ANXIETY AND THE EXPERIENCE OF TIME

HERBERT H. KRAUSS PHD

BEATRICE J. KRAUSS PHD

ANXIETY AND RELATED DISORDERS

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HERBERT H. KRAUSS, PhD, and BEATRICE J. KRAUSS, PhD

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Table of Contents

Authors

Beatrice J. Krauss, PhD
Senior Project Director
National Development and Research Institutes, Inc.
New York, NY

Herbert H. Krauss, PhD
Professor of Psychology and Chair
Hunter College of the City University of New York
Director of Research International Center for the Disabled
New York, NY

Anxiety and the Experience of Time

HERBERT H. KRAUSS, PhD, and BEATRICE J. KRAUSS, PhD[1]

> Time is a very strange thing. So long as one takes it for granted, it is nothing at all. But then, all of a sudden, one is aware of nothing else.
>
> —Hugo Von Hofmannsthal

> Tempora mutantur, nos et mutamur in illis.
> The times are changed, and we are changed with them.
>
> —Latin Proverb

Anxiety is introduced as a common emotion. Anxiety's distressing affectual tone is often accompanied by disturbing thoughts, physical discomforts, and behaviors. Anxiety is considered a normal emotion that, when functioning appropriately, provides necessary information to the individual about the quality and adaptive efficiency of the individual's transactions with the environment. To understand anxiety's role in this process, a neuropsychological information-processing paradigm similar to that which has proven so powerful in explicating visual perception is proposed.

The model provisionally adopted suggests that anxiety normally arises whenever the self *anticipates* a significant threat to its integrity or core,

personal, biographical plans. The model recognizes, however, that pathological anxiety may be produced by dysfunctions in any of the self's hierarchical array of components. Such dysfunction may arise at the highest levels, that is, cultural rules affecting the conceptualization of the self, or, at the lowest levels, as a change in bodily processes that force reorganization of self-experience.

Any attempt to understand the self's anticipations leads necessarily to a study of its organization and orientation in time.[2] An account, albeit an incomplete one, is offered of the formation of the self within social time and the self's continuous interassociation with time in health, emotional dysfunction, and in illness.

PSYCHOLOGY'S UNDERSTANDING OF ANXIETY

The terms "fear" and "anxiety," as Wolman (1992, p. 76) points out, are often used interchangeably. When a distinction between the two is made,

> fear is taken to refer to feelings of apprehension about tangible and predominantly realistic dangers, whereas anxiety is sometimes taken to refer to feelings of apprehension which are difficult to relate to tangible sources of stimulation. (Rachman, 1987, p. 257)

Anxiety is more than simply a distressing emotion. Combined with its unpleasant affectual tone are a complement of cognitive, somatic, and motoric

features in complex interaction (e.g., Mandler, 1984; Papillo, Murphy, & Gorman, 1988; Wolman, 1992).

> An anxious person is in suspense, waiting for information to clarify his situation. He is watchful and alert, often excessively alert and over-reacting to noise or other stimuli. He may feel helpless in the face of a danger which, although felt to be imminent, cannot be identified or communicated. (Davis, 1987, p. 30)

Anxiety's manifestations are complex and multifaceted; each aspect has been investigated separately and incompletely giving rise to an oversupply of "explanatory" frameworks or schemata. This reflects the case in psychology generally where no prepotent guiding paradigms are in force, for emotions, cognitions, behaviors, or their interactions. Psychology's variety of efforts to make anxiety intelligible, therefore, are not exceptional. Mandler (1984) indicates,

> There is no single problem of anxiety. Anxiety has variously been considered as a phenomenal state of the human organism, as a physiological syndrome, and as a theoretical construct invoked to account for a defensive behavior, the avoidance of noxious events, and neurotic symptoms, (p. 220)

Whether or not these several constructions of anxiety can be reconciled is unclear. They have some themes in common, however. Again to cite Mandler (1984),

> Briefly, the following shared characteristics of contemporary theories of anxiety can be noted. First, an archetypical event or class of events exists that evokes anxiety primitively, innately, or congenitally. For Freud, this

> original inciter is overstimulation; for Mowrer, it is pain; for Miller the "innate fear reaction"; for Rank the birth trauma; for Selye, stress; for the existentialists, the very fact of being human and alive. The second communality in theories about anxiety is the postulation that, somehow, the response to the archetypical event is transferred to previously innocuous events—events either in the external environment or in the action of the organism. The typical assumption is that this association takes place with the contiguous occurrence of trauma and neutral events .... Finally, it is assumed that the events terminating or reducing anxiety are closely related to events that evoke it. Thus, the primitive danger of overstimulation is controlled by a reduction in the level of stimulation. Similarly, the "fear" of electric shock is reduced by moving away from events associated with shock, presumably in inverse analogue to the model of hunger and thirst, in which a deficit of some substance (deprivation) is repaired by replacement (eating or drinking), (p. 230)

The multidimensional nature of anxiety, however, makes it no different than any other "normal" emotion. Modern descriptions of emotion stress the significance of effective conformation of individuals to their life circumstances (e.g., Mandler, 1984). Frijda (1988) has provided one of the most accessible summaries of the function of emotion in adaptation. From his reading of the investigative evidence, he formulated a number of propositions which he unfortunately and too grandly calls "laws of emotion," of which there are 11:

1. Emotions arise in the person's response to meaning structures evoked by different situations; the particular emotions arising being a function of the particular understanding one has of the situation.

