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4 Occasions for Sensemaking

Here is an occasion for sensemaking. Two people face a projection screen on which slides of healthy and sick cells are shown. When each slide appears, they decide whether it is sick or healthy, and they receive immediate feedback as to whether they are right or wrong. Their task is to infer rules that might discriminate healthy from sick cells. One subject, Person A, gets true feedback and learns whether he is indeed right or wrong. The other subject, Person B, is given feedback based not on his guesses, but on those of A. If A is told "right," then B will also be told "right," whether B's choice was right or not. At the conclusion of the experiment, something fascinating happens when the two subjects begin to discuss the rules they inferred.

> A's explanations are simple and concrete; B's are of necessity very subtle and complex—after all, he had to form his hypothesis on the basis of very tenuous and contradictory hunches. The amazing thing is that A does not simply shrug off B's explanations as unnecessarily complicated or even absurd, but is impressed by their sophisticated "brilliance." . . . [T]he more complicated B's "delusions," the more likely they are to convince A. (Watzlawick, 1976, p. 49)

If the experiment is resumed at this point, "B shows hardly any improvement, but comparatively speaking, seems to be doing better because A, who now shares at least some of B's abstruse ideas, performs significantly more poorly than the first time" (p. 50).

The study, developed by Alex Bavelas, suggests that "once a tentative explanation has taken hold of our minds, information to the contrary may produce not corrections but elaborations of the explanation" (Watzlawick, 1976, p. 50). The explanation cannot be refuted. "If the premise is that prayer can heal illness, then a patient's death 'proves' that he lacked faith, which in turn 'proves' the correctness of the premise" (p. 50). The ease with which delusions take hold and endure underscores the importance of being clear about the conditions under which sensemaking is initiated, and what resources are available for elaboration. That is the kind of inquiry we are concerned with in this chapter.

When people confront noncontingent reinforcement of their responses, they try to discover a structure that is not there. Their main recourse is invention. These inventions tend to be plausible, persistent, and sealed off from refutation. The very ease with which people can slip into such self-sealing logics is part of the unease that all of us feel when we think about "plausibility" as one of the properties of sensemaking. Person B did make sense of the slides. His account was plausible to himself, and even to Person A whose account was more accurate. Person B told the more interesting story. Person A adopted portions of the story, and in doing so, traded accuracy for plausibility. Hints of the same trade-off are found in the person touting prayer. That person did make sense of the death.

People in organizations act a lot like Bavelas's subjects. Schroeder, Van de Ven, Scudder, and Polley (1989, pp. 123-126) suggest that when people reach a threshold of dissatisfaction with their current conditions, they experience a "shock" and initiate action to resolve the dissatisfaction. Their view of threshold is modeled after that of Helson (1964), as was true for Starbuck and Milliken (1988) in their analysis of the antecedents of sensemaking. Schroeder et al. (pp. 124-125) describe in some detail several shocks, including how people make sense when they leave a steady job to start a new company, search for hybrid wheat varieties to solve a problem of blight, discover that a competing product is in advanced stages of development, fail while introducing a major new product in the naval systems industry, propose a risky joint venture, or face administrative turnover in response to a state budget crisis.

Diverse as these instances are, in each case there was "some kind of shock that stimulated people's action thresholds to pay attention and initiate *novel* action" (Schroeder et al., 1989, p. 123, italics added). People frequently see

things differently when they are shocked into attention, whether the shock is one of necessity, opportunity, or threat. Schroeder et al. are especially interested in shocks as the occasion for innovative ideas, as is summarized in their conclusion that "innovation is stimulated by shocks, either internal or external to the organization" (p. 123). They also observe that shocks need not be massive and sudden to trigger innovation. "Actually a shock may consist of several smaller shocks or changes, each of which is barely perceptible. . . . [I]nnovations do not suddenly spring into action but rather are the result of prolonged activities" (p. 126).

In all of these cases, the shocks interrupted an ongoing flow and were repaired gradually yet plausibly. What are these episodes like in their early stages? When and how do they begin? How much of the human condition is captured by these cases? Those who favor a postmodern, existential turn would argue in effect that these cases are the human condition. Sensemaking is eternally up for grabs. Person B's delusional theory of sick and healthy cells might be a reframing that is superior to the slide-specific ideas of Person A. Others who favor a more positivistic, realist turn would argue in effect that these Bavelas demonstrations are intriguing precisely because they do not occur all that often. Instead, they show traps into which the unsuspecting can be drawn and they reaffirm the importance of refutable conjectures and a commitment to refutation.

This chapter is about the shocks that occasion sensemaking. The nature of those shocks is not obvious if we start with the assumptions that people find themselves in an ongoing flow with no inherent breaks, that action is often the occasion that produces whatever breaks are perceived, and that shocks affect people differently as in Cohen and Gooch's (1990) observation that, compared to civilians, soldiers are less paralyzed by sudden shocks because they walk around with "the knowable possibility of disaster" (p. 1). Paralyzed or not, soldiers have just as much trouble with sensemaking as anyone else. This is clearly documented in Lanir's (1989) account of how the Israeli Air Force shot down a Libyan airliner they mistook for a hostile aircraft on February 21, 1973. Lanir describes this event as one compounded of a series of "inconceivable occurrences" (e.g., the pilot and engineer of the airliner were drinking wine and did not realize they were 70 miles off course) that led to "the reasonable choice of disaster," a phrase that is just as chilling as is Charles Perrow's (1984) "normal accident."

Occasions for sensemaking are themselves constructed, after which they become a platform for further construction. There were hints of this earlier in John Caffey's puzzlement over the discrepancy between X-rays that revealed

injuries to children and parental accounts that failed to mention them. Caffey was not sure whether to construct this as something to pursue, or to let it pass. The same uncertainty occurs when people notice salient, novel, unusual, and unexpected cues such as those reviewed in Chapter 2, page 52. Occasionally, those cues are pursued. Usually, they are not. What makes the difference? To answer that question would require nothing less than a complete description of the human condition. Short of that, I will tackle a more modest set of issues.

