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HOW TIME FLIES: Age, Memory, and Temporal Compression

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We formulate a comprehensive theory that accounts for variation in the perception of time. According to our theory, lived time is perceived to pass slowly (protracted duration) when conscious information processing is high; lived time is perceived to be synchronized with clock time (synchronicity) when conscious information processing is moderate; and lived time is perceived to have passed quickly (temporal compression) when conscious information processing is low. We examine that portion of the theory concerning temporal compression in light of empirical materials. Since episodic memory erodes as time passes, we hypothesize that this generates the experience of temporal compression by lowering the density of conscious information processing. Our data were drawn from three different age cohorts, and we find strong support for the hypothesis.

As you read Mead's (1934) lectures in *Mind, Self, and Society*, you repeatedly encounter people who have problems. There is the person who "has a nail to drive . . . reaches for the hammer and finds it gone" (p. 83). There is the person who "cannot get a lock to work" (p. 94). And there is the "man walking across country [who] comes upon a chasm which he cannot jump" (p. 122). Mead's (1938, p. 79) imagery reflects one of the cardinal tenets of his theoretical framework: "Reflective thinking arises in testing the means which are presented for carrying out some hypothetical way of continuing an action which has been checked."

Dewey's (1922, p. 178) position strongly resembles that of Mead: ". . . it is a commonplace that the more suavely efficient a habit the more unconsciously it operates. Only a hitch in its workings occasions emotion and provokes thought."¹ There is, however, an obvious difference in their respective positions. Dewey argues that, in addition to thought, emotion is also galvanized by problematic circumstances. For Mead (1934, p. 149), role taking is crucial to the emergence of self-consciousness, and this is, of necessity, a cognitive process because emotion "does not directly call out in us the response it calls out in the other."

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The writings of Mead and Dewey suggest that the volume of what James (1890, p. 239) calls the stream of consciousness varies in response to the relationship between self and situation. Mead and Dewey agree that, when confronted by problematic circumstances, increased attentional resources are brought to bear on whatever is blocking otherwise routine and relatively unself-conscious conduct. In a novel or difficult situation, there is heightened self-consciousness of tacit social action in the form of thinking and feeling. Cognition and emotion are different facets of subjective experience, but both cognition and emotion are amplified whenever habit and custom are challenged by problematic circumstances (Turner and Billings 1991, p. 119). In any event, the issue at hand concerns the total volume of experience and not analysis of its variegated content. Given the relationship between self and situation, we believe that variation in the perceived passage of time is conditioned by variation in the volume of experience.

Neither Mead nor Dewey ever deals with the perceived passage of time and its relationship to variation in the volume of experience. Still, Mead has much to say about how temporality figures in the dynamics of self-consciousness and social interaction. Mead's interest in temporality stems from a desire to use evolutionary principles in an analysis of mind, with the latter viewed as an ongoing adaptation to changing circumstances (Strauss 1991). Consequently, Mead has to account for the emergence of new forms of consciousness. As he (1932, p. 31) puts it, the "novelty of every future demands a novel past." Mead fundamentally alters the stimulus-response arc of behaviorism by insisting that, in human interaction, there is an intervening moment—the "specious present" (1938, p. 65)—during which the individual interprets the situation and self-consciously considers alternatives to "the response which has been inhibited" (1938, p. 7). Mead is intent on showing how human beings redefine the past from the standpoint of the present, and how such redefinitions create the possibility of novel futures (Maines, Sugrue, and Katovich 1983). In this manner, he tries to reconcile determinism and emergence.

It is unlikely that Mead would have endorsed research on a possible link between the volume of experience and perception of the passage of time, although such research is implied by his own tenets. He (1938, p. 66) contends that "the unit of existence in human experience is the act." According to Mead (1938, p. 151; Denzin 1988, p. 53), the act is composed of four phases: impulse, perception, manipulation, and consummation. As but one phase among four, perception does not warrant separate attention beyond the part it plays in the social act. And, from Mead's (1938, p. 160) standpoint, experience is embedded within the social act because experience proceeds through self-reflection: "Action of the organism with reference to itself is, then, a precondition of the appearance of an object in its experience." Moreover, Mead (1938, p. 54) tells us that experience can only be grasped from a particular social perspective: "experience . . . has its character over against actual or possible audiences or observers whose selves are essential to the existence of our own selves."

Mead's subordination of experience to action does not square with his own argument that action is prefigured in self-consciousness as one considers various hypothetical solutions to the problem at hand. Perhaps his pragmatism is showing. A particular aspect of experience may or may not lead to consummation of the act; it may or may not have practical (that is, behavioral) effects. Nevertheless, there is much more to life than solving problems, and, with Denzin (1988, pp. 60–61), we assert that Mead's position unnecessarily restricts the symbolic interactionist enterprise:

By placing priority on the act, Mead shifted attention off the ongoing flow of temporal experience that shapes the context wherein the act supposedly occurs. For him . . . the act takes precedence over the moment.

