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TEMPORAL ORIENTATION: TOWARD A DEFINITION OF HUMAN POTENTIAL THROUGH AN APPLICATION OF LASZLOVIAN CONCEPTS.

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GRADUATE COLLEGE

TEMPORAL ORIENTATION:
TOWARD A DEFINITION OF HUMAN POTENTIAL
THROUGH AN APPLICATION OF LASZLOVIAN CONCEPTS

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

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BY

BRINDA KAYE WHITE

Norman, Oklahoma

1978

TEMPORAL ORIENTATION:

TOWARD A DEFINITION OF HUMAN POTENTIAL

THROUGH AN APPLICATION OF LASZLOVIAN CONCEPTS

APPROVED BY

Tyany Pinkus Dewey

Herbert R. Hengst

John D. Pullins

Avraham Scherman

DISSERTATION COMMITTEE

ABSTRACT OF DISSERTATION

TEMPORAL ORIENTATION:

TOWARD A DEFINITION OF HUMAN POTENTIAL

THROUGH AN APPLICATION OF LASZLOVIAN CONCEPTS

BY: BRINDA KAYE WHITE

MAJOR PROFESSOR: MARY EVELYN DEWEY, PH.D.

Self-fulfillment, according to Ervin Laszlo, "is the actualization of potentials inherent in all of us." Since "we are not entirely different," "we can talk of the syndrome of human potentials." This study attempted to define the actualization of human potentials by a temporal definition of optimum functioning. It involved the development of an empirically assessable definition of the functioning of the individual in terms of temporal orientation by using the general systems theory construct of information-flow, as explicated by Ervin Laszlo, as the conceptual base. Past-orientation was defined as manipulative self-stabilization on the sensory level. Present-orientation was defined as adaptive self-organization on the sensory level. Information-flow on the meta-sensory level provided the basis for future-orientation. Using Laszlo's explication of the states of cognitive systems

with which value correlates, future-orientation was determined to be of optimal value and thus termed optimum functioning. Behavioral indicators of a past-oriented person, a present-oriented person, and a future-oriented person, based on the temporal definition of functioning were generated. The following characteristics to which these indicators point and instruments that measure these characteristics were determined: concrete/abstract thinking--Abstract Reasoning Test of the Differential Aptitude Tests, intelligence--Quick Word Test, creativity--Remote Associates Test, dogmatism--Rokeach's Dogmatism Scale, intolerance of ambiguity--Intolerance of Ambiguity Scale, and "prefers familiar/seeks new experience"--semantic differential technique assessing meaning of concept "change." These instruments, defined in this study as the Temporal Functioning Index, along with the Personal Orientation Inventory were administered to seventy individuals who were selected to maximize differences in age, educational background, socioeconomic level, and present affiliation with an institution of post-secondary education.

The data were analyzed using factor analysis, multiple linear regression, and stepwise regression. Factor analysis of scores on the Temporal Functioning Index yielded an ability factor and a closed-mindedness factor. Ability and closedmindedness were determined also to be underlying constructs of the temporal definition of functioning indicating that the Temporal Functioning Index has construct validity. The criterion used to determine the concurrent validity of the Temporal Functioning Index was the Personal Orientation Inventory, the most

widely used and best validated measure of self-actualization. Multiple linear regression yielded a Multiple R of 0.5448, significant at the 0.00098 level. Multiple R^2, 0.2968, is the proportion of the variance of the dependent variable: scores on the Personal Orientation Inventory, which is accounted for by the independent variables: scores on the instruments of the Temporal Functioning Index. Stepwise regression determined the amount of variance of the dependent variable that each independent variable contributed. Rokeach's Dogmatism Scale, the only variable to enter, had a Multiple R^2 of 0.2026. However, that the Personal Orientation Inventory was not developed directly from Abraham Maslow's definition of self-actualization limited its use as a criterion in this study.

A comparison of Maslow's definition of self-actualization with the temporal definition of optimum functioning indicated that the temporal definition of optimum functioning is a more sound and a more assessable definition of human potential. Recommendations for further study provided suggestions for further empirical study necessary to validate the temporal definition of optimum functioning.

Differences in functioning defined in terms of temporal orientation encompass and account for the manifold differences of humankind. Future-orientation, optimum functioning, is that mode of living which is characteristic of individuals living fully in today's complex world. Because, according to Ervin Laszlo, the application of general systems theory "to the analysis of human experience . . . constitutes systems philosophy," this study provides the basis for Temporal Orientation: Framework for a Philosophy of Human Potential.