The purpose of this chapter is to suggest some of what happens when novel moments in organizations capture sustained attention and lead people to persist in trying to make sense of what they notice. To develop some sensitivity to these early stages, I will look at occasions in three ways. First, I will discuss suggestions from other literatures, such as those of problem structuring and controlled cognitive processing, that discuss initiating conditions for processes similar to those of sensemaking. Second, I will discuss two types of occasions, common in organizations, that often produce novelties that capture sustained attention: ambiguity and uncertainty. Third, I argue that common among occasions for sensemaking are interruptions and arousal, the effects of which can be to narrow perception and heighten habitual responding. Both of these effects influence sensemaking. They simplify the cues that are extracted, but in doing so, often encourage the construction of a chimera.

Varieties of Occasions for Sensemaking

Virtually any discussion of attention has something to say about what attracts it, so there is no shortage of ideas about when sensemaking might start. Previous discussions of perceived environmental uncertainty, problem definition, and conditions for conscious cognitive processing provide representative accounts of what gets noticed and then seeds sensemaking.

Perceived environmental uncertainty (Duncan, 1972) is a phrase with a long history, whose rhetorical effect has been to remind us that perceptions matter and that perceptions are a joint product of properties of the environment, processes, structures of organizations, and dispositions of individuals. What is important for our purposes are the environmental determinants. These are properties of an ongoing flow that increase the probability that people, regardless of where they sit in organizations or who they are, will take note of what is happening and pursue it. I focus on three properties deemed crucial by Huber and Daft (1987): information load, complexity, and turbulence.

Information load is a complex mixture of the quantity, ambiguity, and variety of information that people are forced to process. As load increases, people take increasingly strong steps to manage it. They begin with omission, and then move to greater tolerance of error, queuing, filtering, abstracting, using multiple channels, escape, and end with chunking (Miller, 1978, chap. 5). Powell (1985) finds many of these tactics in use when university publishers try to cope with piles of manuscript submissions.

My interest in load is that, in their efforts to cope with a generic property of the flow of events, namely, its sheer volume, people punctuate that flow in predictable ways (e.g., they neglect large portions of it). Those punctuations they do make highlight portions of the residual and heighten its impact on subsequent sensemaking. Any device that reduces information load prestructures what people will notice and affects the sense they can then make. Information load, in other words, is an occasion for sensemaking because it forces cues out of an ongoing flow.

An increase in complexity (Huber & Daft, 1987, p. 134) can increase perceived uncertainty because a greater number (numerosity) of diverse elements (diversity) interact in a greater variety of ways (interdependence). Again, complexity affects what people notice and ignore. For example, with greater complexity goes greater search for and reliance on habitual, routine cues (Weick, 1988), cues that increasingly mislead. This is clearly evident in Perrow's investigations of interactively complex systems such as nuclear power plants. Because such systems are tightly coupled and involve complex transformation processes, unexpected sequences of events are commonplace. These accidents, which are "normal," considering the obscurity of the technology, are neither familiar nor easily solved. The combination of complex technology and limited expertise makes for incomprehensible events. The sensemaking dilemma inherent in these technologies is captured in Perrow's (1984) observation that "warning of an incomprehensible and unimaginable event cannot be seen, because it cannot be believed" (p. 23).

As we have seen before, seeing what one believes and not seeing that for which one has no beliefs are central to sensemaking. Warnings of the unbelievable go unheeded. This means that the variety in a firm's repertory of beliefs should affect the amount of time it spends consciously struggling to make sense. The greater the variety of beliefs in a repertoire, the more fully should any situation be seen, the more solutions that should be identified, and the more likely it should be that someone knows a great deal about what is happening.

The final characteristic discussed by Huber and Daft (1987), turbulence, is defined as a combination of instability (frequency of change) and randomness (frequency and direction of change). Turbulence has received attention recently because of the debate over whether organizations perform better in turbulent environments when they engage in comprehensive but time-consuming information processing, or when they rely more heavily on less comprehensive processes such as intuition, heuristics, and imitation (see Glick, Miller, & Huber, 1993, pp. 189-190 for a summary of this controversy). As with most controversies, the resolution depends on whose work you weigh more heavily—reactions to Eisenhardt's (1989, 1990; Eisenhardt & Bourgeois, 1988) research on high-velocity decision making will tip your reading one way or the other. Aside from that, a common observation among the various partisans is that as turbulence goes up, so too does the use of intuition and heuristics. If intuition is treated as compressed expertise in which people arrive at an answer without understanding all of the steps that led up to it, then Eisenhardt's (1989) decision makers are not that different from Frederickson and Iaquinto's (1989) lumbering executives.

I suspect that turbulence throws people back on whatever heuristics for noticing they know best (Lazarus & Folkman, 1984, p. 104) and that are rewarded and practiced most often in their firms. That does not say much. But it does predict that as turbulence increases, occasions for sensemaking will be defined more idiosyncratically, meaning that microlevel predictions will be more accurate than macropredictions, unless there are strong, homogeneous organizational cultures or binding industry recipes (Spender, 1989).

Aside from the work on perceived environmental uncertainty, previous discussions of problem definition (e.g., Cowan, 1986), especially the stimulating work of G. F. Smith (1988, 1989), suggests a different way to conceptualize occasions for sensemaking. Smith (1988) begins by noting that the term *problem* usually refers to some kind of gap, difference, or disparity between the way things are and the way one wants them to be (p. 1491). Right away students of sensemaking perk up when they hear the existing state described as "the way things are." That response is not simply a knee-jerk display of their interest in construction, invention, and subjectivity, but it also reflects an understanding that goals evolve and change during action, which means that both the existing and the desired state are fluid. In other words, gaps open and close, widen and narrow, which suggests they may be a necessary but not a sufficient condition for noticing. Smith would probably concur with the spirit, if not the letter, of that qualification.