The act, not temporal experience, thus becomes the key concept for Mead, and by implication the generations of interactionists who have followed him.

If we change the emphasis from action to consciousness, then we can examine a facet of experience—perception of the passage of time—that has no place in Mead's theoretical framework.²

"There is a certain temporal process going on in experience," states Mead (1932, p. 13). We will show that there is also a certain experiential process going on in temporality. This change in emphasis implicates the writings of phenomenologists.³ Heidegger (1927/1962) is critical of the way ordinary speech depicts time as if it were autonomous from human existence because he views temporality as an "integral part of human experience" (Lindesmith, Strauss, and Denzin 1991, p. 7). It follows that variation in temporal experience reflects variation in social conditions. Thus, Heidegger (1927/1962, p. 39) proposes that "time . . . functions as a criterion for distinguishing realms of Being."⁴ This proposition mandates investigation of subjective and situated processes that shape the perception of time.

Consciousness is composed of successive experiences: "By thinking, we move through time" (Denzin 1982, p. 38). But how is it that we perceive duration in successive experiences? Husserl (1928/1964, p. 79) suggests that the essence of duration is found in the interplay of "memory and expectation." He points out that we only ever hear one note at a time when listening to a song. Our grasp of the melody results from our ability to remember previous notes and anticipate future notes. Husserl (1928/1964, pp. 44 and 57) differentiates memory into primary remembrance or "retention" and secondary remembrance or "recollection." Each particular note of the melody is perceived now, that is, in the present, but Carr (1986, p. 21) observes that with the "just-pastness" of retention, we have "a special sort of memory" through which "I hear one note *as* succeeding" or "taking the place of its predecessor."⁵ This is in contrast to our recollection of those past events that are not immediately related to the present. Similarly, Husserl (1928/1964, p. 62) differentiates anticipation into primary expectation (or "protention") and secondary expectation. According to Carr (1986, p. 22), Husserl's theory concerns the relationship between figure and ground in that "the temporal is experienced by us as a kind of 'field' like the visual field: the present is its focus" and it stands out against a receding horizon formed by retention and protention. Husserl (1928/1964, p. 47) concludes that human beings have a "temporally constitutive consciousness" which produces the sensation of duration by integrating perception, memory, and anticipation.

A great deal of the sociological research on time has centered on the social organization of temporality as this is manifest in clocks, calendars, and schedules (Fine 1990; Maines and Hardesty 1987; Melbin 1969, 1978; Zerubavel 1977, 1979, 1981, 1982a, 1982b, 1985). Scholars in the new Iowa school of symbolic interactionism use audiovisual recordings in the laboratory to explore the temporal basis for coordinated action (Couch 1982; Katovich 1984; Katovich and Couch 1992). Other studies focus on temporal fea-

tures of social order, such as pauses (Snow and Brissett 1986) and various types of deviance (Reese and Katovich 1989). These studies illuminate behavioral patterns and collective representations, but they overlook the fact that temporal organization is not synonymous with the lived experience of time. Research on temporal order points to the need for development of a social psychology of temporality that embraces the subjectivity as well as the objectivity of time (Flaherty 1987a, 1993).

The potential for research on temporal aspects of subjectivity is evident in the symbolic interactionist literature concerning illness and dying. Early investigations revealed that patients interpret time spent in a hospital by reference to "time perspectives" (Davis 1956, p. 583) or "timetable norms" (Roth 1963, p. 12) which enable patients to anticipate how long their treatment will take. Similarly, the staff at a hospital comes to anticipate certain "dying trajectories" on the basis of their "experiential careers" (Glaser and Strauss 1968, pp. 5, 14). More recently, Maines (1983a, p. 109) has examined the "diabetic experience as lived time," and Lopata (1986) has described the altered temporal experience occasioned by widowhood. Charmaz (1991, p. 4) summarizes her own findings, as well as those of her colleagues, when she states that "being ill gives rise to ways—often new ways—of experiencing time."

These studies provide a wealth of insight concerning the particular temporality of illness and dying, but the findings do not "add up" to a general theoretical understanding of variation in lived time. The symbolic interactionist paradigm does not exclude scientific generalization (Couch 1989). Indeed, Couch (1984, p. 10) calls for research that is directed toward isolation of "abstract sociological principles." Our interests are social psychological rather than sociological; nevertheless, we are intent on discovery of those principles which make for "generic temporal processes" (Maines 1989, p. 114). With respect to the experience of duration, such principles, taken together, would constitute systematic specification of the formal or generic properties of lived time. In this paper, we formulate a general theory of lived time and examine a portion of our theory in light of empirical materials.