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TEMPORAL ORIENTATION: TOWARD A DEFINITION OF HUMAN POTENTIAL THROUGH AN APPLICATION OF LASZLOVIAN CONCEPTS

CHAPTER I

NATURE OF STUDY

Introduction

Self-fulfillment, according to Ervin Laszlo, "is the actualization of potentials inherent in all of us. It is the pattern of what can be, traced in actuality." Fulfillment for the individual "is the actualization of any number and any combination of different potentials, according to the temperament and conscious desires of the individual." "We are not entirely different," however; "we can talk of the syndrome of human potentials, out of which the paths of fulfillment of individual persons are selected." This individual fulfillment "takes place in the framework of the human situation, specified as the syndrome of conditions that defines the existential reality of the given person."[1] What is the potential of the human in today's society? As an answer to this

[1]Ervin Laszlo, The Systems View of the World: The Natural Philosophy of the New Developments in the Sciences (New York: George Braziller, 1972): 109-110.

question, this study involves the development of an empirically assessable definition of the functioning of the individual in terms of temporal orientation by using the general systems theory construct of information-flow, as explicated by Laszlo, as the conceptual base and the elucidation of optimum functioning via Laszlovian concepts.

Statement of Problem

The problem of this study involves the specification of temporally defined modes of functioning using the general systems theory construct of information-flow as the conceptual base; the designation, via Laszlovian concepts, of future-orientation as optimum functioning; and the comparison of the definition of optimum functioning with Abraham Maslow's definition of self-actualization. A Temporal Functioning Index, utilizing original instrumentation as well as certain related established measures, is used to assess functioning temporally defined. Self-actualization is assessed by the Personal Orientation Inventory. It is hypothesized that an assessment of functioning temporally defined involves a complex of measurable factors among which apparently are concrete/abstract thinking, intelligence, creativity, dogmatism, and intolerance of ambiguity. It is also hypothesized that the definition of optimum functioning is similar to Maslow's definition of self-actualization. This study is a beginning step in both the application of general systems theory to determine its heuristic value and the development of an instrument to measure optimum functioning.

Significance of Study

This study is significant for several reasons. (1) It provides

an empirically assessable definition. According to Sutherland,

> the psychologies of Skinner and Maslow are predicated on virtually antonymical premises, and the premises of both theoretical systems are equally empirically unvalidated. As such, they tend to constitute rhetorical rather than scientific systems, per se, and tend to be defended evangelically rather than nomothetically.[1]

As an empirically assessable definition, this Temporal Definition of Optimum Functioning may be empirically validated or invalidated, which is "the ultimate arbiter" of its "scientific acceptability."[2] (2) By providing a temporal definition of functioning much of the incoherence characterizing research on the human experience of time, as indicated in the literature, can be avoided. (3) This definition of functioning is a process definition in that it assesses operational modes rather than knowledge or content. In this sense it relates to the statement made by Litchfield and Sattler in their discussion of the existential notion of intentional time as a dimension of psychological health that content "as a whole, is of much lesser significance than process in conceptualizing psychological health."[3] As a process definition, then, this definition of functioning deals with the individual's mode of living. (4) This study deals with the individual as a system possessing the invariant properties of systems. (5) Optimum functioning is defined in terms of temporal orientation. Man is time-bound. As the literature indicates, through the centuries he has sought an understanding of time.

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[1]John W. Sutherland, A General Systems Philosophy for the Social and Behavioral Sciences (New York: George Braziller, 1973), p. 31.

[2]Ibid., p. 79.

[3]Peter M. Litchfield and Jerome M. Sattler, "An Hypothesis: The Existential Notion of Intentional Time as a Dimension of Psychological Health," The Journal of General Psychology 79 (October 1968): 270.