He does argue that at least two other conditions must occur if a gap is to be pursued and to become a cue for sensemaking. First, the gap must be difficult to close (p. 1491), a stipulation that is consistent with our interest in novelties that persist and are pursued. Second, the gap must matter. As Smith puts it, the gap "must warrant a place on one's agenda" (p. 1491). With these points in hand, Smith then defines a problem as "an undesirable situation that is significant to and may be solvable by some agent, although probably with some difficulty" (p. 1491).

The strength of Smith's definition is its implication that problems are conceptual entities that are designed rather than discovered. His careful explanation of this point is worth quoting in full.

> Since a problem is an "undesirable situation," it does not exist strictly as an objective state-of-the-world, nor as a subjective state of dissatisfaction. A problem is a relationship of disharmony between reality and one's preferences, and being a relationship, it has no physical existence. Rather, problems are conceptual entities or constructs. The term is an abstraction from the world of observables and is applied because it serves a useful function. Essentially the term is an attention-allocation device. Marking a situation as problematic is a means of including it in one's "stack" of concerns, placing it on an agenda for future attention and solution efforts. Thus, there is an element of arbitrariness in labeling a situation as problematic. (Smith, 1988, p. 1491)

Students of sensemaking alert to the nuances in Smith's description would be in a terrific position to advance our understanding of sensemaking and problem solving. Smith is alert to relating, just as Follett was. Problems, being constructs, are constructed and imposed, but not in total disregard of one's context and its constraints. Problem constructions are invented and imposed in the interest of furthering one's projects ("construct serves a useful function"). If problems are conceptual entities, then this means that they will be "addressed with one's general cognitive resources, especially reflective thought" (p. 1491). The importance of that stipulation is that human thought and action must be highly varied to grasp the variations in an ongoing flow of events. Smith cites Ashby's law of requisite variety (e.g., Conant & Ashby, 1970) as an important guideline if problem-solving processes are to manage these variations. The importance of process variety to manage input variety has already featured in our discussion of enactment and processes that resemble a contour gauge (see p. 34). It takes a complex sensing system to register a complex

object, although if enactments create simpler objects, then simpler sensing systems may suffice. In later discussions, I will argue that the richness of one's language is a crucial resource in sensemaking, a suggestion that directly reflects the idea of requisite variety. Rich language affords rich reflective thought—the words I say affect the thoughts I form when I see what I've said.

What Smith shows is that the undesirability of a situation, as sensed relative to one's preferences, is an occasion for problem solving that closely resembles sensemaking. This close resemblance is due to problem solving being essentially action-oriented human thought, and sensemaking also being heavily action oriented and cognitive. The difference between problem solving as Smith discusses it and sensemaking as discussed in this book is simply that I think the connotations of the term *problem* are too narrow when used in the context of an occasion for sensemaking. In other words, I take the "element of arbitrariness in labeling a situation as problematic" more seriously than Smith does. To label something that is novel or undesirable as a "problem" is to imply that it is also something to be solved. But that is not the only label that is possible. If the novelty is truly open to a variety of labels, then one could also say things like, that is an issue, manage it; that is a dilemma, reframe it; that is a paradox, accept it; that is a conflict, synthesize it; that is an opportunity, take it. To label a novelty a problem is a consequential act, just as it is consequential to call it an issue. That is the whole point of sensemaking. Once something is labeled a problem, that is when the problem starts (Weick, 1984, p. 48). Nevertheless, Smith's careful analysis goes a long way toward helping us think more clearly about the earliest steps in sensemaking.

The same is true for Louis and Sutton's (1991) influential essay that introduced the distinction between controlled and automatic information processing (Schneider & Shiffrin, 1977) into organizational studies. Their discussion of "conditions for conscious cognitive processing" (pp. 59-61) provides a valuable overview of occasions for sensemaking. Louis and Sutton first assemble a wide variety of people (e.g., Heidegger, C. Wright Mills, and March and Simon) who have talked about when people tend to shift from automatic to active thinking. Then they summarize the common threads in these statements this way:

> these observations can be analyzed to reveal three kinds of situations in which actors are likely to become consciously engaged. First, switching to a conscious mode is provoked when one experiences a situation as unusual or *novel*—when something "stands out of the ordinary," "is unique," or when the "unfamiliar" or "previously unknown" is experienced. Second, switching is provoked by *discrepancy*—when "acts are in some way frustrated," when there is "an unexpected failure," "a disruption," "a troublesome . . . situation," when there is a significant difference between expectations and reality. A third condition exists of a *deliberate initiative,* usually in response to an internal or external request for an increased level of conscious attention—as when people are "asked to think" or "explicitly questioned." (p. 60)

Several things are crucial about their descriptions. First, things are not noticed only when they are undesirable. Louis and Sutton make room for noticing that is driven by events that are more benign and positive. Second, their mention of "discrepancy" is important because it anticipates a point I will argue shortly, namely, interruption is a common antecedent of sensemaking occasions (see Mandler, 1984, p. 172). Third, their final condition, "deliberate initiative," may seem more suited to the problem of conscious processing, but in fact, explicit exhortation of one person by another to "pay attention" or to say "what this means" or simply to "look at this" may be enough to trigger sensemaking. Fourth, people have to experience the discrepancy and recognize it as such if sensemaking is to start. The mere presence of a discrepancy is not sufficient. As Louis and Sutton (1991) put it, "the situation alone does not determine whether the previously unknown or discrepant aspect of the environment will be experienced as such, whether it will 'stand out.' Instead, the predispositions and experiences of the individual in the situation contribute to the actor's sensitivity and openness to environmental conditions" (pp. 60-61). Recall the soldiers mentioned earlier who wade into the discrepancies of war armed with "the knowable possibility of disaster."