THEORY

There is, then, a tendency for sociological students of temporality to gloss over the basic observation that what feel like minutes for one person may feel like hours for another person. This offhand treatment is remarkable because even cursory reflection indicates that variation in the experience of time does not occur because there are different kinds of people, but because people find themselves in different kinds of circumstances. The variation is evident despite our common socialization to an intersubjective structure of standard temporal units, such as months, weeks, days, hours, and seconds (Sorokin and Merton 1937). Standard temporal units are elements of "the cultural context in which time takes on meaning" (Maines 1983b, p. 185). Put differently, the experience of time is culturally embedded (Davis 1984; Maines 1989).

So, in spite of socialization, each of us feels, now and then, that time is passing quickly or slowly. Therefore, we can conceptualize three points along a continuum that represents the perceived passage of time: synchronicity, protracted duration, and temporal compression. Ordinarily, our perception of time is roughly synchronized with the flow of standard temporal units. In other words, 10 minutes as measured by the clock *feel* like approximately 10 minutes from the perspective of subjectivity. We can refer to this sensation as

synchronicity. But under certain circumstances, there are two other possibilities: 10 minutes as measured by the clock may feel like a much longer or much shorter length of time. Let us refer to the former as protracted duration and the latter as temporal compression.

We argue that variation in the perceived passage of time is a function of the density of experience per standard temporal unit, which is, in turn, conditioned by one's subjective involvement with self and immediate circumstances. According to this formulation, protracted duration occurs when the density of experience is abnormally high, synchronicity occurs when it is moderate, and temporal compression occurs when it is low.

Protracted Duration

Two concepts were especially helpful in our effort to formalize a theory of lived time. Lewis and Weigert (1981, p. 437) use their concept "time embeddedness" to describe "the fact that all social acts are temporally fitted inside of larger social acts." For example, when we meet a colleague in the hall during finals week, we know that time available for chatting is limited by the deadline for grades. In related fashion, Hogan (1978, p. 417) defines "stimulus complexity" as the totality of "the individual's environmental experiences." It follows that for the person in a given setting, the higher the degree of time embeddedness, the higher the degree of stimulus complexity. Both concepts refer to objective features of the situation, but both concepts have implications for the individual's assessment of his or her place in that situation.

The experience of protracted duration emerges in situations characterized by either high or low levels of embedded activity. Paradoxically, both solitary confinement and hand-to-hand combat can seem interminable. Previous research (Flaherty 1987b, 1991, 1992) resolves this paradox by specifying five sequential elements that engender the sensation of protracted duration: (1) the immediate circumstances are extremely eventful or extremely uneventful; (2) the individual has a highly emotional concern for understanding the problematic situation; (3) there is great cognitive engrossment with self and situation; (4) there is abnormally intensified stimulus complexity brought on by heightened attention to self and situation; (5) this results in greater than normal density of experience per standard temporal unit. Thus, it has been shown that the sensation of protracted duration is produced by the individual's response to subjective involvement in unusual circumstances.⁶

Synchronicity

The orderliness of normal interaction presumes that individuals are experiencing synchronicity. In other words, we can conceive of synchronicity as one of the "background expectancies" (Garfinkel 1967, p. 53) that structure interpersonal relations in everyday life. As such, it is a taken-for-granted and thereby unconscious facet of subjectivity. It is, nonetheless, a skill that one acquires during primary socialization, and we contend that it is accomplished through variations on the same five elements that induce protracted duration: (1) the individual is acting in a situation that is unproblematic⁷; (2) emotional concern for one's understanding of the situation is moderate; (3) cognitive engrossment with self and situation is also moderate; (4) this level of involvement with self and situation generates the normal amount of stimulus complexity; (5) this results in a routine and consequently familiar density of experience per standard temporal unit.

The routinization of the density of experience per standard temporal unit is produced by

processes that are external and internal with respect to the individual. From the outside, the individual's experience is modulated by habits, schedules, calendars, seasons, and other socially-defined regularities. From the inside, the individual uses "interpretive procedures" (Cicourel 1974, p. 11) so as to modulate his or her own experiences, thereby avoiding under- or over-involvement with self and situation.⁸ The upshot is that individuals learn the normal correspondence between experience and standard temporal units. It is familiarity with this correspondence that enables individuals to translate the flow of subjective experience into standard temporal units, and vice versa.

Temporal Compression

While protracted duration and synchronicity are primarily phenomena of the present, temporal compression is a phenomenon that is uniquely associated with the past. Its most familiar manifestation is the shocked look backward that is expressed in common questions: where have the hours (days, months, or years) gone? In keeping with the preceding discussion, we can extend the emerging theory by conceptualizing temporal compression as a product of situations in which standard temporal units carry *less* conscious experience than is ordinarily the case. We have identified two factors that lower the density of experience per standard temporal unit: habitual conduct and the loss of memory over time.

