boring* signs.
Speaker: Hmmmm. Not to me. Well, I dig minds, OK. So minds have uh, uh, they turn me on. I dig when I I'm talking to people, somebody intelligent.

These examples represent a popular form or popular use of astrology as an explanatory system. In the more serious use, it presents, as we have seen, an explanation and reconciliation of character types. Its use as a flirtation device functions both by rekeying the talk on a less serious level than that of interview and by providing a legitimate way of talking about the other person's character.

Like the other explanatory systems discussed in this study, astrology has in addition to its popular form an expert version. Like other experts, the astrologer may provide not only an account of character but also advice on how to live.

The relation of popular to expert explanatory systems

Thus far, this study indicates the existence of a number of popular explanatory systems and claims a relation to corresponding expert systems. It is now necessary to consider the nature of this relation. The discussion first examines the synchronic relation between a popular explanatory system and its corresponding expert system and then considers the historical development of popular explanatory systems from expert systems.

The discussion uses popular Freudian psychology as a model, since this is the explanatory system most fully represented in the data and about which there is the most historical evidence. It should be emphasized that I do not claim to have given a full picture of the Freudian explanatory system as it is represented in popular thought. Rather, I am attempting

to demonstrate the existence of popular explanatory systems and to untangle some of the relations between popular and expert systems.

SYNCHRONIC RELATION BETWEEN POPULAR AND EXPERT EXPLANATORY SYSTEMS

Let us begin by considering the current relation between the popular and expert Freudian systems. The first point is that the popular version uses a very small number of the concepts present in expert Freudian psychology. Most notably lacking are any references to theories of sexual development and sexual functioning. These are, in fact, the concepts that first come to mind in considering the influence of Freud on popular culture. However, the topic of the interview – professional history – does not encourage discussion of sexuality, although a number of speakers do mention it obliquely, as we have seen. There are also many other Freudian concepts not present: the Oedipus complex; the tripartite structure of ego, superego, and id; and the stages of psychosexual development, for example. This lack appears to be characteristic of all relations between popular and expert explanatory systems. A professional astrologer looking at the popular use of astrology as an explanatory system would perceive a similar impoverishment of the system in including only birth sign and failing to consider rising sign, moon, and so on.

A second point is that isolated concepts have been borrowed, but not the entire system as system. The concepts of popular Freudian psychology do not require the dense interconnections of Freud's argumentation. Similarly, we may say that the difference between a popular use of astrology and a serious professional use comes in the drawing up of an astrological chart, which permits the expert to investigate patterns, rather than relying on isolated facts about individual signs.

Finally, and perhaps most important, those concepts of the expert explanatory system are included that do not contradict other popular theories of the mind and the reasons for human behavior. That is, Freudian psychology, as it filters into popular thought, is an expert explanatory system that supplements other more widespread theories, rather than supplanting all of them.

THE HISTORICAL DEVELOPMENT OF EXPLANATORY SYSTEMS

This section considers the process by which an expert explanatory system can develop, give rise to popular explanatory systems, and finally become part of common sense. To understand this process for any given explanatory system would require extensive research in intellectual history, research that has, for the most part, not yet been done. Therefore, the current discussion is restricted to a schematic model of how such historical development might occur. Figure 14.1 shows such a model.

The first part of the process is the move from common sense to expert theory. This is the point at which the originator of some expert model

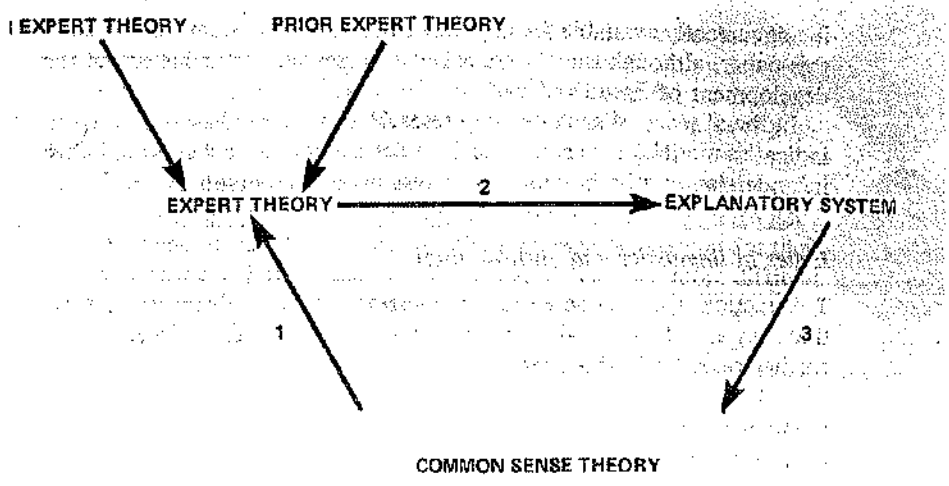

Figure 14.1. Historical development of an explanatory system

of the nature of mind, human behavior, and so on begins the development of the model. The new expert model arises within a context of currently held ideas, both those of common sense and of already existing expert systems. Much of the new expert system will be in opposition to common-sense theories. At the same time, there must be common-sense constraints on the new theory; too entirely radical a theory of mind could not be recognized as a theory of mind at all. Other relevant expert theories extant at the time will also have an effect on the type of models that can be constructed.

We now turn to the second leg of the diagram in Figure 14.1, the move from expert system to explanatory system. This is the process by which this diffusion of ideas takes place from expert into culture. As mentioned, the full expert theory does not become part of this explanatory system; only a limited subset of ideas is chosen. How this selection takes place is a fascinating question. It seems likely that the common sense of the period affects the selection so that the most radical and startling portions of the theory are *not* chosen.

Finally, we turn to the last leg of the diagram, the move from explanatory system to common sense. As a given explanatory system becomes better known and more widely held, it begins to move closer to common sense and may eventually come to form a part of common sense. As an example, we take the notion of the Freudian slip, which seems to be a part of the general, common-sense body of accepted notions and which does not require the support of the Freudian explanatory system to be comprehensible.

To document the historical process suggested in Figure 14.1, extensive research in the history of popular culture would be required. Such research

is not currently available for any of the explanatory systems discussed in this paper, although there is some related research on the history of the development of Freud's ideas.[4]

In the absence of such detailed reseach, this section has attempted to indicate a model for such historical studies and the value they would have in understanding both explanatory systems and common sense.

Issues in linguistics and anthropology

This section discusses some of the questions about explanatory systems that may arise in linguistics and anthropology and sketches directions for further research in this area.

LINGUISTIC ISSUES

From the point of view of linguistics, this work attempts to show that one component of oral life stories is the explanatory system, which furnishes a system other than that of common sense by which the actions narrated can be understood and justified. A possible criticism arising from this point of view is whether this analysis makes too much of the available evidence. That is, we have seen speakers using such phrases as "strokes" or "reinforcement" or "deeper reasons" or "Libra." Since these are common in ordinary conversation, what justification is there to use them to assert the existence of as complex and hypothetical an entity as the explanatory system?

One argument for the postulation of the explanatory system is that speakers do not use metaphors from several systems. That is, we do not find a single speaker using both Freudian and behaviorist metaphors. Since the mixing of metaphors is a common phenomenon in speech, when we find metaphors kept separate in this way, it argues that they come from separate systems, which, in some sense, are known to the speakers.

A second argument is that in narratives exhibiting the effects of a particular explanatory system, the details of construction at the level of the sentence and the entire narrative are consistent with the content of the explanatory system claimed for the life story. This effect is particularly evident in the behaviorist life story examined earlier; however, it is present to some extent in all life stories that use an explanatory system.

These two arguments together suggest that however common the metaphors of these explanatory systems may be, they do indicate the existence of a number of systems, rather than an unstructured collection of concepts that can be used promiscuously and without regard to coherence.