With these three perspectives on occasions for sensemaking as background, we can now look more closely at ambiguity and uncertainty as occasions for sensemaking that are prominent in organizations.

Ambiguity and Uncertainty

Two types of sensemaking occasions common to organization are ambiguity and uncertainty. The "shock" in each case is somewhat different. In the case of ambiguity, people engage in sensemaking because they are confused by too many interpretations, whereas in the case of uncertainty, they do so because they are ignorant of any interpretations.

We look first at ambiguity and the shock of confusion. Ambiguity refers to an ongoing stream that supports several different interpretations at the same

time. Here are three representative definitions that capture the nature of ambiguity.

Levine (1985) says that "literary ambiguity signifies the property of words or sentences of admitting more than one interpretation; experiential ambiguity signifies a property possessed by any stimuli of having two or more meanings or even simply of being unclear as to meaning" (p. 8). Some have argued that ambiguity is more about unclear meaning and "equivocality" is more about the confusion created by two or more meanings, as in a pun or equivoque.

Martin (1992) argues that "ambiguity is perceived when a lack of clarity, high complexity, or a paradox makes multiple (rather than single or dichotomous) explanations plausible" (p. 134). By lack of clarity she means something that "seems obscure or indistinct, and therefore hard to decipher" (p. 134). By highly complex she means that "a plethora of elements and relationships make it difficult to comprehend in any simple way" (p. 134). And by paradox she means "an argument that apparently derives contradictory conclusions by valid deduction from acceptable premises" (p. 134). By means of this definition, Martin underscores that ambiguity is subjectively perceived, interpreted, and felt. People judge events to be ambiguous if those events seem to be unclear, highly complex, or paradoxical.

March (1994) notes, in a description similar to Martin's, that

> ambiguity refers to a lack of clarity or consistency in reality, causality, or intentionality Ambiguous situations are situations that cannot be coded precisely into mutually exhaustive and exclusive categories. Ambiguous purposes are intentions that cannot be specified clearly. Ambiguous identities are identities whose rules or occasions for application are imprecise or contradictory. Ambiguous outcomes are outcomes whose characteristics or implications are fuzzy. (p. 178)

Ambiguity associated with each of these sites means that the assumptions necessary for rational decision making are not met. The problem in ambiguity is not that the real world is imperfectly understood and that more information will remedy that. The problem is that information may not resolve misunderstandings.

The many ways in which ambiguity may crop up in organizational life and trigger sensemaking are suggested by McCaskey's (1982) 12 characteristics of ambiguous situations (Table 4.1).

Table 4.1 Characteristics of Ambiguous, Changing Situations

Characteristic	*Description and Comments*
Nature of problem is itself in question	"What the problem is" is unclear and shifting. Managers have only vague or competing definitions of the problem. Often, any one "problem" is intertwined with other messy problems.
Information (amount and reliability) is problematical	Because the definition of the problem is in doubt, collecting and categorizing information becomes a problem. The information flow threatens either to become overwhelming or to be seriously insufficient. Data may be incomplete and of dubious reliability.
Multiple, conflicting interpretations	For those data that do exist, players develop multiple, and sometimes conflicting, interpretations. The facts and their significance can be read several different ways.
Different value orientations, political/emotional clashes	Without objective criteria, players rely more on personal and/or professional values to make sense of the situation. The clash of different values often politically and emotionally charges the situation.
Goals are unclear, or multiple and conflicting	Managers do not enjoy the guidance of clearly defined, coherent goals. Either the goals are vague, or they are clearly defined and contradictory.
Time, money, or attention are lacking	A difficult situation is made chaotic by severe shortages of one or more of these items.
Contradictions and paradoxes appear	Situation has seemingly inconsistent features, relationships, or demands.
Roles are vague, responsibilities are unclear	Players do not have a clearly defined set of activities they are expected to perform. On important issues, the locus of decision making and other responsibilities is vague or in dispute.
Success measures are lacking	People are unsure what success in resolving the situation would mean, and/or they have no way of assessing the degree to which they have been successful.
Poor understanding of cause-effect relationships	Players do not understand what causes what in the situation. Even if sure of the effects they desire, they are uncertain how to obtain them.
Symbols and metaphors used	In place of precise definitions or logical arguments, players use symbols or metaphors to express their points of view.
Participation in decision-making fluid	Who the key decision makers and influence holders are changes as players enter and leave the decision arena.

SOURCE: McCaskey (1982). *The Executive Challenge: Managing change and ambiguity.* Reprinted with permission.

Here are two examples of ambiguity, one involving gasoline drums and the other involving jurors. Both show how the combination of a lack of clarity and multiple interpretations produce a shock that engages sensemaking.

Robert Merton (1967) shows how language can constrain our perceptions, thoughts, and behaviors and, when there are multiple interpretations, can also produce a shock. He uses the example of gasoline drums.

> In the presence of objects which are conceptually described as "gasoline drums," behavior will tend modally toward a particular type; great care will be exercised. But when people are confronted with what are called "empty gasoline drums," behavior is different; it is careless, with little control over smoking and the disposition of cigarette stubs. Yet the "empty" drums are the more hazardous, since they contain explosive vapor. Response is not to the physical but to the conceptualized situation. The concept "empty" is here used equivocally; as a synonym for "null and void, negative, inert," and as a term applied to physical situations without regard to such "irrelevancies" as vapor and liquid vestiges in the container. The situation is conceptualized in the second sense, and the concept is then responded to in the first sense, with the result that "empty" gasoline drums become the occasion for fires. (Merton, 1967, p. 145)

"Empty" means more than one thing, it is ambiguous, and as a label for gasoline drums, could (and should) construct an occasion for sensemaking. It is the existence of multiple meanings that attracts attention and sets the stage for sensemaking.