Habitual Conduct. The writings of Mead and Dewey imply that the volume of conscious experience is lowest when the individual pursues habitual conduct. Ashcraft (1989, pp. 67-68) and other cognitive psychologists refer to the subjective side of habitual conduct as "automaticity" or "automatic processing." This involves:

. . . mental processes that seem to occur without any conscious awareness or involvement. For skilled readers, one such automatic process is the identification of words. You don't have to decide consciously to identify a word you see printed on the page in front of you—in fact, you . . . can't avoid becoming aware of its meaning as an automatic by-product of perceiving it. . . .

Habitual conduct enables the individual to act on the basis of automatic processing, but as we saw with protracted duration, problematic situations "capture attentional resources," because the individual "must revert back to more conscious control . . . under unusual circumstances" (Ashcraft 1989, p. 68).⁹ Habitual conduct and automatic processing play an important role in temporal compression, although these concepts have not been used in research on the perception of time.

If the passage of time is perceived to slow (protracted duration) when the density of experience per standard temporal unit is greater than usual, then the passage of time should be perceived to have quickened (temporal compression) when the density of experience per standard temporal unit is less than usual. This is exactly what transpires with habitual conduct and automatic processing because the individual is not directing his or her activity with conscious attention to the details of experience. But why do some busy intervals seem to pass slowly while, in retrospect, other busy intervals seem to have passed quickly? Because there are two kinds of busy intervals: problematic complexity and routine complexity. With problematic complexity, the situated challenge demands that increased attentional resources be brought to bear on difficult circumstances. Protracted duration is the result. With routine complexity, the familiar task at hand requires that less than normal attentional resources be brought to bear on habitual circumstances. Temporal compression is the result.

Memory. The second element that generates the sensation of temporal compression is the loss of memory over time, and this is the more common of the two. Habitual conduct and automatic processing are most noticeable in our short-term memory of the near-past (i.e., the last few minutes or hours), but forgetting is more evident in our long-term memory of the distant past (i.e., the last few days or months). Each individual's biography differs, yet nearly everyone notes how the past seems to have gone by quickly. The homogeneity with which time erodes memory is reflected in the uniformity with which we perceive the passage of time: all of us must contend with the fact that time begins to erode memory almost as soon as events have transpired.¹⁰ The loss of memories over time reduces the quantity of experience that was carried by each standard unit of temporality. Thus the past is constantly contracting in our memories, and the speed at which it seems to have transpired quickens as each quantum of experience is forgotten. The passage of time should be perceived to have quickened when standard temporal units carry less experience than is ordinarily the case. Clearly the effect of forgetting fits the emerging theory. The past is perceived to have passed quickly, and is perceived to have passed at an increasing rate, as loss of memory erodes remembered experience per standard temporal unit.

We can complete our formal model of the perception of time by specifying five sequential factors that produce the sensation of temporal compression: (1) the individual is pursuing habitual conduct; (2) the individual has a low degree of emotional concern for understanding the situation; (3) there is low cognitive involvement with self and situation; (4) there is abnormally low stimulus complexity brought on by the absence of need for attention to self and situation; (5) this results in a lower than normal density of experience per standard temporal unit. As a variation on the foregoing, we must also note that most remembered intervals seem to have passed quickly, and seem to have passed increasingly quickly, as the episodic memory of those intervals erodes over time.

Hypotheses

In earlier studies, the concepts protracted duration and synchronicity were generated inductively through the use of qualitative methods (Flaherty 1987b, 1991, 1992). Those components of the theory are already grounded in empirical materials. We have extended the theory to include temporal compression by identifying two factors that should reduce the density of experience per standard temporal unit: habitual conduct and the loss of memory over time. These concepts are logical extensions of the theory, but they are, as yet, untried against empirical materials. Moreover, in contrast to previous research, those components of the theory representing temporal compression have deductive and quantitative implications that lend themselves to straightforward statistical tests.¹¹ Thus, we have derived two hypotheses concerning memory and temporal compression.

First, we hypothesized that time would be perceived as having passed more quickly the further back one is asked to remember. If the loss of memory erodes the density of remembered experience per standard temporal unit, then last year should be perceived as having passed more quickly than last month, and last month should be perceived as having passed more quickly than yesterday.

Second, we hypothesized that, on average, subjects would not report protracted duration if we asked them how they perceived time to have passed yesterday, last month, and last year. Again, if the loss of memory erodes the density of remembered experience, we should find that the average response is at least 3.0 on a scale where 1 = Very Slowly, 2 = Slowly, 3 = Normally, 4 = Quickly, and 5 = Very Quickly.