CULTURAL ISSUES

From the point of view of anthropology, or of social history, a number of questions are raised that cannot be answered within the scope of this

paper. One issue is how many explanatory systems are present in a given culture, and what they are. This question could be answered by an extensive study of a number of types of discourse on a number of different topics, as well as an analysis of the most widely disseminated forms of popular culture. A second issue is the relation between popular and expert forms of an explanatory system. As already discussed, the relation could be investigated using the usual techniques of social history. A third issue is more psychological: How serious are these explanatory systems for their users and how are they related to their behavior? This is a more difficult question, but it could perhaps be approached using a mixture of psychological and participant observation techniques.

These questions, I believe, indicate interesting and valuable directions for research. The present research indicates the existence of a level of conceptual organization that is necessary to understand the structure of life stories. This is already an extremely important finding since it allows us to understand one mechanism by which people make sense of their own lives.

Notes

1. I am grateful to Eleanor Rosch and Dan Slobin for introducing me to autobiography as an area of investigation. My interest in discourse analysis and my understanding of it are due to William Labov. I have also been greatly aided by discussions with Joseph Goguen, A. L. Becker, Veronika Ehrich, Gelya Frank, Nathan Hale, George Lakoff, Willem Levelt, Livia Polanyi, Naomi Quinn, Larry Selinker, Sandra Silberstein, and James Weiner. My primary debt is to the people who told me something of their lives and whose stories are here treated dispassionately as objects for analysis.

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2. The examples of this paragraph have been constructed by the author.
3. The data discussed were gathered from 1977 through 1979. I have noted that starting in 1980, as economic conditions worsened, stories of professional choice have begun to include at least a mention of economic circumstances, although they still do not mention social class.
4. For example, Ellenberger (1970) discusses the social history of the development and spread of Freud's thought. Sulloway (1979) discusses the relation of Freud's theories to the theories of biology extant at that time. Bakan (1958) discusses Freud's debt to the Jewish mystical tradition of linguistic interpretation. Hale (1971) gives a history of the acceptance and modification of Freud's thought in the American professional psychological circles. All of these works, though, concentrate on Freud's relation to other expert systems and to his acceptance by other experts. There is no systematic history of the effect of Freud's thought on the general public.

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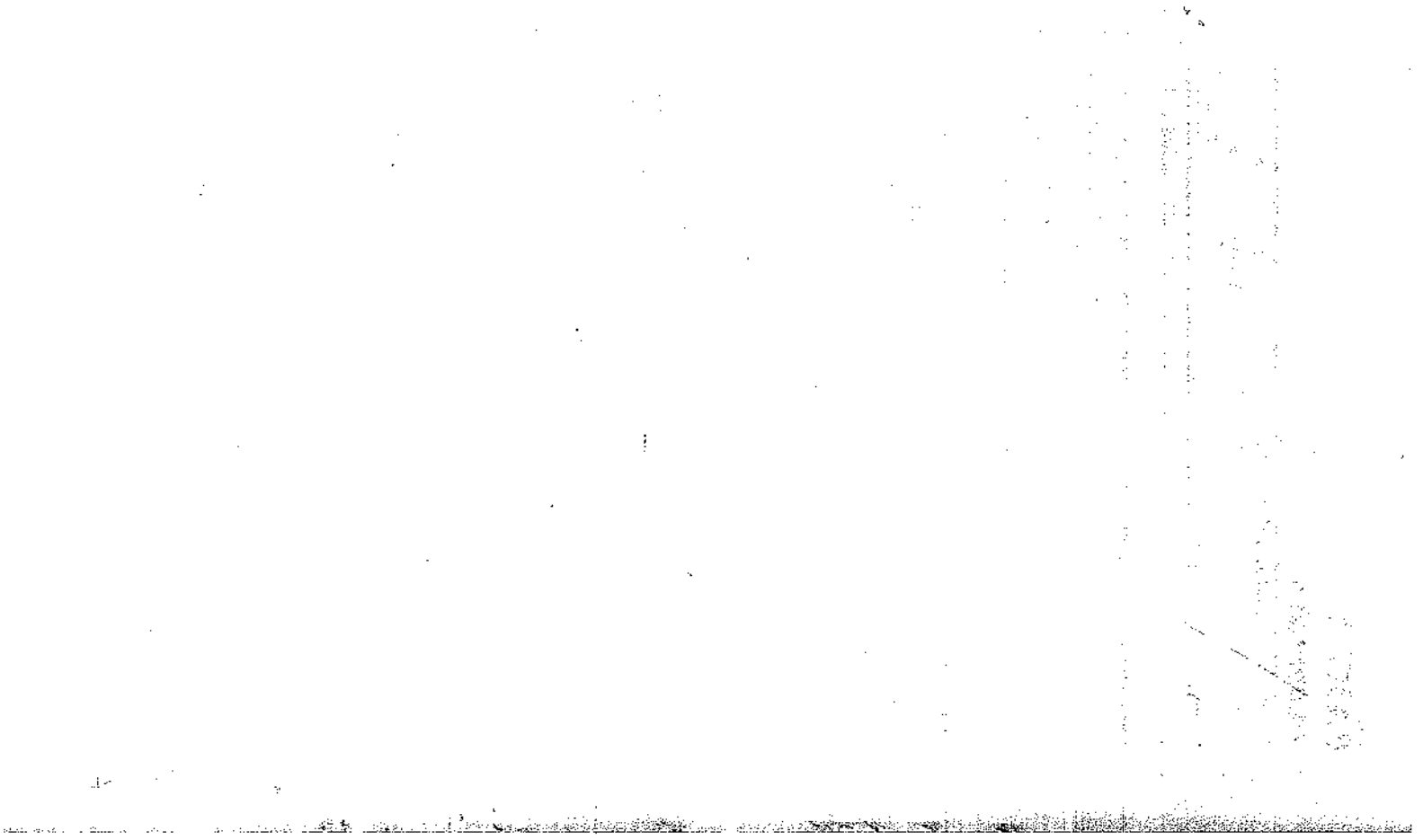
PART V
An appraisal



15

Models, "folk" and "cultural"

PARADIGMS REGAINED?[1]

Roger M. Keesing

Some ten years ago, I reflected in a series of papers (1972a; 1972b; 1972c; 1974) on the limitations of cognitive anthropology as then practiced: "ethnoscience," "ethnographic semantics," "the new ethnography." I argued that in its preoccupation with inductive rigor and cultural uniqueness, cognitive anthropology had followed the premises of American descriptive linguistics, even as the Chomskyan revolution had made these premises untenable in the realm of language. Analyzing the semantics of folk classification on the promise that the methods and models so developed could be extended so as eventually to produce a "cultural grammar" was, I thought, naïve. The focus on artificially simple and simplified problems (especially the semantics of kin terms in their genealogical senses) had deflected our attention from the deep complexities of meaning and context and deep questions about the rule-governedness of social behavior. I pointed to the incredible complexity of the organization of mind and brain, as then beginning to emerge in the neurosciences and artificial intelligence research. In this light, anthropologists' attempts to describe cultural knowledge seemed curiously unrealistic:

> Cognitive anthropology has so far been an Alice in Wonderland combination of sweepingly broad aspirations and ludicrously inadequate means. We have been cheerfully and optimistically using high school algebra to explore the most profound mysteries of the natural world. (1972c)

Yet, my message in these critiques was not entirely pessimistic. In "Paradigms Lost," I noted that pioneers of the linguistic frontier such as Charles Fillmore and George and Robin Lakoff had made impressive incursions into the territory claimed by cognitive anthropology, and I suggested that paths connecting the two disciplines were opening up once more. In my 1972 University of Illinois lecture on "Toward a New Cognitive Anthropology," I noted that while proponents of "The new ethnography" were trying to characterize formally the cultural knowledge of native actors, artificial intelligence (AI) researchers were trying to write "cultures" for automata. There and in an assessment of kinship studies (1972b), I pointed toward a potential convergence between AI research

and cognitive anthropology: Both were making parallel simplifying assumptions, and both were facing the same intractable problems of pattern and relationship; each had something to learn from the other. I further suggested that a nascent understanding of categorization in terms of prototypes, contexts, and fuzzy edges in anthropology (Berlin & Kay), cognitive psychology (Rosch), linguistics (Lakoff), and AI pattern-recognition research could revolutionize the simplistic models of then-prevailing ethnographic semantics.