2. Meaning structures are predictably connected to potential actions

(e.g., moving toward food).

3. Meaning structures are those schemata which hold significance for an individual's goals, motives, and concerns.

4. The intensity of an evoked emotion varies directly with the extent to which a situation is believed "real."

5. Emotions are elicited more as a consequence of expected or perceived changes in the favorability of circumstances than the actual continuous experience of the situation.

6. The intensity of an emotion is a reflection of a relational process in which the consequences of an event are compared to a frame of reference.

7. To a degree, an asymmetry exists between pleasure and pain. Pleasure is contingent upon change to a greater degree than pain and disappears with satisfaction. Pain persists under adverse conditions.

8. Events linked to emotions retain their power to evoke emotions unless exposure to them produces either habituation or extinction.

9. Emotions tend to be closed judgments, tend to control other action systems, and, if intense enough, override other concerns. Emotions are, therefore, phenomenologically decisive; "[c]losure, or control precedence, may well be considered the essential feature of emotion. The notion of control precedence captures in some sense the involuntary nature of

emotional impulse or apathy, its characteristic of being an 'urge,' in both experience and in behavior" (Frijda, 1988, p. 355).

10. Every emotional impulse induces internal processes that tend to modify the original emotions and its possible consequences. That is, at some level of place in the action hierarchy, the consequences of an emotion—rage, for example—can be appreciated and procedures activated to modify the emotion.

11. Whenever a situation can be interpreted in alternative ways, the individual has a tendency to select the interpretation that minimizes negative "emotional load" and maximizes emotional gain.

APPLYING INFORMATION PROCESSING MODELS TO EMOTION AND ANXIETY

Recognizable in Frijda's (1988) depiction of emotion is the influence of those model's that have proved enormously successful in illuminating visual perception (e.g., Livingstone & Hubei, 1988; Van Essen, Anderson, & Fellerman, 1992), and to a lesser extent motor coordination (Bizzi, Mussa-Ivaldi, & Giszter, 1991; Kalaska & Grammand, 1992) and memory (e.g., Baddeley, 1992; Cohen, Eichenbaum, Deacedo, & Corkin, 1985; Squire & Zola-Morgan, 1991; Tulving, 1989). They depict the central nervous system as a central information processing system, an enormously complex, hierarchical structure of branched, interacting, information-transforming processing components or modules. An example of this paradigm is Van Essen, Anderson,

and Fellerman's (1992) representation of the primate's visual system. The primate visual system, they reason,

> contains dozens of distinct areas in the cerebral cortex and several major subcortical structures. These subdivisions are extensively interconnected in a distributed hierarchical network that contains several intertwined processing streams. A number of strategies are used for efficient information processing within this hierarchy. These include linear and nonlinear filtering passage through informational bottlenecks, and coordinated use of multiple types of information. In addition, dynamic regulation of information flow within and between visual areas may provide the computational flexibility needed for the visual system to perform a broad spectrum of tasks accurately and at high resolution, (p. 419)

The visual system is but one component of the central information processing system; the ability to acquire new memories is a distinct cerebral function, for example, separable from other perceptual and cognitive abilities; and the ability to acquire new memories is not a singular faculty, but is composed, instead, or multiple separable systems that are differentially affected by lesions of the central nervous system (Squire & Zola-Morgan, 1991). The enormous difficulties inherent in appropriately applying these models to personality-environmental transactions may be intuitively estimated. Such complex coordination requires temporal organization of information flow for each module. Consider the simultaneous intellectual, expressive, memory, emotional control, and motor coordination necessary for the concert pianist to perform. Consider also how the pianist works over time to reduce the possibility of potential miscoordination.

The prospect in the foreseeable future of delineating and explicating those central information processing system's configurations that underlie anxiety is even more reduced when one considers that the system patterns which produce anxiety and the disorders in which it is manifest are likely to be multiple and vary from person to person (e.g., Lang, 1977) and situation to situation.

Speculations, however, about the mechanisms of anxiety have not ceased. One promising line of conjecture, and certainly one that reduces the complexity of the problem, is that anxiety in many, if not all, of its forms follows a common path. One indicator of that route may be the linkage between *anxiety* and the sense of *foreboding* that psychologically-minded theorizers, diverse as Bandura (1986), Freud (e.g., 1964), Geertz (1973), Heidegger (1962), Kelly (1963), Lewin (1943), and Sherover (1971) have uniformly emphasized. Skinner (1969), for example, described the connection in this way:

> A *premonition* is a prior warning, and one has *foreboding* only with respect to coming ills. *Anxiety,* in the sense of fear of an impending event, is more than expectancy, and so is *anticipation,* which seems to be as close as the English language comes to an antonym of anxiety. Anxiety involves emotional responses to a conditioned aversive stimulus, anticipation to a conditioned positive reinforcer, (p. 127)

Kelly (1963) expressed the relationship between anxiety and foreboding somewhat differently:

> [T]he person is bent on anticipating events . . . Each person attunes his ear to the replicative themes he hears and each attunes his ear in a somewhat different way .... More and more he seeks to anticipate all impending events of whatever nature. This means that he must develop a system in which the most unusual future can be anticipated in terms of a replicated aspect of the familiar past.
>
> Now it so happens that a person must occasionally decide what to do about remodeling his system . . . . How much can he tear down and still have a roof over his head? How disruptive will a new set of ideas be? Dare he jeopardize the system in order to replace some of its constituent parts? . . . Sometimes his anticipation of events will be more effective if he chooses to conserve the system, (p. 58)
>
> What the client experiences, assuming that the construct [self] fails to work for him is *anxiety,* (p. 118)