A similar scenario of multiple interpretations as the occasion for sensemaking is found in jury trials. Garfinkel (1967) argues that in a jury trial, actions that "appear straightforward and plain in their meanings and consequences are made equivocal by the contending advocates. The contenders insistently depict the sense of action in clearly incompatible ways. Under these conditions, it is of interest that among the alternative interpretations that someone is mistaken, that someone is lying, or that each could seriously believe what he contends, jurors typically believe the last" (pp. 111-112). Jurors confront the necessity for sensemaking when they perceive incompatible accounts and presume that people are telling the truth. These properties of an ongoing flow encourage the construction of an occasion for sensemaking.

Before moving to an examination of uncertainty, I want to note that neither Merton nor Garfinkel refer to their examples as cases of ambiguity, even though both cases involve multiple interpretations. Instead, both label their cases examples of equivocality. I think it is important to retain the word *equivocal*

(Weick, 1979, pp. 179-187) because it explicitly points to the presence of two or more interpretations as a trigger to sensemaking. Although the word *ambiguity* also means the presence of two or more interpretations, it can also mean something quite different, namely, a lack of clarity, which, as we will soon see, makes it quite similar to uncertainty. The ambiguity of the term *ambiguity* can be troublesome, because it implies quite different remedies. Ambiguity understood as confusion created by multiple meanings calls for social construction and invention. Ambiguity understood as ignorance created by insufficient information calls for more careful scanning and discovery.

Descriptions of conditions for sensemaking in organization refer just as often to uncertainty as to ambiguity. The shock attendant to uncertainty is one of ignorance. It comes from "imprecision in estimates of future consequences conditional on present actions" (March, 1994, p. 174). Several different definitions capture the idea that ignorance and imprecise extrapolations trigger sensemaking.

First, Burns and Stalker (1961) describe uncertainty as

> the ignorance of the person who is confronted with a choice about the future in general, and in particular about the outcomes which may follow any of his possible lines of action. Since he must choose, if he is to remain operative (as a businessman or any other agent), he acts in accordance with his belief about the future and the specific possibilities. These possibilities will always be differentiated in his mind according to the degrees of belief with which they are credited. (p. 112)

Variation in lines of action to which one has access, the content of beliefs about the future, the intensity with which these beliefs are held, and information about specific possibilities should produce variations in ignorance and a stronger or weaker tendency to construct and pursue an occasion of sensemaking.

Second, Frances Milliken (1987) has made the important point that prevailing definitions of uncertainty locate that uncertainty in one of three places. People lack understanding of how components of the environment are changing (state uncertainty), or of the impact of environmental changes on the organization (effect uncertainty), or of the response options that are open to them (response uncertainty). Different capabilities are required to detect and cope with each of these three (Milliken, 1990). To remind observers that they need to specify the locus of uncertainty, Milliken defines it as "an individual's perceived inability to predict something accurately" (p. 136). That "something" may lie outside the organization, as was the case with Sutcliffe's (1994)

accuracy study, or inside as one tries to become clearer either about potential threats that could become opportunities or about the extent to which one can mobilize the response variety requisite to cope with the variety in the strategic responses of others.

Third, Stinchcombe (1990) extends Burns and Stalker's suggestion that uncertainty about the future animates organizations and, using an information-processing perspective, argues that uncertainty is reduced by "the earliest available information that will show what direction the actor ought to be going because of the way the future of the world is, evidently, turning out" (p. 2). Thus the organization is concerned with "news" that gives some cue about how things might turn out. An organization needs "to be where the news breaks, whenever it breaks. Information is 'news' for the organization when it is a first appearance of some sign of how the future is going to be, in a respect crucial for the organization" (p. 3).

Although Stinchcombe might well wince at this elaboration, I see a trace of retrospective problem definition in his statement that information shows the direction in which the actor ought to be going. Old intentions to move in a certain direction do not await favorable news. Rather, news often creates new intentions to move in directions that had only been vaguely glimpsed before. Faced with news as an outcome, people ask, what history might have generated this outcome and what should I do presuming that the history I have constructed is plausible? Uncertainty about the actual future is replaced by more certainty about the present, which itself was an actual future just a short time ago. The greater certainty about the meaning of present news is created because people reconstruct a history that serves as a plausible explanation for how it got there. Complicated as all of this may sound, it simply asserts that news can stimulate an occasion of sensemaking because it stimulates people to write an account of how the news got there. And how the news got there often implies what the organization should do next.

Stinchcombe's analysis is a more nuanced treatment of uncertainty and of more help in analyzing sensemaking because it argues that uncertainty changes over the course of a decision. He uses the example of drilling for oil. "People do not decide to drill exploratory wells until after geological studies have shown a promising formation; they do not drill the first production wells until exploration shows that the find is 'commercial' . . . and they do not develop the whole field until the first production wells come in as anticipated" (Stinchcombe, 1990, pp. 4-5). What is important here is that uncertainty "is reduced through news; then, finally, the residual uncertainty is transformed into risk and people make their bets. . . . Uncertainty is transformed piecewise

into risk, with a large part of the risk at first being a guess concerning the value of the news that a news-collecting structure will bring in" (p. 5).

Occasions for sensemaking should vary as a function of how far into the future a line of action extends, the availability of news, the capability for scanning (e.g., Daft, Sormunen, & Parks, 1988), the tolerance for risk, the design of the news-collecting structure, and the ease of movement toward sources of news. Difficulties with sensemaking should result in organizations being left with larger chunks of residual uncertainty, which necessitates their taking larger risks, which increases the probability that they will fail. This prediction originates in an organization's capability for sensemaking in the face of uncertainty about the future.