That in 1983 a surviving little band of battered pioneers of the early cognitive anthropology could sit around a conference table with George Lakoff, with students of Rosch and Kay pursuing complexities of semantics in terms of prototypes and fuzzy edges; with Jaime Carbonell, who is trying to teach automata to reason analogically as human beings do; and with a new generation of cognitive anthropologists collaborating with AI researchers, suggests that my guarded optimism and glimpses of a new cognitive anthropology were not so far off the mark.

But is all this more than collective optimism, fraught with the same old naïveté? Do we simply have new catchwords for the 80s – "folk models," "prototypes," "schemas," "instantiations," "conventional metaphors" – that disguise the same old difficulties with new labels? Is the interdisciplinary venture genuine, or have we cognitive anthropologists just enticed outsiders into our wild goose chase? Or joined theirs?

A detailed summary and retrospective of the past decade of cognitive anthropology would be tedious. However, some assessment of the new developments in relation to the past, to the future, and to the deep problematic of characterizing what native actors know and how that shapes what they do, may be worthwhile.

An ambiguity in this task needs to be made explicit at the outset. My assigned task, at the conclusion of the Conference on Folk Models, was to assess retrospectively the papers presented in the conference and the theoretical concern with *folk models* that had been their focus. After an initial version of my paper had been circulated – indeed, my critique may have been one of the stimuli to the change – the concept of folk models was recast as *cultural models* by the editors. Moreover, the set of papers initially given and discussed at the conference was considerably reduced, and some key contributors to conference discussion are not represented in this volume. Was I, then, to present a retrospective critique of a conference on folk models? Or, was I to summarize a volume addressed to essentially the same problematic, differently labeled, and with a substantially reduced set of papers? I have chosen a middle course, addressing myself mainly to papers included in the volume, but alluding where worthwhile to other participants in the conference and points raised there. I also look both at folk models and their mutated version, cultural models.

Cultural knowledge and cultural theory

I have argued (1974; 1981) that an ideational theory of culture does not commit us either to a monolithic view of "a culture" as a shared system of symbols or to a deterministic view of culture as directly generating behavior. An ideational theory of culture can look at cultural knowledge as distributed within a social system, can take into account the variation between individuals' knowledge of and vantage points on the cultural heritage of their people. It can also view cultural knowledge as shaping and constraining, but not directly generating, social behavior.

In their pursuit of *cultural grammars*, however, pioneers of the new ethnography had seldom dealt with variation and the distribution of knowledge. The *cultural code* was an idealized set of rules assumed (heuristically) to be shared; and despite the protestations about accounting for appropriate, not actual, behavior, a view of human beings as rule-following and appropriateness-maximizing had pervaded early cognitive anthropology. This orientation left little room for the processes of co-creation, negotiation, and contextual shifting on which ethnomethodologists and other social interactionists have focused. The assumption that behavior is pervasively rule-governed led in many cases to a strategy of inference whereby unconscious rules were posited to account for observed behavior, even where there was no evidence for the "rules" other than the behavior they were assumed to be generating.

Has an emerging new cognitive anthropology transcended the limitations of a view of an idealized native actor mechanically enacting implicit rules? The past decade has seen an increased concern with problems of cognitive variability, which had been foreshadowed by Sankoff (1971), Wexler and Romney (1972), and others. This has been most clear in study of folk classification, as in Gardner's (1976: 464) examination of cognitive variability and sharing and "the model of the omniscient informant."

Have the frontiers been carried still further, toward an understanding of how the distribution of knowledge and perspective articulates with the structure of social systems? I see in the conference papers and volume some grounds for optimism, some for pessimism.

In place of the idealized native actor, we are presented with "folk" and "experts." The folk, in turn, may have different models from one another (e.g., Kempton's alternative models of how thermostats work, the alternative metaphors of marriage explicated by Quinn, and the folk models of electrical current as water or lemmings discussed by Dedre Gentner at the conference). There thus is room here for variable versions of a common culture – and that I take to be an advance. But the folk/expert dichotomy, if we take it seriously, would seem itself to represent a folk model of society: and one which, I argue below, is itself fraught with dif-

ficulties. *Cultural models* may steer us clear of some of these traps; but the reconceptualization raises further problems.

The conception of human beings as pervasively rule-following is being transformed into a more sophisticated framework for looking at culture and behavior. The cognitive models explored in these papers constitute paradigms through which one places constructions on everyday experience; conventional metaphors represent simplified, transformed, culturally defined realities. But these are frameworks of interpretation, not sets of rules and routines native actors follow to maximize the appropriateness of behavior. There is room here for choice, for alternative constructions, for creativity. There is also an emerging concern with the creative social processes of co-construction of situationally shared and negotiated realities. Quinn's paper (this volume) and her other recent work vividly show how an understanding of a marriage is negotiated, fashioned together in (as well as from) ongoing interaction by husband and wife; Price (this volume) shows how cultural interpretations of disease are fashioned in the process of interaction. We are even learning that lexical semantic analysis may require reference to the situational context of speech, as Eve Sweetser's elegant analysis of the semantics of *lie* in English (this volume) illustrates.

These developments and continuing advances by students of pragmatics in linguistics and speech act theory in philosophy make it clear that the static and deterministic models of early cognitive anthropology were sterile not because they were (or aspired to be) cognitive. They were sterile because, as preliminary mappings of what human beings know about their world, they were not placed within an adequate, multisided paradigm of how what we know articulates with the social worlds we create together (and which, dialectically, create us and what we know). This is a problem to which I return.

In my review of cultural theory (1974) and more recent assessments of culture (1981; 1982) I have noted that a cognitive view of culture, while potentially allowing us to interpret the distribution and variability of knowledge and the situational co-construction of shared worlds, renders it difficult to capture the publicness and collectiveness of culture as symbol systems (Geertz 1972). As Varenne (1984:291) has perceptively written in critically assessing "individualist" theories of culture, the collective tradition of a people is in an important sense external and transcendant in relation to any individual; such a cultural tradition

> *is always already there.* It is in this sense that ideology, or culture, is an external social fact that is part of the environment of individuals. To the extent that it is part of the environment, it is something to which individuals will adapt and against which they may react. . . .

This sense of externality and transcendance, which is easily lost if we either reduce a culture to the "head" of an idealized omniscient native actor or distribute versions of "it" through the "heads" of a population of

native actors, is potentially captured more clearly in the notion of *folk models, cultural models,* or *folk knowledge* (Clement 1982). These models are at once cultural and public, as the historically cumulated knowledge of a people and the embodiments of a language, and cognitive, as paradigms for construing the world.

Models, "folk" and "cultural"

The central concern with folk models at the Princeton conference and its Los Angeles predecessor represents a confluence of several streams of thought. One is the continuing quest in cognitive anthropology to capture the uniqueness of a culturally constructed world, now tempered with realism: If one cannot go from folk taxonomies boldly out to write a cultural grammar, one can usefully seek a partial but systematic model of a single target domain.