Considerable research evidence supports the putative relationship between threat and anxiety (e.g., MacLeod, Mathews, & Tata, 1986; Mathews & MacLeod, 1986; Mogg, Mathews, & Weinman, 1987). Furthermore, although disorders of anxiety frequently co-occur with depressive disorders (e.g., de Ruiter, Ruken, Garssen, van Schaik, & Kraaimaat, 1989; Lesser, et al., 1988; Sanderson, DiNardo, Rapee, & Barlow, 1990) and both have in common general affective distress as well as other common symptoms (e.g., Clark & Watson, 1991), anxiety and depression can still be differentiated because only anxiety is co-joined with anticipated threat (Clark, Beck, & Steward, 1990; Clark & Watson, 1991).

Gray (1988) has advanced the most cogent argument that a separable

subsystem of the brain mediates anxiety. He suggests evidence drawn from three separate sources: (1) the action of drugs known to reduce anxiety, namely barbituates, ethanol, and benzodiazepines; (2) the effects of infantile stress on adult behavior; and (3) selective animal breeding designed to produce “reactive” and "nonreactive” genotypes— has converged and supports the hypothesis that a “behavioral inhibition system,” the crucial constituent of the anxiety network, exists. The behavioral inhibition system depends upon neuronal activity in the septal area, the hippocampal formation, noradrenergic neurons in the locus coeruleus, serotonergic neurons in the raphe nuclei, and their interconnections. “The primary function of this system,” Gray (1988) posits:

> is apparently to suppress behavior that threatens to produce an unwelcome outcome (pain, nonreward, etc.). It follows that the system can only usefully be put to work if some other system is producing behavior that needs to be suppressed. There are essentially two major motivational systems that can do this... a ‘reward system’… mediating approach and active avoidance behavior and in response to stimuli associated with reward or the omission of anticipated punishment; and the fight/flight system…. To these should be added a number of more specialized mechanisms that mediate various forms of unconditional appetitive behavior (eating, drinking, copulation, etc.). These conditions imply . . . when the behavioral inhibition system is active, the total emotional experience will be an amalgam of the emotional effects of activity in this system and those of the activity in the system whose output is under inhibition.... [S]uch an amalgam will be maximally negative in affective tone when the system inhibited is the fight/flight system, (p. 24)

Normal operation of Gray’s “anxiety system” (or any viable alternative)

"breaks down" when any significant component at any level functions aberrantly. Just as anemia may be caused by many things—iron deficiency, defective red blood cells, and so on—so too may anxiety disorders.

The examples that follow describing how the "anxiety system" might go "haywire" are based upon extrapolations from Dennett's (1991) summary description of well-regarded models of how the perceptual system works. Because of their success in explaining visual perception, models developed from that field are often applied to other systems and problems. Characteristic of these models are rounds of expectation-informed hypothesis testing.

> It is widely held that human vision, for instance, cannot be explained as an entirely "data-driven" or "bottom-up" process, but needs, at the highest level, a few "expectation-driven" rounds of hypothesis testing. Another member of the family is the "analysis-by-synthesis" model of perception that also supposes that perceptions are built up in a process that weaves back and forth between centrally generated expectations, on the one hand, and confirmation (and disconfirmations) arising from the periphery on the other hand… The general idea of these theories is that after a certain amount of "preprocessing" has occurred in the early or peripheral layers of the perceptual system, the tasks of perception are completed—objects are identified, recognized, categorized—by generate-and-test cycles, (p. 12)

If similar cycles occur in the "anxiety network" as Gray (1988) supposes, dysfunctional anxiety might be produced when an individual's hypothesis-generation (i.e., the expectation) side of the "analysis-by-synthesis" cycle

requests information about whether the situation was threatening, and the data-driven side (the confirmation side) produces a series of inappropriate confirmations, perhaps attributable to defective regulation in the arousal system. A different, but equally damaging, route to dysfunction would be followed if the hypothesis-generating side of the cycle allowed no other possibility than threat.

The hypothesis that both specialized brain structures and anticipation play an important role in anxiety is supported by Tulving's (1989) fascinating case history of K.C. Especially interesting is the implication one can draw from it that episodic memory and the self-system may be intrinsic to the experience of anxiety.

> On 30 October 1980, a 30-year-old man, whom we shall call K.C., had an accident that changed his life. Driving his motorcycle home from work in a town near Toronto, he went off a curve at high speed. When help arrived, he was alive but unconscious, and he remained so for three days in the hospital. He had suffered a severe closed head injury. Now, nearly nine years later, with extensive brain lesions in the left frontal-parietal and right parietal-occipital regions and possibly in other parts of the brain, he is densely amnesic.
>
> K.C.'s case is remarkable in that he cannot remember, in the sense of bringing back to conscious awareness, a single thing that he has ever done or experienced in the past. He cannot remember himself experiencing situations and participating in life's events. This total absence of personal recollections makes K.C.'s case unique: no other reports exist of amnesic patients who have been incapable of recollecting *any* personal happenings. (p. 362)