Neither of our hypotheses address automatic processing because empirical examination of that concept requires methods that are quite different from those used to examine the loss of memory over time. In cognitive psychology, the operational definition of automatic processing involves interference designs. Subjects are said to engage in automatic processing when their performance of a primary task is not degraded by simultaneous performance of a secondary task which has been shown to demand attentional resources. Hence, automatic processing does not lend itself to direct measure of recollection by pencil-and-paper instruments because it is a concept that refers to activity one pursues with little or no conscious involvement, and there is, consequently, little or nothing to remember.

METHODS

Sample

The age of our subjects was an important consideration. First, there was the possibility that the hypothesized relationship between memory and the perception of time might be conditioned by the subject's age. Second, we anticipated that age might have its own effect on the perception of time. Fortunately, there were three undergraduate programs on our campus, each of them serving a very different constituency in terms of age. Our subjects were 366 students drawn from courses in those three programs. The first subgroup (N = 122) consisted of traditional students enrolled in the residential program. Their mean age was 19.8, with 46.8 percent male and 53.2 percent female. The second subgroup (N = 122) consisted of nontraditional students enrolled in the continuing education program. Their mean age was 38.4, with 42.6 percent male and 57.4 percent female. The third subgroup (N = 122) consisted of students enrolled in the Elderhostel program which brings older people to campus for brief noncredit courses. Their mean age was 71.2, with 38.3 percent male and 61.7 percent female. We selected courses with similar enrollments, and accepted only the necessary number of volunteers, thereby generating an equal number of subjects in each of three subgroups: young, middle-aged, and elderly.¹²

Measurement

In measuring our subjects' perception of the passage of time, we used three Likert-type scales where 1 = Very Slowly, 2 = Slowly, 3 = Normally, 4 = Quickly, and 5 = Very Quickly. We measured the effects of memory by asking the subjects to consider three different periods of their lives: yesterday, last month, and last year. Our data were gathered during the first week of March, 1990. Subjects were instructed to define the phrase "last month" as February of 1990. Subjects were instructed to define the phrase "last year" as 1989. The questionnaire asked our subjects to take a few moments and think about yesterday. They were asked to think about the things they did and the things they experienced. Then they were asked to select the number most accurately indicating how time seemed to have passed yesterday. This same format was used to measure their perception of how time seemed to have passed last month and last year. We hypothesized that our subjects would remember less of their experiences last year than of last month, and less of their experiences last month than of yesterday.¹³

Design

The dependent variable is the subject's perception of the passage of time, and it consists of the subject's selections of one number from each of the three Likert-type scales. There

are two independent variables: (1) the subject's age (young, middle-aged, or elderly); and (2) the subject's memory of his or her experiences yesterday, last month, and last year. Each of the 366 subjects was in one of three age groups, and each subject contributed three of the 1098 scores on the Likert-type scales. The subject's age is a between-groups factor, and the subject's memory of yesterday, last month, and last year is a repeated-measures or within-subjects factor. Thus we used a two-factor mixed design for the analysis of variance (Collyer and Enns 1987). We tested the main effects of age and memory as well as the possibility of interaction effects using the MANOVA program from SPSS (1988). In addition, we examined the differences between pairs of means using two-tailed protected *t* tests—uncorrelated for the between-groups factor, correlated for the within-groups factor.

RESULTS

Table 1 presents a summary of the analysis of variance. The results show strong support for our hypotheses. Both of the expected main effects are statistically significant. Clearly, the subject's perception of the passage of time is affected by the subject's memory of his or her experiences yesterday, last month, and last year. Just as clearly, the subject's age (young, middle-aged, or elderly) is a factor shaping his or her perception of the passage of time. In addition, Table 1 shows that there is no evidence of interaction between the two factors of age and memory.

Table 2 presents the means and standard deviations for each subgroup in response to our three questions concerning the perceived passage of time. This table allows us to examine differences among the means across categories of the independent variables, thereby enabling us to give a more detailed analysis of the two main effects.

The Effects of Memory

In accord with the theory concerning temporal compression, subjects perceived time to have passed more quickly the further back in time they were asked to remember. We had hypothesized that the means for the perception of time yesterday, last month, and last year would be in reverse rank-order to their objective length. Table 2 shows that, as expected, the mean for yesterday is lower than the mean for last month, and the mean for last month is lower than the mean for last year in the full sample as well as all three age groups. This, despite the fact that, from the objective standpoint of standard temporal units, yesterday is

Table 1
Analysis of Variance for Temporal Compression

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	Probability
Between Subjects					
Age	12.60	2	6.30	5.74	.004
Error	398.14	363	1.10		
Within Subjects					
Memory	107.66	2	53.83	94.38	.000
Age × Memory	.92	4	.23	.40	.806
Error	414.08	726	.57		
Total	933.40	1097			

approximately one-thirtieth of last month, and last month is approximately one-twelfth of last year. Twelve *t* tests are possible for differences between pairs of means: yesterday by last month, yesterday by last year, and last month by last year for three age groups and the full sample. All twelve *t* tests are statistically significant with $p < .008$ in each case.