Another stream of thought comes from Lakoff and Johnson's (1980) exploration of how conventional metaphors build on paradigmatic, experientially based models. The models embedded in and constitutive of language itself offer hope of systematic methods of inference; we can use as data materials less elusive than evanescent behavior, less directly constituted by ethnographic interviewing, perhaps, than the spuriously "hard" data of early ethnoscience.

Another stream comes from semantic theory, particularly the prototype semantic theory pioneered by Eleanor Rosch (1973; 1975; 1977; 1978) and Brent Berlin and Paul Kay (Berlin & Kay 1969; Coleman & Kay 1981). These models of the cognized world build on prototype relationships in a number of ways that promise to make prototypy, along with conventional metaphor, a pervasive organizing principle. We find in these papers not only prototypic or canonical exemplars of categories (the chairiest chair), but also the prototypic idealized interactional situation (the purely informative speech act) and the prototypic sequence or scenario (an idealized family structure or life history).

Finally, the concern with models of everyday reality in cognitive anthropology parallels, and is closely tied to, an emerging concern with *naïve theory* or *mental models* in cognitive psychology (see, e.g., Gentner & Stevens 1982; Johnson-Laird 1981; McCloskey, Caramazza, & Green 1980), a tradition represented here by Collins and Gentner (this volume).

The focus on folk or cultural models by cognitive anthropologists and fellow cognitivists in kindred disciplines raises a number of theoretical and methodological issues. I look at most of them in the sections to follow; some bear examination at this stage.

A first question, which I raise here and touch on again in the next section but do not attempt to answer systematically, is how we are to define folk or cultural models so they usefully delimit some sectors, but not all, of the cultural knowledge of individuals. What are such models? And what

do human beings know that does *not* comprise these models? There are at least two important dimensions here: One concerns their sharedness, as folk or cultural constructions; the other concerns their "model-ness." The original characterization of these models as "folk" did not reflect their adherence among the untutored masses,[2] but their common-sense nature. Such models comprise the realms of (culturally constructed) common sense. They serve pragmatic purposes; they explain the tangible, the experiential (hence perspectivally egocentric), the probable; they assume a superficial geology of causation; they hold sway in a realm in which exceptions prove rules and contradictions live happily together. I return to the experientially based, culturally conventional commonsensicality of such models. What, then, makes them "models"? Presumably, it is their paradigmatic, world-proposing nature. These cultural constructions of the everyday world do not consist of disconnected bits of cultural wisdom, expressed in precepts, parables, proverbs, or pragmatic, probabilistic operating strategies, but of the world-proposing (however simplified and internally or externally contradictory) models embodied or expressed in these bits. Such models, then, are not *presented* to us in what everyday people say and do in their everyday lives, or in the stuff of metaphoric talk; they are *re*presented, in fragmentary surface facets. We must infer the more coherent, if unarticulated, models that lie beneath (as we infer native actors must, in learning them). How such models of everyday reality relate to other modes and realms of cultural knowledge then becomes a central question.

How diverse are such models in different culturally constructed worlds? What constrains their diversity? This second question is raised by D'Andrade (this volume) at the end of his superb paper on American models of the mind. In many realms, folk conceptualizations – of emotions, time, mental processes, and so on – are turning out to be more similar than might have been expected (especially in the light of anthropological dogmas about cultural uniqueness and the relatively arbitrary nature of cultural constructions). Conventions for talking about mental processes are different on Ifaluk and in the United States in ways congruent with differences in cultural precept and practice, but they are not *very* different – more shadings of value and emphasis than unique conceptualizations. If that turned out to be true of Balinese and Tikopia and Eskimo, as well, their varied ways of saying the same thing could not necessarily be taken as expressing deep truths about the cognitive organization of information. It would, I think, tell us more clearly about the experiential nature of consciousness, the way members of our species experience and perceive the operation of mind/brain. Loosely speaking (with apologies to Paul Kay), it tells us not about the nature of human heads, but about how it feels to live inside them.

A third question, implied by D'Andrade (this volume) and raised more squarely by Linde (this volume), is the degree to which scientific discourse builds on and with such common-sense models. The physical sciences have

progressively penetrated through and beyond everyday, common-sense models of experienced "reality." Yet the physicist leaves subatomic particles and relativity behind, the mathematician non-Euclidean geometry, as they enter the parking lot and drive home through a world of seemingly solid objects, flat surfaces, and straight lines. Moreover, conventional metaphors and common sense cannot be expunged from the natural languages to which the most precise scientists must have recourse (Kuhn 1979). Disengaging what passes for behavioral science from "folk" models and conventional metaphors is hopeless: Most of psychology (and, we could add, much of sociology and anthropology) reflects common-sense cultural models of the mind and reified metaphors.

Are "folk" or "cultural" models cognitive?

Granted that conventional models of everyday reality are a worthwhile focus for anthropological concern, why should they be analyzed cognitively? Or, put another way, anthropologists have been characterizing such models for decades as (elements of) other peoples' cultures; nowadays, our symbolist colleagues interpret them as public systems of shared meaning. What is gained by interpreting models of everyday reality as cognitive codes rather than as cultural texts?

Let me exemplify with the work of Clifford Geertz, who watched with some wonder at the Princeton conference as cognitive anthropologists explored the realm of culturally constructed common sense as if it had just been discovered. Much of Geertz's work has explored this realm in cultural terms. Consider, for example, his brilliant essay in which the cockfight as cultural text is illumined by Balinese models of society and sociality (1972). Consider the depiction of the Moroccan scenario of Cohen and the sheep (1973) as articulation and negotiation of cultural models. The comparative interpretation of conceptions of self and person in Bali and Morocco (1966; 1974) depicts culturally constructed models of the most fundamental takens-for-granted about human-beings-in-the-world. Finally, Geertz's essay on "Common Sense as a Cultural System" (1975) explores conceptions of personhood, sociality, sexuality, and other realms of the everyday.

There is a double twist to cognitive anthropology's emergent concern with models of everyday cognition – with folk models of the mind, of emotion, of mundane experience. A good deal of Geertz's work, and, of course, much of phenomenology (Husserl, Schutz, Heidegger, Merleau-Ponty), is precisely about models of everyday cognition: about what thinking, remembering, understanding, seeing, communicating, getting angry, the passage of time are, experientially, to human beings; and, more or less explicitly, how they are culturally constructed, how they are shaped by language and metaphor. What, then, is specially to be gained by characterizing models of everyday experience in cognitive terms? Are putatively cognitive accounts of models of the mind more perceptive,

systematic, or powerful than, say, a psychoanalytically informed cultural-symbolist account such as Paul's (1976) analysis of the Sherpa temple as a "model of the psyche"? Do we gain from our cognitive assumptions and commitments? Or, do we achieve, perhaps more pretentiously and less gracefully, what is achieved through the word-magic of a Geertz depicting personhood in Bali (1966) or a Schutz (1962; 1967) or Natanson (1967; 1970) depicting the phenomenology of self and role?

The papers in this volume provide ample evidence that there are wide differences, theoretical and methodological, between symbolists and contemporary cognitivists; and that the cognitivists are achieving important new insights. Where symbolists mainly view their task as interpretive, cognitivists mainly view theirs as scientific. For the latter, the primary data – transcribed tapes of interviews or other discourse or other "hard" records of the behavior of individuals – are crucial, and the inferences drawn from them systematic and explicit. The naïve inductivism of much early ethnoscience is tempered now with realism and appreciation for interpretive insight as well as with rigor; however, concern for methodological precision emerges clearly in these papers. It is misleading that Geertz's metaphor of culture as text to be read suggests close convergence: The texts of the cognitivist exploring models of everyday reality mainly comprise what individual subjects and informants said and did.