Tulving (1989) wrote about K.C. to differentiate between episodic memories (memories of personal experiences), and semantic memories (memories of impersonal facts). K.C. experienced minor upset in retrieval of the latter, and seemingly total loss of the former. For example, confronted with chess pieces, K.C. "knew" how to play chess, knew factually that his father had played chess, but could remember no incident of playing chess with his father nor that he, K.C., had participated in any other chess games. He remembered that his family owned a summer cottage, but had no recollection of being there or taking part in any of the activities that occurred there. Tulving generalizes from this case,

> (C)ritical features of episodic information have to do with the self in time. The concept of a personal past ties together these two entities. K.C. has no particular difficulty apprehending and discussing himself or physical time. He knows what facts about himself could be said to be true and what facts could not; he also knows what most other people know about physical time, its units, its structure, and its measurement by clocks and calendars. It is his apprehension of objectively experienced time that seems grossly impaired.
>
> The impairment not only encompasses the past, it also extends to the future. Thus, when asked, K.C. cannot tell a questioner what he is going to do later on that day, or the day after, or at any time in the rest of his life . . . . K.C. is destined to spend the remainder of his life in a permanent present, (pp. 363-364)

Concomitant with K.C.'s loss of a "personal" future came a diminished sense of anxiety. When queried about his level of anxiety, Tulving (personal communication, March, 1992) characterized K.C. "as one of the least anxious

—under all circumstances—individuals" Tulving has met; Tulving further observed that amnesics, in general, even without the peculiar features of K.C.'s case, seemed to experience less anxiety than either normals or those with other brain syndromes which had not affected their episodic memory (Tulving, personal communication, March 1992).

K.C.'s unique symptoms were driven by a biological event that disrupted his recognition of a past self and projection of a future one. It has been argued (Aaronson, 1972; Fischer, 1970; Krauss, 1967; Lazarus, 1991; Mandler, 1984; May, Angel, & Ellenberger, 1958; Wallis, 1966) that, at the molar and phenomenological level, anxiety is experienced as a threat to self, with the concept of the self and its powers to cope often originating in the past, but aimed toward the future. In such systems, anxiety occurs in response to an event that signals an impending "identity" threat, with anxiety's intensity varying with the self's assessment of the reality of that threat and its "impendingness" (Lewin, 1943).

As Brewer (1991) points out, psychologists have become increasingly "self centered." Too much emphasis on the term *self*, however, masks the extent to which psychologists believe the self is both internally and socially constructed. "Two features characterize the dominant view of 'self' within modern empirical psychology," according to Deci and Ryan (1990, p. 237). "First, the self tends to be conceptualized as a set of cognitive appraisals and

schemata; second, the self tends to be understood as a reflection of social evaluations." In addition, however, Deci and Ryan argue the concept of the self broadens with social experience beyond these immediate evaluations.

> [T]he self does not simply reflect social forces; rather it represents intrinsic growth processes whose tendency is toward integration of one's own experience and action with one's sense of relatedness to the selves of others. Thus the self is not simply an outcome of social evaluations and pressures but instead is the very process through which a person contacts the social environment and works to integration with respect to it. (p. 238)

It has been debated as to how the self might be schematized to capture both active individual processes and social forces. Currently, distributed models of the central information processing system have been applied to the self (e.g., McClelland, 1985), with centers of control at multiple nodes. One such is Dennett's (1991);

> A self, according to my theory, is not any old mathematical point, but an abstraction defined by the myriads of attributions and interpretations (including self-attributions and self-interpretations) that have composed the biography of the living body whose Center of Narrative Gravity it is. As such, it plays a singularly important role in the ongoing cognitive economy of that living body, because of all the things in the environment an active body must make mental models of, none is more crucial than the model the agent has of itself. To begin with, every agent has to know which thing in the world it is. (p. 427)

Because it must act within the circumstances of culture and it is a reflection of culture, self and culture are necessarily interlocked. If the experience of anxiety is to be understood, therefore, not only must the self's teleology be

appreciated but the culture's construction of temporality, its timeframe for *foreboding*.

The theme of a teleological identity or teleological self is certainly not new to psychology (Krauss, 1967). It was explored in depth by the Europeans Adler (Ansbacher, 1950; Ansbacher & Ansbacher, 1956) and Jung (e.g., 1934/1965), but comes rather late to American personality theory (e.g., Kelly, 1963). Allport, the dean of American personologists, remarked "People, it seems, are busy leading their lives into the future, whereas psychology, for the most part, is busy tracing them into the past (1955, p. 51).

Although they had different reasons for doing so, both Adler and Jung considered individuals to be goal directed, their actions directed toward the realization or warding off of a future:

> Life is teleology par excellence; it is the intrinsic striving towards a goal, and the living organism is a system of directed aims which seek to fulfill themselves. The end of every process is its goal. All energy flow is like a runner who strives with the greatest effort and the utmost expenditure of strength to reach his goal. Youthful longing for the world and for life, for the attainment of high hopes and distant goals, is life's obvious teleological urge which at once changes into fear of life, neurotic resistances, depressions and phobias if at some point it remains caught in the past, or shrinks from risks without which the unseen goal cannot be achieved. (Jung. 1934/1965, p. 5)

Decades after Kelly's brilliant attempt, American psychology and sociological psychology have come to focus on the construction of the self in

time. The self, it has been hypothesized, is created through an individual's development of a "narrative" life story or "life script" (e.g., Charmaz, 1991; Dennett, 1991; Mandler, 1984). This life script defines the individual's identity by placing the individual in a setting with other characters and confronting them with an unfolding series of events. The actions of characters and subtexts of assumed motivation, goals and intentions reveal and create "identity." To the extent events create major discontinuities in an evolving life story, "biographical work" or rewriting a life script "to put one's life back together" occurs.