The theory asserts that the experience of protracted duration is a response to subjective involvement in unusual circumstances. By definition, such episodes are rare, and the memory of them erodes as time passes. Subjects who wanted to characterize their perception of time yesterday, last month, or last year in terms of protracted duration would have selected a 1 (Very Slowly) or a 2 (Slowly) from the Likert-type scales. Therefore, we hypothesized that none of the means for the three scales would be lower than 3.0. Table 2 confirms our prediction. In fact, subjects selected a 1 or a 2 for only 8.4 percent of their 1098 responses: 52 times for yesterday, 26 times for last month, and 14 times for last year. Each of the latter two frequencies is roughly one half the size of the preceding one. Furthermore, the descending order of these frequencies highlights the way in which memory affects the perception of time.

The Effects of Age

Our findings with respect to age were somewhat serendipitous. While we anticipated that age might have a direct effect, we did not expect it to be so strong and systematic. The means for the middle-aged subgroup are higher than the means for the other two age groups in each of the three time periods. This indicates that the middle-aged subgroup consistently perceives time to have passed more quickly than do the other age groups. There are no statistically significant differences between the means of the young and the elderly subgroups; all of the statistically significant differences are found when contrasting the middle-aged subgroup with one of the other two age groups.

Looking first at the means for yesterday, we find that the mean for the middle-aged subgroup is significantly different than that of the young ($p = .052$) as well as that of the elderly ($p = .013$). Similarly, when we examine the means for last month, we find that the mean for the middle-aged subgroup is significantly different than that of the young ($p = .011$) as well as that of the elderly ($p = .027$). It is only in the contrasts for last year that the differences between the means for the middle-aged and the means for

Table 2
Means and Standard Deviations of Responses to Questions on Perceived Passage of Time by Age of Respondent

	Yesterday		Last Month		Last Year	
	Mean ^a	SD	Mean	SD	Mean	SD
Young (N = 122)	3.402	.888	3.836	.965	4.131	.953
Middle-Aged (N = 122)	3.631	.947	4.115	.718	4.328	.673
Elderly (N = 122)	3.344	.851	3.885	.883	4.189	.846
Full Sample (N = 366)	3.459	.902	3.945	.868	4.216	.834

^a1 = Very Slowly, 5 = Very Quickly.

the other two subgroups are not quite significant ($p = .064$ for the young and $p = .156$ for the elderly).

In computing the F value for the main effects of age, the MANOVA program creates an index for the perception of time by adding the subject's scores on the three scales (yesterday, last month, and last year). This index serves as the dependent variable in a one-way analysis of variance, and the program computes a mean for this index within each of the three age groups (young, middle-aged, and elderly). The differences among the means for the three age groups become even more distinct when this index is used as the basis for the protected t tests. Again, there is no significant difference between the means for the young and the elderly ($p = .838$). Moreover, as before, the mean for the middle-aged subgroup is significantly different than that of the young ($p = .002$) and that of the elderly ($p = .004$).

We suspect that the age structure of our sample serves as an indirect indicator of variation in the degree of habitual conduct which characterizes different stages in the life cycle.¹⁴ Certainly there is considerable evidence supporting this interpretation. Ryff (1985, p. 105) observes that middle-aged people experience greater routine complexity in their daily lives than do the young or elderly. Her data dovetail with those of Robinson (1990, p. 33) who finds that "it is adults aged 35 to 54 who are most likely to report feeling rushed." Cohler (1982, p. 221) notes that, with adulthood, one usually acquires "a complex role portfolio . . . including marriage, parenthood, and work." In contrast, research by the Carnegie Corporation of New York (1992, p. 28) shows that approximately "40 percent of adolescents' waking hours are discretionary—not committed to other activities (such as eating, school, homework, chores, or working for pay)." At the other end of the age spectrum, the elderly must contend with what Rosow (1974, p. 9) calls "role loss" due to departure of their children as well as their own illness, retirement, and widowhood. Given the logic of our theory, if middle-aged people engage in more habitual conduct, then we should expect them to perceive time as having passed more quickly. Still, this is a post hoc interpretation, and verification of that portion of the theory concerning habitual conduct must await a more direct examination of its effects.

In sum, the effects of memory on the perception of time seem to be more general than do the effects of age. While age generates temporal compression only among the middle-aged, memory generates temporal compression among all age groups.¹⁵

DISCUSSION

Collins (1989, p. 2) has argued that Mead "developed a sociological theory of mind," albeit one that is in need of revision and further development. To that end, Collins (1989, p. 18) has proposed a theory of "interaction ritual chains" which extends Mead's model by elaborating on the latter's simplistic view of role-taking:

One might say there is a continuum from tentative and ambiguous role-taking at one end, to completely certain role-taking at the other. A key ingredient of ritual interaction is that the role-taking is at the high certainty end of this continuum.