Inevitably, the perspectives these approaches yield are quite different. Where symbolists find coherence and systematic structures, cognitivists are likely to find in their primary data contradictions, alternative constructions, small and partial coherences, individual variations. This difference in perspective does not rule out our finding global structures or systematic models underlying apparent diversity – witness D'Andrade's model of American models of the mind or Lakoff and Kövecses's model of models of anger embodied in American English (both in this volume). It is perhaps no coincidence that the most coherent and global models of everyday reality described in these chapters are the schemas built into a language. Even here, however, as Kay's paper reminds us, there are alternative if not quite contradictory models expressed in conventional usage. Cognitivists' engagement with such models does take them into domains already extensively explored by symbolists and others; but the insights this exploration is beginning to yield are complementary to, and in some important ways corrective of, those discovered along different paths.

I am concerned that this exploration takes place with adequate appreciation of how extensively mapped this territory already is and of the insights to be gleaned from earlier work. Cognitive anthropology grew up curiously innocent of social theory; it need not remain so in its maturity. Past explorations of everyday cognition and common-sense constructions of reality include not only those of the phenomenological tradition and its offshoots (Husserl, Schutz, Heidegger, Merleau-Ponty, Foucault, Ricoeur) but also those of the Marxist tradition and its offshoots (Marx, Gramsci,

Althusser, Bourdieu). In this Marxist tradition, the realm of common sense is viewed as refracting as well as reflecting, disguising as well as illuminating, shaped by as well as shaping the realities of a social world.

I am also concerned about what I see as a problematic theoretical disjunction between folk models as cognitive structures and as social and cultural patterns. Early cognitive anthropologists radically oversimplified matters by reducing "a culture" to an idealized cognitive system. However, the solution proposed by Clement (1982) – that we see *folk knowledge* as having its locus "in the group" and not in the individual – seems to pose another set of dangers. Clement contrasts her concern with folk knowledge with the earlier assumptions of ethnoscience in these terms:

> In . . . ethnoscience, attention is focused on cultural competence – . . . mentally held principles and recipes that the individual has learned which allow him or her to behave in a culturally appropriate manner. . . . In contrast . . . , *folk* knowledge is viewed as an aspect of the group. Folk representations, the means through which folk knowledge is expressed, are . . . products of the institutionalized patterns of information processing and knowledge distribution within the group. (1982:194)

If what we study is collective, however, if its locus is "in the group" and not in "mentally held principles and recipes," can we usefully regard ourselves as cognitivists and effectively and legitimately borrow models and methods from the cognitive sciences? What we want to study, I think, ultimately is how individuals cognize and use models they (partly) share with others, models that are common coin in the community. That will require that we see folk models *both* as collective and social *and* as "mentally held principles and recipes."

Perhaps, then, we need to distinguish between models (*I*), the pool of common-sense knowledge and understandings of the community, and encoded in its language; and models (*II*), the (alternative, partial) versions of these models cognized and invoked by individuals in everyday perception, thought, and interaction. If early ethnoscience erred in imagining that we could adequately characterize level (*I*) as an idealized version of level (*II*), we equally err, I think, if we try to characterize level (*I*) using theoretical frameworks derived from and appropriate to cognitive science (chunking, instantiations, etc.). It is true that the pools of ideas in communities can include only ideas that are thinkable and knowable by individual humans. As systems, however, these pools are not subject to many other constraints that structure the cognition of individuals, and their dynamics are quite different. We can be wiser cognitive anthropologists if we distinguish these two loci of conceptual models and levels of analysis and engage ourselves with the nature of each and the interplay between them. Replacing *folk* with *cultural* in designating the models we are concerned with avoids some of the problems raised by the term *folk* (and the folk model of society it itself embodies) to which I pointed in earlier ver-

sions of this commentary. In locating the models as collective and shared, however, it perhaps renders more problematic than *folk* did attempts to analyze such models as if they represented the cognition of individuals.

Perhaps an example, to which I later return, will serve to clarify. Consider the folk models constructed around the concept of *luck* in American culture as a set of public, largely shared conventions for talking, for explaining outcomes, for characterizing good or bad fortune. Linguistic conventions ("some people have all the luck," "thank my lucky stars") and cultural icons (rabbits' feet) are cultural coin of the community. Yet, at a level of individual cognition, these cultural models of luck (folk models *I*) are drawn on in quite different ways. When I talk about having all the luck on the tennis court on a particular day – the day when all my let-cord shots dropped over and the occasional desperate lunge yielded a winning drop volley off the racket frame – I do not surmise that my "luck" was anything but random chance. Other people, on the tennis court or in poker games or reflecting on the trajectory of life, invoke (I think) *luck* with a conviction that the outcome of events is ultimately determinate, or at least skewed in favor of some, against others. Some people carry rabbits' feet or other amulets, wear "lucky" headbands or use "lucky" putters, convinced that this will affect the outcome of events. Individuals perceiving contradictions between their "rational" and magical beliefs may invoke the folk concept of *superstition* to rationalize their conjunction. In the cognition of individuals, conceptions of luck may be central (e.g., to a gambler) or peripheral, may be invoked with metaphysical implications or without, may be "believed" or not. The same conventional linguistic expressions and metaphors regarding *luck* may be used by different speakers of American English with radically different implications: The folk models (*I*) embodied in language structure our talk whatever our personal folk models (*II*) of luck. In the cognition of individuals, folk models (*II*) articulate with, exist side by side with, evoke and are evoked by other systems of folk models drawn from the pool of the community in diverse ways.

To take another example, my color vision differs from that of the majority in the community in that I am neurophysiologically incapable of making color distinctions (greens vs. reds, in some perceptual environments) made by normal members of the population. I and a substantial minority are constrained to use a conceptual system we lack the perceptual equipment to use properly, or at least conventionally. Like other people in the population, however, we turn green with jealousy, red with anger; we use folk models (*I*) of the community as best we can.

If cognitive anthropologists are to pursue more deeply and more formally the place of folk models *in* the mind, not simply *of* the mind, then some further questions are in order. One characteristic of such models, or of some of them, is their probabilistic and partial nature. They are, as elements of culturally constructed common sense, models that work

well enough for everyday use. But human beings, operating in a universe of unique constellations of events, must deal with the atypical, the improbable, the unexpected – not simply with ideal types, canonical circumstances, the probable, and the normal. As Haviland (1977) and Randall (1976) observe, we must have ways of engaging, construing, and acting on circumstances our rules of thumb do not aptly comprehend – despite our high tolerances for living with contradiction, for not only holding mutually incompatible models but also for maintaining models in the face of their demonstrated inadequacy. ("The exception proves the rule," as Geoff White's proverb [the volume] might remind us.)

But do we have, in addition to the models of culturally constructed common sense, deeper grammars to which we have recourse in the face of the atypical and complex? Do common-sense models, enabling us to deal with the world probabilistically on the basis of typical scenarios, "canned" or formulaic routines, and ideal types, operate in conjunction with cognitive processes whereby we decompose situations into their deeper constituents and interpret them with an underlying grammar when we have to? Or, do we simply muddle through by extrapolation, approximation, and ad hoc invention? I raised these questions more than 15 years ago (1970) in looking at what I took to be an underlying grammar on which folk sociological models of roles were constructed; and I reflected again on the adequacy of such an inferred grammar when, five years later, I was assessing my exploration of roles in relation to the state of play in cognitive anthropology:

> One facet of the miraculous and still mysterious process of everyday, mundane social life is the way we act, and perceive others to be acting, in culturally standardized *capacities*. We enact *roles:* or so social science theory, drawing on the theatrical metaphors of folk sociology, would have it. (1975:5)
>
> But since no adequate description of roles had ever, to my knowledge, been formulated – and certainly not in a non-Western culture – I could not *assume* that the metaphor of 'role', derived from our folk sociology, would turn out to fit the way the Kwaio [of the Solomon Islands] organized their knowledge of their social world. 'Social identity' and 'role' might not turn out to reflect the deeper and unconscious levels at which cultural algorithms were coded. (1975:9)

I had provisionally inferred, using the method described in my 1970 paper, that the labeled more-or-less standardized capacities in which Kwaio acted were often composites of underlying elements.