Perhaps the most sophisticated and articulated psychologist-produced elaboration of person-environment transaction across time (and the most relevant to this chapter) is the stress-appraisal-coping model of Lazarus and his colleague (e.g., Folkman, 1984; Lazarus, 1991; Lazarus & Folkman, 1984). According to this model, a dynamic set of "transactions" occurs between an individual and his or her surroundings. Environmental events are appraised as potential sources of benefits, threats, challenges, or harm, in a definitional process labeled *primary appraisal*. The definition of threat, benefit, harm, or challenge is measured against the individual's commitments and meaning structures. A *secondary* appraisal process occurs when the individual judges whether he or she possesses the personal or situational resources to deal with a potential harm or threat from the environment. If sufficient resources are believed to be on hand, a threat may be redefined as a challenge. Primary

and secondary appraisal together instigate an important set of psychological behaviors, coping. Coping can be problem-focused, focused on the emotions arising from the situation, or both. Lazarus (1991) suggests fright and anxiety arise from a concentration on the threat of future harm:

> A *threatening* encounter makes one feel uneasy (anxious) which is not only unpleasant but is apt to constrict one's ability to think and perform. The constriction is connected with a strong effort to protect oneself from anticipated danger, (p. 18)

The transactional and existential nature of anxiety in Lazarus' mind is, however, clear:

> Anxiety arises when existential meaning is disrupted or endangered as a result of physiological deficit, drugs, intrapsychic conflict, and difficult-to-interpret events. The threat involved is symbolic rather than concrete. If the threat is mild, and the structures that are endangered not very central to the person's identity the result is apt to be mild uneasiness. If the threat is severe and the meaning structures central, the result is apt to be a full-grown anxiety attack and a personal crisis of major proportions. (p. 234)

Coping and the engagement of personal resources are particularly difficult when one is anxious, because Lazarus argues, the "hallmark" of anxiety is that it is in response to a situation of ambiguity, and, indeed, the psychological feelings accompanying anxiety are feelings of uncertainty:

> The core relational theme of *anxiety* is *uncertain, existential threat.* The uncertainty about what will happen and when obviates any clear idea on the part of the person what to do to prevent or ameliorate it. We are nagged by abstract, ambiguous, and symbolic threats to our ego-identity. (p. 236)

Lazarus locates the threat to meaning that generates anxiety in the future. Melges (1990), more directly than Lazarus, holds that one's sense of identity (that which Lazarus notes is under threat when the individual is anxious) is related to one's ability to maintain a time perspective, especially a vision of one's self in the future.

Melges offers three reasons for this. Each reason can be construed as originating from a different level of the personality, and as being more or less involved in, or originating from socially coordinated activity. That is an individual has a comfortable rate of performance or foresight that partially originates from, and is maintained and validated by social responses, much as, *within* the individual, components are coordinated by a Central Information Processing System.

a) Because a person becomes familiar with his or her self over time, the disruption of the continuity of temporal perspective impairs this sense of familiarity . . . and thus the self feels strange.

b) Within the framework of temporal perspective, momentary changes of sequence, rate, and rhythm are evaluated . . . . When this framework becomes blurred, the interpretation of the self (identity) also becomes compromised.

c) Because human beings are basically goal-correcting organisms, a firm grip on the personal future . . . provides a key anchoring

> point for the continuity of temporal perspective. Future time perspective, as a means-to-ends process, gives order and direction to temporal perspective. (pp. 256-257)

If Melges is correct, two conclusions may be drawn. Each individual, as the existentialists aver (e.g., Hoffman, 1986; Krauss & Krauss, 1990), fashions a self that is necessarily rooted in time, and one's experience of anxiety is necessarily conditioned by one's temporal perspective.

THE SELF IN SOCIAL TIME

The external flow of time into which we emerge at birth and in interassociation with which we are shaped across our life spans (e.g., Montanegro, 1985; Piaget, 1966; Solomon, Groccia-Ellison, Levine, Blanchard, & Pendlebury, 1991) has been structured differently in different historical eras (e.g., Elias, 1982; Poulet, 1956; Sarap, 1989; Wilcox, 1987; Yaker, 1972) and is culturally distinctive (e.g., Duncan, 1968; Geertz, 1973; Kluckhohn & Strodtbeck, 1961; Levine, 1990; Maxwell, 1972; Triandis, 1987). "Biblical man," according to Yaker (1972, p. 32) "perceived time as a series of linear moments .... Each day of life was one day closer to its fulfillment, and one day further from its creation." On the other hand, for the Greeks of the classical age, time was episodic: "The subject matter determined the shape of Greek time. A particular war, polity, people, or religion created its own temporal boundary; a particular lesson, its own time frame" (Wilcox, 1987, p. 81).

When a Trobriand Islander wishes to distinguish between different kinds of occasions, Maxwell (1972) notes "he will say, for example, 'Molubabeba-in-child-his,' that is, in the childhood of Molubabeba, not a previous phase of *this* time, but a different kind of time. For him, history is an unordered repository of anecdote, he is not interested in chronological sequence" (p. 46).