Here are two examples of uncertainty, one involving Milgram's (1963) famous obedience experiments and the other involving auctions. The deep puzzlement felt by Milgram's subjects who tried to get another subject to learn by punishing incorrect responses is captured vividly by Ross and Nisbett (1991), who pick up the scenario at its advanced stage where the learner has repeatedly failed:

> The subject's task was that of administering severe electric shocks to a learner who was no longer attempting to learn anything, at the insistence of an experimenter who seemed totally oblivious to the learner's cries of anguish, warnings about a heart condition, refusal to continue responding, and ultimately ominous silence. What's more, the experimenter evinced no concern about this turn of events, made no attempt to explain or justify that lack of concern or, alternatively, to explain why it was so necessary for the experiment to continue. He even refused to "humor" the subject by checking on the condition of the learner. . . . And how does one respond when "nothing seems to make sense," when one's own understanding of the actions and outcomes unfolding around one obviously is limited or deficient? Few people, we suggest, would respond by acting decisively or asserting independence. Rather, they would become uncharacteristically indecisive, unwilling and unable to challenge authority or disavow role expectations, and highly dependent on those who calmly and confidently issue orders. In short, they would behave very much like Milgram's subjects. (pp. 57-58)

At first I planned to use Milgram's study to illustrate ambiguity and confusion, but on a closer reading, it became clearer that the problem here is not one of too many interpretations, but one of too few. In Daft and Lengel's (1986) terminology, there is an absence of information. The subject needs more information to determine what outcomes will follow from any of his or

her possible lines of action. In the subject's view, if more were known about this laboratory, it would make more sense. Because what is needed is more information, one way to get that under these conditions is simply unqualified compliance with someone who has that information.

The second example of uncertainty, an auction (C. W. Smith, 1989), again shows how difficulties in extrapolation trigger an occasion for sensemaking. Buyer uncertainty at an auction is analyzed by Clark and Halford (1980) based on their investigation of 132 auctions. Among the recurrent buyer uncertainties they observed were

1. Limited quantity of a particular item for sale: There may be only one rolltop desk, for example, whereas at a retail outlet or antique shop, several would be available. (Consequently, the buyer's response is, "Will I get it?")
2. Increased competition: In addition to fewer numbers of a particular item, many competitors hope to win the bid. ("Will someone outbid me?")
3. Public nature of the purchase: Bidding on an item at an auction, especially if the competition is keen, is considerably different than making a purchase from a retail clerk. The buyer at auction is concerned about getting a "good deal" and avoiding "losing face." ("Will I pay too much?" "Will I make a fool of myself?")
4. Lack of warranty or guarantee on the item purchased. ("Even if I win the bid, will I buy a 'lemon'?")
5. Group pressure to bid and buy, including the influence of the auctioneer. ("Will I get carried away and buy items I don't need?" "Will I pay more than I should?"). (Clark & Halford, 1980, pp. 305-306)

All of these uncertainties can be subsumed under the idea that the buyer suffers from "imprecision in estimates of future consequences conditional on present actions" (March, 1994, p. 174) and is unable to be certain about "the outcomes which may follow any of his possible lines of action" (Burns & Stalker, 1961, p. 112). What Clark and Halford emphasize is that this is not a desirable state of affairs for either the seller or the auctioneer, because the uncertain buyer may not bid at all. The bulk of their study is an account of many ways in which auctioneers give information, build trust, and reduce the uncertainty felt by the wary buyer. Auctioneers do not negotiate an understanding out of multiple possibilities, the way people do when they face ambiguity. Instead, auctioneers try to show what the clear consequences will be of actions when the buyer makes a bid (e.g., the auctioneer makes a serious effort to give an honest appraisal of items in terms of their condition, p. 318).

Again, the point I want to emphasize about uncertainty is that the shock occasioned by an inability to extrapolate current actions and to foresee their consequences produces an occasion of sensemaking. People are ignorant of any interpretation that will facilitate extrapolation. That ignorance may lead people to construct an occasion for sensemaking during which they try to reduce this ignorance.

Before leaving the discussion of ambiguity and uncertainty, I want to underscore the differences in the kinds of occasions for sensemaking that are constructed when ambiguity or uncertainty are the focus. These differences have been shown most clearly in Daft's work with Macintosh (Daft & Macintosh, 1981), Lengel (Daft & Lengel, 1984), and Trevino (Daft, Lengel, & Trevino, 1987). What he has shown is that there is a difference between ignorance and confusion. To remove ignorance, more information is required. To remove confusion, a different kind of information is needed, namely, the information that is constructed in face-to-face interaction that provides multiple cues.

"When confronted with an equivocal [ambiguous, confusing] event, managers use language to share perceptions among themselves and gradually define or create meaning through discussion, groping, trial and error, and sounding out. Managers organize cues and messages to create meaning through their discussion and joint interpretation" (Huber & Daft, 1987, p. 151). When multiple meanings produce a shock, a greater quantity of information is less help than is a different quality of information. To reduce multiple meanings, people need access to more cues and more varied cues, and this is what happens when rich personal media such as meetings and direct contact take precedence over less rich impersonal media such as formal information systems and special reports. To resolve confusion, people need mechanisms that "enable debate, clarification, and enactment more than simply provide large amounts of data" (Daft & Lengel, 1986, p. 559). The problem with ambiguity is that people are unsure what questions to ask and whether there even exists a problem they have to solve. These are the issues that need to be hammered out through subjective opinions, because no one has the foggiest idea what objective data, if any, are relevant.