> This conception of social identities as fractionated elements from which we formulate social personae has . . . advantages analytically and theoretically. The elements, if they have any cognitive salience, are ways of organizing knowledge at an unconscious level. . . . In this view, social identities serve as "building blocks" or elements that, by "grammatical" rules of combination, are combined into composite social personae with

> predictable role entailments. We are conscious of, and often label, typical high-probability combinations. They are the 'pre-packaged' units of a culture. Navigating probabilistically in our social world, we expect physicians or attorneys or gas-station attendants to be male, and expect fathers to give their daughters away as brides; yet we can deal in culturally appropriate ways with less familiar and less typical combinations. (Keesing 1975:16)

> Some are improbable, some rare, and a few probably unique. The point is that instead of taking a small set of ready-made social identities as the basic units of a cultural inventory, we would view our actors as continually *creating* 'social personae' . . . out of the elements provided by the culture. (Keesing 1970:434)

My point is that a cognitive theory of folk models, as culturally constructed common sense, would perhaps in the long run not want to take these models as representing cognitive organization but as representing a set of operating strategies for using cultural knowledge in the world; they comprise sets of shortcuts, idealizations, and simplifying paradigms that work just well enough yet need not fit together without contradiction into global systems of coherent knowledge. A cognitive theory of such models of everyday reality would, I think, ultimately want to take them not as the constituents of cultural knowledge but as their surface manifestations. (I have similarly argued that, contra the early ethnoscience, an adequate cognitive theory would not assume that lexemes or taxonomies are the fundamental constituents of cultural knowledge but rather would see labeling and taxonomic classification as emergent phenomena to be explained in terms of more fundamental constituents and processes [Keesing 1970:444–45; see also Randall 1976].) Against this line of speculation can be counterposed an argument, articulated by Quinn and Holland in their introduction, that it is the simplifying power of the models of culturally constructed common sense, in codifying the prototypical, that allows human beings to cognize such vastly complicated natural and social worlds.

The problem of how we human beings deal – whether by extrapolation, analytic decomposition, feature-weighting, flexible modes of pattern matching, or whatever – with the atypical, the marginal, the fuzzy, or categorically liminal – has received little attention in cognitive anthropology to this point. It squarely confronts AI researchers, notably in pattern recognition; and it faces us in various forms when we work with prototype analyses, whether in semantics or other realms. (See, for example, Kempton 1981 and Kronenfeld, Armstrong, & Wilmoth 1985.) Cognitivists in anthropology and kindred fields need to confront these problems, at once formal and substantive, more directly. It may be, as Lakoff (1984) has recently argued, that explorations of the logics and patterns of prototype categorization will in the long run not only revolutionize

our understanding of cognition but also demand reformulation of the basic Aristotelian premises of western logics. My point is that if we are going to be cognitivists, in relation to models conceptualizing everyday reality, we need to be good ones, to explore deeply the way cultural knowledge is organized and applied to the world.

If our models of other peoples' models are to fit into the emerging conceptualizations of cognitive science, and at the same time are to fit into the wider anthropological enterprise, we need to be asking strategic questions about the structure of cultural knowledge and the way it is used in ongoing social life.

Culture, memory, and behavior

I noted a decade ago that despite a common boundary beween cognitive anthropology and cognitive psychology, a curious gap had arisen between them. Pioneers of cognitive anthropology such as Frake and Conklin had read and learned cognitive psychologists such as Miller, Galanter, and Pribram (1960). But especially as psychologists probed memory experimentally, *memory* as conceptualized psychologically and *culture* as conceived anthropologically had become strangely separated. Short-term and long-term memory represented "real" cognitive processing capacities; but what was remembered was artificial, an artifact of experimental procedures.

Human beings, of course, remember particularities – people, places, experiences; but they also abstract from particularities to derive general rules, models of meaning, expectations and strategies and routines. These abstractions from experience,

> rules for deciding what is . . . , what can be . . . how one feels about it . . . what to do about it . . . and . . . how to go about doing it. (Goodenough 1961:552)

comprise cultures, as cognitive systems.

Early attempts in artificial intelligence and cognitive psychology to create models of memory dealt mainly with memory as a psychological construct – that is, with remembered particularities (see Norman & Rumelhart 1975). But as AI models were pushed further, the need to simulate the "internal models of reality" (Gregory 1969) on the basis of which complex organisms perceive and act became clear. Automata had to be programmed with "cultures"; and much progress in AI in the last decade has been in this direction.

I return later to the growing convergence between cognitive anthropology and artificial intelligence. My concern at this stage is to look more closely at the interplay between memory of particularities and generalized "rules" in ongoing behavior.

In 1974, I had raised the question of the degree to which the knowledge human beings use to act in the world is generalized. Could it be that "the

cultural code" is as much an artifact of our assumptions and methods as "memory" was for experimental cognitive psychology?

> It remains an open question to what degree human action is guided by a general conceptual code, a theory of the world and the game of social life that can be disentangled from the particularities and immediacies of each individual's unique experience and life space. (Keesing 1974:93)

Do we human beings interpret the unique situations of life by extrapolating from unique past situations as well as by applying generalized models of the possible and appropriate? John Haviland warns that:

> it is difficult to distinguish an "ideational" component, which involves knowledge of the general rules of the culture, from knowledge of a wide set of contingencies which are in no sense common to a cultural tradition. We ordinarily have thought of one's cultural competence as composed of codes: conceptual schemata for, say, plants and animals, kinship systems, political structures, and so on. The conceptual schemata have, we assume, an independent existence prior to any particular configuration of animals, any set of actual kin, any actual political operation. But in gossip the nonparticular is irrelevant before the actual; the contingencies determine the general principles – for they are all there is. In gossip, the world becomes more than ideal schemata and codes; it rests on the Who's Who, much expanded, on history, on reputations, on idiosyncrasies, on exceptions and accidents. Gossip exalts the particular. Much of an actor's cultural competence rests on a vast knowledge of contingent fact, raw unconnected trivia. . . . (Haviland 1977:181)

Similar questions about the relationship between cultural models, individual experience, and situational factors are explored by Brown (1985).

Could it be that the "cultural code" itself is partly an artifact of the elicitation process? Do we and our informants enter into a process of co-creation, with normative statements as our collective work? Noting "the processes of collective creation whereby situations are defined, social identities assigned, and rules and relationships negotiated in everyday life," I have recently suggested that

> normative assertions are very often contextually created to suit the purposes of the moment, not simply *cited*. The 'rules' we ethnographers have decontextualized, in turn, may often be constructions fabricated as collective 'work' by the ethnographer and his or her subjects. The ethnographer fashions, with informants, situations in which the construction of normative statements is their joint 'work', their co-creation. Normative statements that emerge in this process of co-creation are then objectified and decontextualized in the production of ethnographies. (Keesing 1982:43)

Randall (1976:546) has asked whether cultural "rules" are in part situationally created and co-created even in the realm of folk categorization:

> . . . folk taxonomies as we know them from ethnographic tradition [may be] . . . constructed by applying normally unexploited principles of native logic to various scraps of knowledge lying around in the mind.

Randall suggests that folk taxonomies are in large measure artifacts of our elicitation procedures and suggests that cognitively stored complexes or associations of characteristics and prototype images are more likely to be the bases of actual categorization than are taxonomic trees. This, he suggests, may be because

> instead of consciously systematizing, most people tackle a different task . . . [i.e.,] to operate adequately in a physically demanding, complex, and often dangerous socioecological environment. Doing this does not involve constructing taxonomic trees, but rather, in a particular situation, selecting a contrast set of characteristics which is both sufficiently specific to achieve a practical and safe result and sufficiently general to accomplish one's purposes efficiently. (1976:552)

Similar concerns about the situational structuring of supposed cultural schemata are expressed by Frake (1977) and Agar and Hobbs (1985).