Significant aspects of an individual's self derive from and depend upon his or her culture's orientation to time. Selves will differ among cultures which differ in temporal orientation; selves will differ within cultures in the extent to which the temporal perspective predominant in that culture is congenial. From the perspective of twentieth-century America, for example, the Balinese formulation of personhood is "depersonalizing" according to Geertz (1973, p. 390). This he attributes to the "presentness" of their society:

> Consociates, as they meet, confront and grasp one another in an immediate present, a synoptic "now"; and in so doing they experience the elusiveness and ephemerality of such a now as it slips by in the ongoing stream of face-to-face interaction, (p. 390)

Duncan (1968), to select an example closer to home, argues that unlike Europeans whose actions are determined by their past, the behavior of Americans is determined by their sense of the future. "This does not mean that we Americans have no history," he remarks (1968), ". . .we have a great historical tradition in America, but it is the history of the future, not the past, which concerns us" (p. 27).

Both proximal and distal forces produce a culture's temporal orientation and act to induce the self's participation in it. For Lacan (cf. Sarap, 1989; Wilder, 1968) the experience of temporality and the persistence of human identity is an effect of language, and languages do differ in the treatment of time.

> Nearly all languages enable their speakers to discriminate between past, present, and future events, but they do so with varying degrees of difficulty. In English we use three basic tenses, and combinations of these. We cannot speak of an event without using one or another tense, so that the recognition of this tripartite division of time is built into our language. Other languages, however, operate differently .... [S]peakers of the Luganda language . . . are compelled by their grammar to note whether an event occurs within or before the twenty-four-hour period immediately preceding the time at which the event is described .... Other languages, however, are much more careless in their handling of time and in some cases . . . may not use any tenses at all. (Maxwell, 1972, pp. 44-45)

Language is more than tense structure, it creates meaning. Consider how powerful the metaphor "time is money" has been in defining our own:

> In our culture time is money in many ways; we calculate telephone calls, hourly wages, interest on loans. But not only do we *act* as if time is a valuable commodity, we also *conceive* of time in that way. T don't have the time to give you.' 'How do you spend your time these days?' Thus we understand and experience time as the kind of thing that can be spent, wasted, budgeted, invested wisely or foolishly, saved or squandered. (Sarap, 1989, p. 53)

But as important as language is, other cultural configurations also contribute to cultural temporality. Whether culture is individualistic or collectivist also

makes a difference in time perspective:

> Interaction is conceived in a longer time perspective by collectivists than it is by individualists. Specifically, goals are closer in time among individualists; one expects tit-for-tat rewards from social interactions. Distant goals are more common among collectivists. One does not expect immediate reciprocity, but long-term reciprocity is most important. . . . For Buddhist collectivists one's acts have consequences for many generations to come and can determine whether one may enter nirvana. (Triandis, 1990, p. 60)

Perhaps the best descriptive summary as to how modern Western culture's temporal orientation is formed has been provided by Elias (1982):

> With Western society as its starting point, a network of interdependence has developed which not only encompasses the oceans further than any other in the past, but extends to the furthest arable corners of vast inland regions. Corresponding to this is the necessity for an attunement of human conduct over wider areas, and foresight over longer chains of actions, than ever before. Corresponding to it, too, is the strength of self-control and the permanence of compulsion, affect inhibition and drive control, which life at the centres of this network imposes. One of the characteristics which make this connection between the size of and pressure within the network of interdependence on the one hand, and the psychological make-up of the individual on the other particularly clear is what we call the 'tempo' of our time. This 'tempo' is in fact nothing other than a manifestation of the multitude of intertwining chains of interdependence which run through every single social function people have to perform, and of the competitive pressure permeating this densely populated network and affecting, directly or indirectly, every single set of individuals, (pp. 247-248)

Implicit in this description are three important points. As has been affirmed since Plato (Krauss, 1990), personality and culture are reciprocal creations; there is a tacit hierarchy of needs and goals, within an individual, within a

society, and in an individual's relationship to society, which must be negotiated out in a time-bounded framework (e.g., Durkheim, 1933); and social contexts demand temporary or permanent inhibition of some needs and goals, for others to be fulfilled in a social milieu which more and more is regulated by an objective external tempo. This inhibition or control, the reader will recall, was a central aspect of Gray's (1988) conceptualization of anxiety.

However extensive or necessary an external arbitrary organizer of social life it might be, social time, as William James (1928) has so astutely pointed out, may not necessarily uniformly penetrate into the various components of self-structure:

> That one Time which we all believe in and in which each event has its definite date, that one Space in which each thing has its position, these abstract notions unify the world incomparably; but in their finished shape as concepts how different they are from the loose unordered time and space experiences of natural men! Everything that happens to us brings its own duration and extension, and both are vaguely surrounded by a more meaningful 'more' that runs into the duration and extension of the next thing that comes. But we soon lose our definite bearings; and not only do our children make no distinction between yesterday and the day before yesterday, the whole past being churned up together, but we adults still do so when the times are large, (p. 178)

This description, however, does not make clear whether James believed individuals participate in two or more time schemes simultaneously, switch from one to another, or interweave these time schemes. We still do not know.