Literature dealing with the Psychology of Time, Physiological Time and the Sociology of Time indicates that the experience of time varies from individual to individual. Differences in functioning defined in terms of temporal orientation encompass and account for the manifold differences of humankind. (6) By using the general systems theory construct of information-flow, as explicated by Laszlo, as the conceptual base, this study provides an opportunity to test general systems theory to determine its heuristic value. (7) As the conceptual base, general systems theory provides systems concepts, one of which is information-flow, which "are capable of remaining invariant where others encounter limits of applicability" thus making "it easier to recognize similarities that exist in systems of different types and levels." "For, if the world is intelligibly ordered as a whole, then the more regions of order are disclosed by a theory, the more that theory is divested of the personal bias of the investigator."[1] Use of general systems theory as the conceptual base prevents such bias. (8) With the elucidation of optimum functioning via Laszlovian concepts, experimental research can be conducted to determine what factors promote the optimum functioning of the individual. "For only if we know both where we are and where we want to go can we act purposively in seeing about getting there."[2] These reasons, then, indicate the significance of the study.

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[1]Ervin Laszlo, Introduction to Systems Philosophy: Toward a New Paradigm of Contemporary Thought, with a Foreword by Ludwig von Bertalanffy (New York: Harper & Row, 1972), p. 10.

[2]Laszlo, The Systems View of the World, p. 117.

CHAPTER II

RELATED LITERATURE

The literature on time is extensive and multifarious. Aspects of the subject are dealt with in a variety of ways ranging from experimental and observational studies to exploratory and speculative writing. Because of its diversity this literature is organized for discussion purposes into the following categories: Philosophy of Time, Psychology of Time, Physiological Time and Sociology of Time.

Philosophy of Time

Through the centuries man has been concerned with the question, "What is time?" Genesis tells us, "In the beginning God created the heavens and the earth." In the development of biblical thought time gave meaning and significance to the events of the world. In contrast, in its beginning, the Western philosophic tradition, as interpreted by Sherover,[1] did not approve of the idea of a beginning. Time, as an aspect of the world, was itself seen as timeless. "The world was conceived as an ongoing process without beginning or end and time was the mark of the rhythm or pattern of the continuity of change within it."

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[1]The author is relying primarily on Charles M. Sherover's interpretation in this discussion of the philosophy of time.

Heraclitus of Ephesus, a pre-Socratic Greek, recognized this change and sought to understand it in terms of an unchanging Law (Logos) which guided all change within the unity of the world. As the biblical and Greek traditions came together in the latter days of the Roman Empire to form the common core of Western intellectual tradition, their similarities and differences provided the source of the dialectic which followed, particularly that dealing with time.[1]

Plato, Aristotle, Plotinus and Augustine each thought of time "as dependent upon a supervening timeless reality" and sought its meaning "in some aspect of this transient world." Each "tied time to sequential order in nature, to visible movement and perception of change." Each discussed its nature in terms of its connection with motion and argued which of the two is ontologically prior.[2] For Plato (427-347 B.C.), time was the "moving image of eternity."[3] It was not eternity but an order of being which came into existence with the ordering of the universe. It was the principle of rational order in the world.[4] Aristotle (384-322 B.C.) defined time as the "number of motion in respect of 'before' and 'after.'"[5] Time was not motion but the

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[1]Charles M. Sherover, The Human Experience of Time: The Development of Its Philosophic Meaning (New York: New York University Press, 1975), 1-7.

[2]Ibid., p. 15.

[3]Plato, Timaeus, trans. Jowett, quoted in Charles M. Sherover, The Human Experience of Time: The Development of Its Philosophic Meaning (New York: New York University Press, 1975), p. 17.

[4]Sherover, The Human Experience of Time, p. 17.

[5]Aristotle, Physics, Book IV, trans. Ross, quoted in Charles M. Sherover, The Human Experience of Time: The Development of Its Philosophic Meaning (New York: New York University Press, 1975), p. 23.

measure of motion.[1] From this physical description of time Aristotle moved to the question of whether time is conceivable apart from mind and soul. This raised the question of the seemingly simultaneous objective and subjective aspects of time which Aristotle avoided.[2] For Plotinus (A.D. 205-270), motion was really the measure of time. Time was both objective and subjective; it was "objective--more primordial than any observable motion or sequence of change--and yet, paradoxically perhaps, grounded on soul as its 'subjective' act." Time was "the form of activity of purposive life" which was directed toward the future for self-fulfillment.[3] Augustine (354-430) viewed time as essentially subjective or psychological with past, present, and future times depending on the mind.[4] His experiential past-present-future perspective was in contrast to Aristotle's ordered sequence of before-and-after. Each of these four classical writers, according to Sherover, gave ontological priority to space rather than time. Each "approached time questions by asking what time is and seeking the answer in terms of its relationship to the measuring of observed change."[5]

During the sixteenth century men in Western Europe began to turn away from the wisdom of the Middle Ages and through investigations

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[1]Sherover, The Human Experience of Time, p. 23.