We must also be wary, in our pursuit of folk models, of doing what we seemingly have done with folk taxonomies: creating more global and coherent models than our subjects in fact cognize. Folk models may by their nature have a partial and situational ad hoc quality, a lack of global systematicity. I am concerned that some of what we take to be folk or cultural models may not exist until our strategies of questioning lead informants to create them; or worse yet, until their responses provide fragments out of which we create them. Perhaps one does not need a generalized model of how thermostats operate, or what electrical current is, until an ethnographer induces us to formulate one, or elicits situational responses suggesting that we are implicitly using one. Perhaps all we need are operating strategies that can be internally contradictory precisely because they are not motivated by any systemic model. That, then, leads to further speculations about the cognitive processes involved.

To what degree do we extrapolate from knowledge of the particular – the canonical case, the prototype example, the closest experience – as well as strategically formulating and choosing abstract models that allow high enough probabilities of adequacy, models that work well enough? Explorers of the cognitive frontier, in anthropology, AI, and other fields, do not yet know. Here, Price's observations of disease diagnosis and interpretation in Ecuador (this volume) are particularly interesting. The "experts" in the process of folk diagnosis she describes have recourse to particular actual case scenarios, from which they derive interpretations of a new case, its possible causes, and best treatments.

It would seem that cognitive interpretation of new situations entails a close interplay between extrapolation from the particular and application of the general, as Haviland (1977) had glimpsed in the gossip of

Zinacantan. Are there then separate cognitive compartments, where memories of the particular and models of the general, rules and codes, are stored and organized? Or, are the general "rules" hung onto, illuminated with, and organized in terms of knowledge of prototypical particularities? The latter intuitively seems more plausible and potentially powerful a system; and I am cheered by Jaime Carbonell's observations (personal communication) that recent research in artificial intelligence is exploring just these possibilities. Here, again, prototype conceptualizations that take as background prototypical contexts (that can then be modeled on or remembered in terms of actually experienced events or exemplars) may provide a crucial link between knowledge of the general and memory of the particular extrapolation from past experience to interpret new experience.

Cognitive anthropology and artificial intelligence

This brings me to the convergence, which I had anticipated a decade ago (see also Colby & Knaus 1974), between cognitive anthropology and artificial intelligence. It had seemed curious to me that AI researchers were beginning to write simple "cultures" for robots with enormous difficulty while the "new ethnographers" were aspiring singlehandedly to write cultural grammars of everything the "natives" knew. Given that the most mathematically sophisticated researchers in the world, working in teams, were hard-pressed to program "knowledge that" allowed automata to recognize and manipulate a few objects in artificially simplified environments, it was hardly surprising that a lone ethnographer in a jungle, virtually illiterate in formal languages, was hard-pressed to write more than token segments of a cultural grammar of Subanun or Kwaio.

Had anthropologists anything to contribute to the development of what I foresaw as an emerging formal science of communications, a general theory of information – "knowledge" – in biological systems and its simulation in automata? Could anthropology's cognitive theories of culture begin to be realized in some more substantial and less evanescent and illusory sense through collaboration with AI researchers and others exploring the formal organization of biological information systems? A decade ago, I had foreseen the prospect of positive collaboration:

> . . . If cognitively oriented anthropology is to survive we will have to add our strengths, our knowledge of cultural variability, to the strengths of interdisciplinary teams working on the frontiers of artificial intelligence research and related fields. The problems of how humans organize their knowledge . . . are too vastly complicated for any single researcher or any single discipline to tackle them alone . . . without the anthropologist's help the cybernetician may well create robots that find their Chinese counterparts inscrutable. (Keesing 1975:20)

> [Anthropologists] have, in our studies of other cultural worlds, gained a grasp – mainly intuitive, I think – of how those worlds vary, and how real human beings think, perceive, and choose. . . . The challenge is to make [this knowledge] available to colleagues with the mathematical powers to incorporate our implicit knowledge into their explicit models; and to maintain a continuing dialogue with them that keeps their models anchored in human realities. (Keesing 1972)

I had been concerned that in the early 1970s, AI researchers (especially in pattern recognition) seemed to be making simplifying assumptions parallel to those that were creating a false sense of accomplishment in ethnographic semantics (especially analyses of kin terms). The mysteries whereby human beings recognize patterns across contexts lie at the heart of semantic analysis; cognitive anthropologists studying kinship semantics in narrow genealogical frames were spuriously simplifying the task. AI researchers, by artificially holding frames constant and seeking to capture relational patterns by feature analyses, seemed to be following a similar strategy. I had belatedly realized, as I put it in 1975, that in my own attempts at cognitive analysis, I had been "hunting elephants with a fly swatter." But I suggested that my hunt "posed rather clearly some of the complexities of the phenomena" and hence served "as a corrective against the simplifying assumptions so often made in artificial intelligence and related fields to make dead flies look like elephants" (1975:21).

Both cognitive anthropology and AI still seem prone to celebrate more or less successful fly hunts. At least serious collaboration has begun, however, as witness the work of Ed Hutchins on one side of our conference table and Jaime Carbonell on the other. More formally sophisticated models, both in semantic analysis (prototypes, feature weighting) and pattern recognition, the growing dialogue and common vocabulary emerging from the work of such scholars as Schank (Schank 1980; Schank & Abelson 1977), and engagement with anthropological problems, cognitively framed, by AI researchers such as Klein and his colleagues (Klein 1983; Klein et al., 1981) give cause for measured optimism.

Conventional metaphor

Lakoff and Johnson's provocative 1980 book on conventional metaphor has kindled interest in cognitive anthropology and acquired a central place in the growing concern with folk or cultural models. Lakoff and Johnson (and others less widely read by anthropologists, such as Ortony 1979 and Sacks 1979) have been developing a view of language as pervaded by metaphors that are neither "creative" nor "dead" but conventional and fundamentally constitutive of our ways of everyday talk. Lakoff and Johnson, in particular, have developed a view of metaphor as paradigmatic and experientially based.

A metaphoric schema, establishing a universe of discourse in terms of another universe of discourse (LOVE IS A JOURNEY, TIME IS MONEY), in effect defines the kind of paradigm that has been conceptualized here as a folk or cultural model. The anthropologist can explore the cultural particularity of a particular model-embodied-in-metaphoric-schema and, as brilliantly exemplified in Naomi Quinn's analyses of American marriage (1982; this volume), can go on to show how people live their lives, as well as construe their lives, through such metaphoric schemas.

The focus on metaphor articulates closely with an increasingly generalized understanding of prototypy as an organizing principle. The prototype pattern may be a canonical enactment or expression of the metaphor; as philosopher Mark Johnson, another conference participant, would want to remind us, it may be the quintessential experiential pattern on which the metaphorical relationship is built; it may be a prototypical developmental cycle (the unfolding of an ideal marriage, the course of true love, the cycle of the canonically happy family). A metaphorical schema factors out contingent complexities of real life in proposing homologies of form, pattern, and relationship between the source domain and the metaphorized one. A world thus simplified becomes a world of the prototypical.