INDIVIDUAL DIFFERENCES IN PHENOMENAL AND SELF-TIME

Time perception varies not only over the life span, and with the smaller or larger impact of events, but is influenced differentially by aspects of the biological and social self. Drug- and disease-induced alterations in time-perception have been noted. Often, they have been attributed to changes in the usual rhythms of the central or the sympathetic nervous system, affecting heart rate, breathing, rate of movement, and other "regularities" of internal pace against which one would almost unconsciously measure the external flow of events (Goldstone, 1967). For example, after taking psilocybin, a subject found his handwriting slow compared to his inner sensations, "A hundred years, so it appeared to me, would not suffice to describe the fullness of experience contained in a single minute." Many psychotomimetic compounds induce a central sympathetic excitation syndrome, characterized by hyperthermia, pilo-erection, hyperglycaemia, tachycardia, and so on (Fischer, 1967). Barbiturates, in contrast, induce a central slowing (Goldstone, 1967). Contractions and expansions of personal time are experienced during the "dreamy state" accompanying temporal lobe seizures (Fischer, 1967), and time speeds for those who have experienced the slowing of bodily processes accompanying hypothermia (Cohen, 1967).

The significance and meaning of these observations are complicated by a more articulated view of internal rhythms which postulate multiple internal

clocks, some constantly running (i.e., circadian rhythms), some stopping and starting, that is, interval clocks (e.g., Church, 1984; Kristofferson, 1984; Richter, 1960). Long-term clocks have been hypothesized for cyclic events; sleeping-waking, feeding, menstruating, and processes involved in the hormonal regulation of the body (Friedman, 1990). Interval clocks are necessary for the coordination of the multiple systems required in complex activities, for example, sports, cooking (Michon, 1990), and can be inferred from the time-sense necessary in humans and other animals for conditioning to occur (Friedman, 1990).

Such multiple clocks may be responsible for some of the paradoxical findings in the literature on accuracy of time estimation, a literature that varies between psychophysical scaling of time intervals of minutes and seconds, and perception of biographical time (e.g., Cohen, 1967). These findings suggest time may be differentially *experienced* by components of the self:

> Acute situational anxiety and chronic pathological conditions of depersonalization and derealization influence a person's subjective awareness of time, but leave his objective estimation of time intervals quite intact— a rather unexpected finding. (Lehmann, 1967, p. 801)

Zakay (1990) also notes that generally the literature reports filled or busy time appears to pass more slowly than "empty" time. (Zakay warns these findings must be considered tentative because researchers rarely are aware

of subjects' cognitive processes during "empty" time.)

Habitual orientations toward time perception can be *used* to induce motivational states. At least three authors (De Voider & Lens, 1982; Friedman & Rosenman, 1974; Yarnold & Grimm, 1982) suggest an orientation toward the future creates urgency and time pressure in the present, characteristic of high-achieving students and those with Type A personality.

In a series of experiments on hypnotic time distortion, Aaronson (1972) explored subjects' motivational and affective states when their orientation toward time was altered. He reported subjects to whom it was suggested they had no present were immobile; no past were confused and irritable; and no future were euphoric and semi-mystical, a finding which incidentally reinforces the belief that a future orientation is necessary to anxiety.

In the world of the compulsive (in DSM-III-R obsessive-compulsive disorder is considered an anxiety disorder, American Psychiatric Association, 1987), von Gebsattel (1958, p. 185) hypothesizes, the future is seen as negative and frozen. "[A] world without mercy and without grace of Fate . . . opens up or, rather, shuts up." The obsessive-compulsive binds anxiety in the present and wards off the future with a "rule-ridden unchangeability."

ANXIETY AND SOCIAL TIME

Coping with anxiety can be facilitated or inhibited by a synchrony or dis-synchrony between an individual's internal pacing for actions and decisions, and the external flow of events (e.g., Freund & McGuire, 1991; Michon, 1990). As Elias (1982) suggested, any dissynchrony challenges individuals' structuring of activities and leads to new attempts to control either themselves or external events. A dissynchrony, indeed, can "erode our sense of coherence"; and our social position can remove us from control over the social resources we need to cope.

> Control over time—our own or other people's—is a form of power. Powerful persons have the ability to regulate other people's time and labor. The ability to manage our own schedule is limited by our position in society . . . *Time is socially organized, and the ability to schedule time and manage it is socially distributed,* (p. *91)*

In exploring powerlessness over time, Freund and McGuire (1991) introduce the concepts of environmental overload, produced by an environment that "demands too much, too fast," and underload:

> Overload and underload have been linked to increased excretions of catecholamine, a stress hormone. A study of sawmill workers found that those whose jobs were characterized by a lack of control over their situation were most likely to have increased catecholamine secretions in urine and feel tired, tense, anxious and ill more frequently than other workers. (Frankenhauser & Gardell, cited in Freund & McGuire, 1991, p. 99)

Likewise, underload and lack of control produced stress.

The dissynchrony can be *internally*, as well as externally imposed; self-imposed over-control is characteristic of the "time-sickness" of the Type A personality, these authors argue. In a reworking of Freud, Marcuse (1955) essentially makes the same argument, but in the language of existentialism, that control over time, in its *content*, is aimed for or against an unalienated self:

> Man exists only *part*-time, during the working days, as an instrument of alienated performance; the rest of the time he is free for himself . . . This free time would be potentially available for pleasure. But the pleasure principle which governs the id is "timeless" also in the sense that it militates against the temporal dismemberment of pleasure, against its distribution in small separated doses. A society governed by the performance principle must of necessity impose such distribution because the organism must be trained for its alienation at its very roots—the *pleasure ego.*
>
> The irreconcilable conflict is not between work (reality principle) and Eros (pleasure principle), but between *alienated* labor (performance principle) and Eros. (pp. 42-43)