Implicit in this statement is the assumption that the individual will need to devote more or less attentional resources to interaction depending on the degree to which the immediate situation is problematic.

This assumption is, as we have seen, just as fundamental for Dewey as it is for Mead. These forerunners of symbolic interactionism tell us that there is variation in the volume of subjective experience, and that this variation reflects variation in the nature of one's circumstances. The phenomenologists—Heidegger, Husserl, Schutz—direct our analysis to internal time consciousness, and they demonstrate that temporality varies across different realms of being. From Goffman's microstructuralism we learn that subjective involvement with self and situation is conditioned by social conventions. According to the ethnomethodologists, Garfinkel and Cicourel, these social conventions constitute background expectancies enacted in largely tacit fashion through interpretive procedures. In short, our theoretical model integrates elements of symbolic interactionism, phenomenology, microstructuralism, and ethnomethodology. These writings serve as the foundation for a theory that explains variation in the perceived passage of time. All manner of objections can be raised concerning our syncretic approach to what are, after all, apples and oranges. But where those concerned with classification see divergence, those seeking discovery see convergence and a platform for continued development. Thus, we do not view these writings as incompatible texts, but rather as disparate stepping stones which, when properly aligned, allow us to climb a little higher and see a little further.

A theory that is meant to account for variation in the perceived passage of time must take into consideration the interplay of different levels of consciousness. The emerging theory depicts the density of conscious experience as a crucial element conditioning one's perception of the passage of time. In effect, we have argued that protracted duration occurs when conscious information processing is high, synchronicity occurs when conscious information processing is moderate, and temporal compression occurs when conscious information processing is low. Our theoretical model for the perceived passage of time acknowledges the interplay of different levels of consciousness. The model asserts that the intensity with which one directs attentional resources to the situation at hand varies according to where that situation falls along a continuum from abnormally repetitive activity to abnormally problematic activity. Variation in the nature of the social situation, and its implications for self, govern variation in the level of conscious information processing. In turn, variation in the level of conscious information processing is reflected by the density of experience per standard temporal unit. Ultimately, it is the density of experience per standard temporal unit that determines variation in the perception of time.

With this theoretical model, we are in a position to subsume, at a higher level of abstraction, more particular observations concerning the perceived passage of time. For example, Denzin (1984, p. 58) notes that "Intense emotionality appears to stop time." Similarly, Katz (1988, p. 31) contends that rage "magnifies the most minute details" creating the potential for "an endless present." As another example, Charmaz (1991, p. 90) describes "the dragging time of pain and suffering." In each case, these findings can be recognized as specific manifestations of those factors that generate the experience of protracted duration. These empirical statements, then, provide corroboration for a theoretical model that transcends the particulars of this or that research setting, thereby providing us with a broader and deeper understanding of the ways in which subjective and situated processes condition the perception of time.

One component of our theoretical model remains to be examined in light of empirical materials: the postulated relationship between automatic processing and temporal compression. However, in his research on the temporal organization of restaurant kitchens,

Fine (1990) unintentionally corroborates this part of our model and points the way toward one direction for future research. Fine's study makes it clear that chefs experience two kinds of dinner rush. On some nights, everything goes smoothly and the work is habitual. The chefs report that they cook in an unthinking manner (automatic processing), and those nights seem to pass quickly (temporal compression).¹⁶ On other nights, things go awry and the work is problematic. Their difficulties demand great amounts of attentional resources, and those nights seem to pass slowly (protracted duration). Thus, Fine's study indicates the promise of replication which could confirm the postulated relationship between automatic processing and temporal compression.

Wiley (1989, p. 79) elaborates on the work of Collins by proposing conceptualization of "intra-personal ritual" which functions for the sake of "intra-psychic solidarity." His proposal points to another direction for future research. As it stands, our theoretical model is limited to analysis of how the situation and one's response to the situation condition the perceived passage of time. Hochschild (1979) has demonstrated that emotional experience is not simply a response to the situation at hand, but rather is the result of ritual effort on the part of the self to promote or suppress a certain emotional experience. By analogy, we anticipate that there are temporality rules, and that individuals engage in ritual time work for reasons of intrasubjective and interpersonal solidarity. The emerging theory implicates the micro-management of involvement with self and situation. Further investigation could extend our understanding of the ways in which individuals manipulate their perception of time so as to foster or inhibit a particular temporal experience. Moreover, such research could lead to a richer conception of human subjectivity that integrates the effects of agency and context.

Finally, another direction for future research is suggested by Maines (1989, p. 117) where he states "that despite the great differences in cultural time logics and the substance of time-consciousness . . . various cultures have much in common when it comes to temporality." Does our theoretical model for variation in the perceived passage of time have cross-cultural validity? This question can only be addressed in light of empirical materials that are drawn from cultures very different from our own—especially cultures that are not organized on the basis of clocks or even calendars as we know them. Our data on this issue are, as yet, anecdotal and provisional, but what little we have is encouraging. For example, when a wedding separates two sworn sisters in rural China (Yao 1992, p. 20) one writes to the other of her sorrow:

Elder Sister being gone three whole days
Feels like years.