A predictable anthropological response to Lakoff and Johnson's provocative book has been to show how distinctive are the conventional metaphoric schemas of other peoples (see, e.g., Salmond's intriguing sketch of Maori metaphor, 1982). In some realms, as in body-part metaphors (J. Haviland, unpublished data), conventional metaphors used in different languages are much less diverse than the anthropological relativist might expect (see also White 1980); and in others (e.g., metaphors of time in terms of space), what appear to be differences probably in fact represent the same metaphor phrased in terms of contrasting perspectival orientations. Yet, there clearly *are* differences in conventional metaphors. Our talk of emotions in terms of *hearts* contrasts markedly with Japanese talk of emotions in terms of *bellies*, or other people's in terms of *livers*. Anger is talked about quite differently in Ifaluk (Lutz this volume) or in Ilongot (Rosaldo 1980) than in English, with its beautifully coherent metaphoric schema of hot liquid in a container (Lakoff & Kövecses this volume).

A crucial question linguistic philosophers have pondered now confronts us. To what extent are conventional metaphors, and the schemas they express, constitutive of our experience? Do varying schemas, whether of emotion, time, causality, social relationships, and so on, reflect contrasting modes of subjective experience, of thought and perception – or of simply different conventions for talking about the world, as creatures with our human brains and sensory equipment and bodies experience it? There is no simple answer. In discussion of his and Lakoff's paper, Kövecses cautioned that the conceptual model of anger they had analyzed could not be assumed to be culturally or experientially salient outside the realm of

language. And in my conference paper (Keesing 1985) and discussions, I warned of the danger of imputing to our subjects metaphysical theories that seem to be implied by conventional ways of talk. Out of our conventional ways of talking about *luck*, I suggested, a nonnative observer could be led to infer a metaphysical theory of an invisible substance of which people have more or less. We anthropologists, with our bent for cultural exotica and our propensity for viewing cultures as radically unique and diverse (not to mention our imperfect command of field languages), may often have imputed metaphysical notions to our subjects that in fact represent no more than conventional tropes: "Some people have all the luck."[3]

That leads to a further epistemological concern about conventional metaphors and about the models, folk or cultural, on which conference and volume have been focused. Perhaps, working here on a terrain much more slippery than that of folk classification (though that was more slippery than we realized), we really need to draw on our own intuitions as native speakers, need a deeper command of semantic shadings and hidden connections than we acquire in learning fieldwork languages. At least that could be one implication of the fact that so many of the ethnographic papers of the volume (10 of 13) deal with our native language and culture.

"Folk" or "cultural" models in society

I argue in the second section that early cognitive anthropology was naïvely reductionistic in its tacit premise that cultural rules generate behavior – that social interaction is an epiphenomenal outcome of a shared code, a product of rule-following and maximizing of appropriateness. Early cognitive anthropology was, I think, equally naïve in its tacit assumption that the institutional structures of society are themselves epiphenomenal – that cultural rules generate social systems as well as behavior. Such a view was perhaps intended only as a heuristic corrective to the alternative determinisms – ecological, economic, functionalist – then prevailing in anthropology. However, we nonetheless implied the Subanun, Hanunoo, Trukese, or Kwaio society was a more-or-less direct outcome of the rules of a cultural grammar; cognitive anthropology's task was to uncover these mainly implicit rules.

As heuristic corrective, this view doubtless had some value, especially when applied to a small-scale classless society in the Philippines or Solomon Islands. But cultural "rules" are themselves historically situated, shaped (although not determined) by economic and ecological constraints and social processes. Cultural knowledge does not simply vary from individual to individual. What actors know, what perspectives they take, depend, even in the least complex classless societies, on who they are – whether they are male or female, young or old, leader or led.

Early cognitive anthropology, taking its models from linguistics, grew up curiously innocent of social theory. It was not simply its concern with

trivia, its aura of scientistic objectivity, that brought "the new ethnography" into collision with the radical anthropology catalyzed by the blood of Vietnam. An anthropology that reified the cultural status quo into the determinant of institutions as well as behavior, that ignored class and history and economy, that ignored the ideological force of cultural rules, could scarcely be the needed "new" anthropology, revolutionary in both senses.

Both cognitive anthropology and the various modes of radical anthropology have mellowed, become less strident in their critiques, less sweepingly millenarian in their claims and aspirations. Yet cognitive anthropology remains, I think, curiously innocent of social theory.

In the conference focused on folk models, I became something of an ideological gadfly about this issue. The model of society assumed there seemed, from the perspective of Marxist social theory, to be itself a folk model manifesting itself as science. But like other folk models, this one – of society as comprising "experts" who properly understand and properly control knowledge and society and "folk" – has strong ideological force. Like other folk models, it disguises and mystifies real structures of class and power. Models are created for the "folk" as well as by them. As instruments of ideological hegemony, such models – whether we call them "folk" or "cultural" – may legitimate and perpetuate the status quo: whether they be models of Hinduism that reinforce and perpetuate the position of Brahmin priests or the models of illness among the Ecuadorian poor that allow the masses to contend with grim struggles of life and death while the country's oligarchs go to the Mayo Clinic.

Folk models in the form of ideologies of patriotism and empire have led hundreds of thousands of Europeans to "glorious" deaths in service of their rulers. Not all folk models so clearly serve ideological ends. (Such an argument would be hard to make of models of electricity or anger.) But cognitive anthropology's emergent concern with conceptual paradigms of this kind, whether it labels them as *folk* or *cultural* models, needs surely to be tempered by sophistication about the sociology of knowledge and the uses of ideology.

The concept of culture as shared and societal embodies, as social theory, deeply conservative premises (see, e.g., Abercrombie 1980). We need to keep in view (at least in our peripheral vision) the production, control, distribution, and ideological force of cultural knowledge. Anthropologists, like other social scientists, are perforce specialists as well as generalists. Specialized work in cognitive anthropology may leave no room for long excursions into the class structure of society and the production and control of the knowledge we seek to map.[4] But we need to be much more cautious and wise than were the pioneers of "the new ethnography" about embedding the cognitive systems we purport to explore and map within social systems and about our place in the multidisciplinary advances of social/behavioral science.

An emergent social/behavioral theory must bridge between the institutional and abstract and the essentialities of humanness. Social systems are

constructed out of, as well as constrained by, what human beings are; and how human beings cognize their worlds constrains and shapes how humans-in-societies reproduce them. Exploration of conceptual models, of metaphors, of the construction and co-construction of meaning, of how what we see is constituted by what we know, can contribute importantly to an emerging composite understanding of humans-in-societies.

We need a specialized concern with cognition. There is challenge enough in trying to keep up with rapidly moving frontiers in AI, psycholinguistics, linguistics, and other subfields of cognitive science. Perhaps it is too much to expect cognitive anthropologists and other explorers of conceptual models of everyday reality to be social theorists as well. At the same time, however, I believe we must also step back regularly to assess how what we are exploring articulates with a wider concern with humans-in-societies. Otherwise, we run the danger that beset "the new ethnography" – of radically misconstruing the place and power of the provisional models. Cognitive anthropology, I think, must be pursued in the long run as part of a multidisciplinary, multisided, and mutually informed exploration.

Notes

1. I was asked by Dorothy Holland and Naomi Quinn to assess the Conference on Folk Models, and developments in cognitive anthropology against the background of my earlier critiques of the field. I have interpreted the invitation as mandate for the self-indulgence reflected in these pages, where I refer to my earlier critiques as if they were divinely inspired. I ask the reader's indulgence for this egocentric perspective on a field in which I have for 20 years been a marginal participant.
2. Clement suggests that cognitive anthropologists are using *folk* "in a broad sense to refer to any group of people participating in a cultural tradition," and that – with no pejorative intent – they "use 'folk' in this broad sense to legitimate the study of indigenous classification systems in their own terms" (1982:211).
3. See Keesing 1985 and Lutz 1985 for discussions of the problem of "false exoticism."
4. For a recent attempt of mine to articulate Marxist perspectives on ideology with recent work on prototype categorization and conventional metaphor, in examining concepts of race and ethnicity, see Keesing (in press).

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