Elias (1982) sees such conflict unfolding historically in Western culture as the demands of interdependence increasingly structure and delay the inclinations of an individual self:

> [I]t makes people accustomed to subordinating momentary inclinations to the overriding necessities of interdependence; it trains them to eliminate all irregularities from behavior and to achieve permanent self-control. This is why tendencies in the individual so often rebel against social time represented by his own super-ego, and why so many people come into conflict with themselves when they wish to be punctual. From the

> development of chronometric instruments and the consciousness of time —as from that of money and other instruments of social integration—it is possible to read off with considerable accuracy how the division of functions, and with it the self-control imposed on the individual advances, (p. 248)

TIME AND BIOGRAPHICAL WORK

Some of the most dramatic alterations in time perception/orientation occur for individuals to whom "life-changing" events beyond their control have occurred. Such individuals must rework their futures by examining and finding new life stories in their pasts (Wallis, 1966), in a process some authors call "biographical work."

Many researchers have looked at these adaptations in persons with illnesses or accidents that change possible futures. For such persons, biographical work consists of projecting future life scripts that incorporate valued goals independent of illness while accommodating the discontinuities evoked by illness (Corbin & Strauss, 1987). The former identities and future plans of the chronically ill often "become questioned, undermined, altered or negated" (Charmaz, 1987, p. 283) both by the realities of limits imposed by illness and by the danger illness will take on a "master status" (an attribute which serves as a filter through which all other attributes of the person are viewed; Hughes, 1945) either in one's own mind or in others' (Charmaz, 1987; Nerenz & Leventhal, 1983; Schur, 1979). Chronically ill individuals

achieve control and purpose by reviewing and reconstructing their biographies (Corbin & Strauss, 1987). Biographical work may, as Brooks and Matson (1982) suggest in their work with multiple sclerosis patients, involve considerable self-redefinition. The biographies look forward not only to how time should be filled in the service of the self, but also to different endpoints, immanent death, permanent "differentness," as in irreversible disability, or recovery (Adams & Lindemann, 1974).

Relatively early in the HIV epidemic, with little hope of cure, HIV seropositive men had to cope with a sense of urgency about the time remaining to them (Siegel & Krauss, 1991). They decided to what extent to invest in their futures. In so doing, many seemed to be expediting a script for a completed life. Career-related concerns were often central to the script—one man, who recently returned to school, remarked he wanted to see Ph.D. on his tombstone. Though many HIV seropositive men had hopes a cure for HIV/AIDS would be found, most accepted their infection as irreversible and life-limiting.

Career choices and achievement frequently reflected key identity issues for these men in their 20s to 50s; similar concerns emerge for cancer patients in this age group (Rowland, 1989) and reordering of priorities is commonly found among cancer patients in general (Siegel & Christ, 1987). The HIV seropositive men's urgency for achievement was quite different from the

time-sense of individuals with spinal cord injury (Lilliston, 1985) who, while waiting to find out if functions will recover, may feel anxiously "imprisoned" in the present, or from the experience of an individual with a cancer for which treatments are we 11-developed. In the latter case, the passage of disease-free time, although characterized by persisting anxieties about recurrence (Siegel & Christ, 1990), signals "cure" and a tentatively grasped, new normalcy.

Studies of those who experience illness or accident make clear that their identity challenges can be "written" toward three futures: I will persist, that is, I will someday be myself again; I will end; I will change.

CONCLUSION

Anxiety is created or moderated at multiple levels. It can be induced or reduced by changes in bodily sensation some of which in turn alter time sense; it is responsive to the fit between a culture's and individual's pace; it is modified by an individual's satisfaction with the projection of his or her future self; it is altered by an individual's sense of control over the possible futures that social contexts and circumstances allow; and it is emphasized or diminished by a socially negotiated temporal perspective.

Common to the experience of anxiety in time is a sense of *foreboding* or threat emanating from the future. We have argued that one central aspect of

the phenomenology of this foreboding is perception of threat for key self-identity concerns. If a sense of self is dampened, by biologic (e.g., deficits in episodic memory) or social factors (e.g., a collectivist vs. individualistic orientation that does not also overstructure time), we predict the *probability* of anxiety will change. For the individual, a perception of resources and abilities to control what the future self will be, what the future context of the self will be, or to negotiate the junctions of self and environmental challenge will alleviate anxiety. Part of the task of control is for the individual to construct a life story capable of satisfactorily encompassing probable futures, but based in a real past and enacted in the present. In contrast, where there is harmony, what Ruth Benedict (1934) refers to as *synergy*, between social and individual integrity, both the necessity for control and the experience of anxiety ought be diminished.

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Notes

[1] We would like to thank Michael Krauss, The Graduate Center, City University of New York, for his critical reading and substantive comments on this chapter.

[2] The discerning reader will note that the authors describe no explicit computational model for temporal representations either in the self or any subpart of its hierarchy.

While there are many different paradigms of human memory and information processing, e.g., Johnson-Laird's mental modeling. Bartlett's schema, Schank and Abelson's scripts (Posner. 1989), there is as yet no one comprehensive and widely accepted theory or paradigm. In addition, none of the more complete models describe temporal organization in detail. However, several authors have recognized the importance of focusing on how episodes are represented in time (cf. Block. 1990: Diamond, 1990; Gibbon & Alan, 1984). The complexities of any model incorporating temporal information will go far beyond the difficult problems inherent in adequately representing static information.