There is, then, important work to be done, and it holds the promise of expanding the horizon of our knowledge concerning human subjectivity.

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NOTES

1. Elsewhere, Dewey (1895, p. 27) states that emotion is provoked when "the conditions for mere habit are denied."

2. Denzin (1988, p. 75) provides justification for the change in emphasis: "Consciousness is the factual starting point of an interpretive theory of experience in the world."

3. Mead's (1938, p. 35) own reservations notwithstanding, we concur with Denzin's (1985, p. 224) argument that "the main tenets of symbolic interactionist thought . . . are compatible with . . . phenomenology."

4. Schutz (1962, p. 230) extends this idea when he argues that each "finite province of meaning" is characterized by "a specific time-perspective."

5. From Husserl's (1928/1964, p. 52) standpoint, each moment perceived as the present draws behind itself "a comet's tail of retentions."

6. Heightened self-consciousness is the crucial linkage between situations characterized by high or low levels of embedded activity. Seemingly "empty" intervals are nothing of the sort; as Mead and Dewey teach us, they are in fact filled with cognitive and emotional responses to one's predicament.

7. More specifically, the activity is not so familiar that it is habitual or so novel that it is cognitively challenging, and there is neither too much nor too little embedded activity.

8. Goffman (1974, p. 117) notes that convention sets limits on one's involvement with self and situation: "it is often understood that although a particular degree of involvement is preferred, considerable variation in intensity is acceptable, boredom marking one boundary and 'overinvolvement' the other."

9. This is in keeping with Goffman's (1963, p. 2) observation that "routines of social intercourse in established settings allow us to deal with anticipated others without special attention or thought." In *Frame Analysis*, he (1974, p. 345) adds that, for the most part, an individual's involvement with matters at hand "is deep only when there is sudden trouble to avoid."

10. As time goes by, there is little or no deterioration in semantic memory (knowledge) or procedural memory (technique). However, episodic memory concerns the details of social interaction in terms of specific events or experiences, and, generally speaking, this type of memory erodes with the passage of time (Ashcraft 1989, p. 241).

11. And, by using such tests, we ground the overall theory in multiple methods or triangulation (Denzin 1989).

12. Thus, it is not a simple random sample from a known sampling frame. However, Henkel (1976, p. 85) points out that "our data can be thought of as a random sample from some hypothetical universe composed of data . . . like those at hand." As is typically the case with procedures of this sort (Henkel 1976, p. 86), we assume that our statistical tests address the following question: "if such a population were to exist, could sampling error account for any differences between the expected and observed value of the statistic?"

13. The word "less" refers to the total volume (i.e., number) of experiences per standard temporal unit.

14. As Maines (1983b, p. 186) reminds us, there are "patterns of life events in relation to age." It follows that the density of experience per standard temporal unit is also structured by "age norms."

15. We found no evidence that perception of the passage of time varies by gender.

16. It is interesting to note that Fine's (1990, pp. 108-109) subjects repeatedly use variations on the word "automatic" as they try to describe their reactions to routine complexity.

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Sociologists have been rather reluctant to address postmodernism seriously. The challenges it poses to their discipline (Brown 1991; 1992; 1993; Appel 1996). In part, this is because of the complexity of the nature and implications of postmodern social theory. In part, it is because the ordinary lay sociology, or at least the sociology of the social sciences, is at a sign of or cure for the malaise that many believe is plaguing the "social sciences" (Wiley 1981) is postmodernism.

Concerned with the tasks associated with deconstruction, or the articulation of a different sociology? Does the postmodernist critique of the history of the discipline, or does it constitute a rack of ideas?

Chomsky's "Inequality, Foundationalism, and Sociological Theory" asks questions. The author has written a provocative article that suggests that much of what currently passes as sociological theory is not only not sociology, it is not even a growing discipline. It is a critique of the virtues of deconstructing much of that part of an otherwise uncharacteristic of theoretical traditions and the ways in which social scientists manipulate an argument and the notion of theory. (Chomsky 1997, p. 200). Deconstruction, however, is not a method, it is rather a view of a means to an end, that can bring the social sciences back to their postmodernist social theory that would be a more useful and politically relevant sociology, as they were articulated for the first time in C. Wright Mills's formulation of the "sociological imagination."

The thesis is based on the central premise that the pursuit of the social sciences is inevitably a legitimizing strategy, and is defined by a restrictive vision which leads to a repression of the articulation of more radical, or perhaps to abandon foundationalism in the interest of advancing a postmodernist sociology.

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