The main reason to separate confusion from ignorance is that communication capabilities that help resolve one may hinder the resolution of the other (e.g., Nayyar & Kazanjian, 1993, pp. 747-753). People who try to reduce confusion with lean formal media may compound their problems when they overlook promising integrations. And people who try to reduce ignorance with media that are too rich may raise new issues that prevent them from making sense. Prolonged episodes of sensemaking may occur when a need for more information (ignorance, uncertainty) is mislabeled as a need for different kinds of information (confusion, ambiguity). In addition, sensemaking may also prove

troublesome when the problem is correctly identified as one of confusion or ignorance, but media of inappropriate richness are used to solve it. People mistakenly try to reduce their confusion with formal information processing that is not rich enough or their ignorance with a group meeting that is too rich. Either mismatch can prolong and intensify what started out simply as something out of the ordinary.

General Properties of Occasions for Sensemaking

Starbuck and Milliken (1988) propose that the basic occasion for sensemaking consists of "incongruous events, events that violate perceptual frameworks" (p. 52). If we unpack that phrase, we begin to see some features that are shared by the occasions that have been reviewed in this chapter.

To "violate" something is to interrupt an ongoing flow. Mandler (1984) argues that there are basically two types of interruption that trigger sensemaking and cognitive change:

> First, the new event that is not "expected"—that does not fit into the ongoing interpretation of the environment—and, second, the "expected" event that does not happen. While distinguishable, these two types have the same kind of interruptive structural consequences: the new event is disruptive because it occurs instead of the "expected" event, and the absence of the "expected" event implies the presence of something else that is "unexpected." In either case the ongoing cognitive activity is interrupted. At this point, coping, problem solving, and "learning" activities take place. It is apparently at this point that the focus of consciousness is on the interruption. (p. 188)

Mandler's view of the two basic types of interruption fits neatly into our concern with sensemaking carved out of ongoing activities. It also fits neatly with the occasions reviewed so far in this chapter. Some, including noncontingent reinforcement, novelty, undesirable situations, and ambiguity, are basically interruptions produced by new events that were not expected. Others, including discrepancy, excess information, complexity, and turbulence, as well as uncertain extrapolation, are interruptions produced by expected events that did not happen.

It is not the mere fact of interruption that is crucial. Rather, it is the fact that interruptions, defined as "any event, external or internal to the individual,

that prevents completion of some action, thought sequences, plan, or processing structure" (Mandler, 1982, p. 92), trigger activity in the autonomic nervous system. We have already seen the effects of this system in the earlier discussion of emotion (p. 45 in Chapter 2). For our present purposes, what is important about activity in the autonomic nervous system is that it absorbs information-processing capacity, which then decreases the efficiency of complex thought processes. How much of a decrease occurs is being actively debated (e.g., Christianson, 1992; Anderson, 1990; Neiss, 1988, 1990). The degree of autonomic activity that occurs following an interruption depends on two factors: first, the degree of organization of the action or thought process that is interrupted (invariant, habituated actions with high degree of expectancy among parts create a sharp increase in autonomic activity when interrupted) and second, the severity of interruption (high external demand to complete an action, coupled with repeated attempts to restart the action and repeated interruptions, combine to facilitate arousal).

The autonomic activity triggered by an interruption focuses attention on two things, both of which consume considerable information-processing capacity. Attention is focused on the interrupting event, and if it is not altered, on the internal autonomic activation itself. When autonomic arousal consumes scarce information-processing capacity, this reduces the number of cues that can be processed from the activity that was under way at the time of the interruption.

In Mandler's model, stress is an interruption that signals an emergency and draws attention to events in the environment. In the short run, this signaling is adaptive and improves coping. Autonomic activity alerts people to the existence of threatening events, but if the threat is not dealt with and the arousal continues, then it registers in consciousness and interferes with ongoing cognitive activity. Thus consciousness becomes the arena for troubleshooting, but unless the diagnosis and coping is swift and the response being interrupted is weak in its organization, the troubleshooting consumes information-processing capacity, and this leads to the omission of important cues for task performance and an increase in cognitive inefficiency (Staw, Sandelands, & Dutton, 1981).

We now see that not only does an interruption produce arousal but arousal uses up attention, reduces the cues that can be used in sensemaking, focuses attention on the interruption, and has the potential to escalate cognitive inefficiency. Loss of cues makes sensemaking harder, which raises arousal even higher, which leads to even more cue loss and even less sensemaking. The loss of cues for sensemaking in response to increased arousal has been well

documented, often under the generalization that an increase in the level of arousal leads people to narrow and focus their attention on those aspects of the situation judged most important (e.g., Easterbrook, 1959; Wachtel, 1967; Weltman, Smith, & Egstrom, 1971). In the case of task performance, as arousal increases people invest more processing resources into whatever task becomes the focus of their attention, they speed up their rate of processing, and they ignore more cues on the periphery, all of which improve their performance. As arousal continues to increase, however, people now begin to neglect some cues that are crucial for performance of their central task, they pay more attention to their own agitated condition than to the task, and their performance drops. Refinements of these generalizations also suggest that cue loss and a drop in performance occur sooner on complex, difficult tasks than on simpler tasks. It takes less interruption and less arousal to make a complex task senseless than it does to make a simpler task senseless. Also, as arousal increases people tend to abandon recently learned responses and categories and fall back on earlier, overlearned, often simpler responses (Barthol & Ku, 1959; Weick, 1990b, p. 576).

Carried to its extreme, these relationships can have profound effects. Holsti (1972), first citing Wilensky's remarks, then draws the moral:

> T.S. Eliot once spoke of a world that ends "not with a bang but a whimper." What we have to fear is that the bang will come, preceded by the contemporary equivalent of the whimper—a faint rustle of paper as some self-convinced chief of state, reviewing a secret memo full of comfortable rationalizations just repeated at the final conference, fails to muster the necessary intelligence and wit and miscalculates the power and intent of his adversaries.
>
> The conclusion is sobering: men rarely perform at their best under intense stress. The most probable casualties of high stress are the very abilities which distinguish men from other species: to establish logical links between present actions and future goals; to create novel responses to new circumstances; to communicate complex ideas; to deal with abstractions; to perceive not only blacks and whites, but also the many shades of gray which fall in between; to distinguish valid analogies from false ones, and sense from nonsense; and, perhaps most important of all, to enter into the frames of reference of others. (p. 199)

Normally, to forestall regression and incompetence in the face of high arousal, people practice complex routines over and over so their tasks become simpler and buffered better against loss of cues and a performance decrement. This is especially true in the case of combat stress. However, these efforts to

minimize the disruptive effects of arousal have had mixed success, as Reason (1988) makes clear:

> All disciplined armies have based their training of recruits upon the assumption that the rigors of real combat can reduce humans to mindless automata. As a consequence, soldiers have been repeatedly drilled not only in the mechanics of handling their weapons (the numbered sabre "cuts" of cavalrymen, the elaborate loading sequence for the 17th century musketeers, etc.), but also in contingent problem-solving routines such as the "immediate actions" required to clear a blocked machine-gun. But even "second nature" behaviors can crumble in the face of imminent destructions. The American Civil War yielded some poignant instances of cognitive failure. After Gettysburg, over 200 of the muzzle-loading rifles picked up from the battlefield had been loaded five or more times without being fired. One had been loaded 21 times and never fired (Baddeley, 1972). Following the engagement at Kennesaw Mountain, during the battle for Atlanta, tree trunks in front of defensive works were found to be bristling with ramrods, fired off prematurely during the loading sequence by troops under attack. . . . Marshall, interviewing Second World War combat veterans, found that, on average, not more than 15% of the men questioned had actually fired at the enemy during an engagement. In the best units, only one-quarter of the soldiers used their available firepower, though most of the actions had occurred in conditions where it would have been possible for at least 80% of the troops to have used their weapons in earnest; this indicates around 30% net effectiveness. (p. 406)

These statistics should give pause to those who assume that human sensemaking can be sorted neatly into that which is automatic or controlled, mindless or mindful, routine or nonroutine. These distinctions are clearly continuous rather than dichotomous.

The pressures of combat may lead to filtering, neglect, and the disruption of routines, but everyday life is not war. But pressures in everyday life can be additive and build up under some conditions (Bolger, DeLongis, Kessler, & Schilling, 1989). Furthermore, negative affect has arousal-like effects (Taylor, 1991, p. 69). Consider the case of aircraft pilots.

> A pilot may say that he does not allow his work and his domestic life to mix; but this statement can only be partly true. Human beings are 24 hour-a-day people, possessing only one brain with which to control all their activities; and this brain has to cover both work and play. In sum, events which happen

> in one segment of daily life may therefore influence what happens in other segments. The pilot who has just quarreled violently is in a dangerous state, for although he may have moved away from the person with whom he has quarreled, and climbed aboard his aircraft, the physiological and psychological effects of the quarrel may last well into the flight, and the crushing retort which he wishes he had thought of at the time of the argument may crowd his single decision channel to the exclusion of more important information. (Allnutt, 1982, p. 17)

Accident investigations that focus on the last 5 minutes of cockpit conversation before the crash miss completely the longer buildup of pressure that may affect sensemaking, starting with crew interaction at the beginning of the day's flight schedule (e.g., Ginnett, 1990).

An example of additive pressures affecting sensemaking in organizations is Barley's (1986) study of the adoption of CAT scan technology by medical staff. The point of tension in this system was the interaction between radiologists who knew less about the technology than did the technicians they supervised. The technicians themselves did not completely grasp the technology, but knew more about it than did the radiologists. Investigators of sensemaking are intrigued by this incident because the radiologists, in their interactions with technicians, produced a steady stream of directives, imperative speech, puzzling countermands, sarcasm, and usurped control, all of which should make the technicians agitated. Although Barley did not focus on this sequence, that agitation should make it harder for the technicians to make sense quickly of the new technology, which should invite even more intense harangues from the radiologists, and so on. The radiologists may feel righteous, and the technicians may feel contrite, but the technology itself remains puzzling, patients subjected to the technology remain vulnerable to misdiagnosis in unknown ways, and the pressure within the system steadily creeps upward toward levels associated with more acknowledged battlefields.

Under conditions of high arousal occasioned by interruption, attention is deployed toward that which is perceived as psychologically central and away from that which is perceived as peripheral (Mandler, 1984, p. 256). That could prove troublesome for sensemaking. Recall that sensemaking is about context. Wholes and cues, documents and meanings, figures and grounds, periphery and center, all define one another. Sensibleness derives from relationships, not parts. If the periphery gets less attention than the center as arousal increases, then it is not at all clear that, at least for purposes of sensemaking, the center holds. To lose the periphery is to lose the context for the center, which means

the center vanishes. Small wonder that the resulting experience is one of shock (e.g., see the collapse of sensemaking in the Mann Gulch disaster described in Weick, 1993b).

What may forestall a dramatic collapse like this is that people are usually engaged in projects. As arousal increases and cues from the periphery are neglected, people continue to pay attention to the central project. But if the cues in the periphery were crucial contextual cues for the center, then the loss of those peripheral cues may mean that the person doing the project gets better at performing something that now makes no sense to continue performing. The meaning of the task, as defined by the periphery, is lost as attention narrows. Life does not become senseless. Instead, it becomes empty. This basic pragmatic quality of life, life lived in projects, may be all that stands between sense and senselessness. Depending on whether one's important projects are difficult or easy, tightly organized or loosely organized, rich or lean in substitute pathways of completion, barely learned or overlearned, those projects will be easier or harder to interrupt, more or less arousing when interrupted, easier or harder to repair when interrupted, and more or less sensible as a result. What we can count on in all of this is that interruptions are consequential occasions for sensemaking.