[2]J. Alexander Gunn, The Problem of Time: An Historical and Critical Study (London: George Allen & Unwin, 1929), p. 25-26.

[3]Sherover, The Human Experience of Time, p. 27-34.

[4]Richard M. Gale, ed., The Philosophy of Time: A Collection of Essays (Garden City, New York: Doubleday & Co., Anchor Books, 1967), p. 5.

[5]Sherover, The Human Experience of Time, p. 34-39.

of the world around them continue once again the long road of scientific discovery where Alexandrian Greeks had left it a thousand years before. As a result, by the end of the seventeenth century scientific knowledge was brought to bear on the minds of the educated classes and by the eighteenth century had become a serious factor in man's beliefs and actions.[1] This scientific knowledge also affected man's concept of time.

The ideas of René Descartes (1596-1650) in the early part of the seventeenth century began a critical phase in the history of philosophy which faced man with questions of a different kind such as "Where do we get this notion of time, and how is it related to our immediate experiences?"[2] Descartes thought of time as a series of separate independent moments patterned after the idea of a sequence of numbers. Duration was "objectively uniform and real" while time was "a human mode of quantifying it in terms of spatial displacement." With minor terminological modifications, Newton adopted, some forty years later, Descartes' distinction between real duration and human modes of sequential description as a first principle of his new physics. John Locke (1632-1704) believed that time as measure is "dependent upon the periodicity of appearances in our minds, not on motion external to our minds." For Locke, duration was "an irreducible line of separable moments alongside of which things transpire." Time, then, became a method of counting these moments and apportioning to each event the

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[1]John Hermann Randall, Jr., The Making of the Modern Mind: A Survey of the Intellectual Background of the Present Age, rev. ed. (Cambridge, Mass.: Houghton Mifflin Co., Riverside Press, 1940), p. 203.

[2]Paul Fraisse, The Psychology of Time, trans. Jennifer Leith (London: Eyre & Spottiswoode, 1963), p. 3.

appropriate number of moment-points. According to Sherover, Locke "effectively moved the quest for the understanding of nature's temporal sequences to a quest for the temporal understanding of the understanding itself, to a quest for the temporal constitution of human experience." Gottfried Wilhelm Leibniz (1646-1716) attacked the Newtonian conception of Absolute Time. He believed that "time and space cannot be absolute; they can have no reality independent of the entities that are related in terms of them." According to Leibniz, then, time was an existential phenomenon "'well-founded' in the sequential ordering of the continuity of one's life experiencing." For Immanuel Kant (1724-1804), time was the prime principle of order as it may be experienced by man. Time and space were real only within experience.[1] Fraisse wrote that Kant "prepared the way for the psychologists by diverting them from the search for a reality 'in itself,' and indicating the origin of the notion of time in the activity of the mind which thinks and relates various changes."[2] Kant believed that only by using concepts that are temporally structured can we make legitimate cognitive claims about the world as we perceive it. According to Sherover, Kant's work "has served as the fulcrum of the continued attempt to understand the nature of time in human experience to our own day."[3] Descartes, Locke, Leibniz, and Kant, then, each contributed to moving our concern from the notion of time itself to our awareness of time in our experience.

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[1]Sherover, The Human Experience of Time, p. 97-121.

[2]Fraisse, The Psychology of Time, p. 5.

[3]Sherover, The Human Experience of Time, p. 97-121.

Sherover's analysis suggests that Hegel, Lotze, Bergson, and Alexander, each in his own way, sought to move "from the nature of human thinking to the world in which and about which one claims to think."[1] Turning "from the introspective method, which had dominated the movement from Descartes to Kant," G. F. W. Hegel (1770-1831) "initiated something of a revival of Aristotelian realism." Time, "tied to motion or change in the world of nature," "developed into the essential principle of a dynamic world order--which, somehow, was to be explained as the expression of a timeless logic incarnate within it." Hegel thought of time as a series of nows in which each now negates previous nows. Time was then a form of Becoming with only the present being truly actual. "The thrust of Hegel's influence," according to Sherover, "has largely been to turn attention away from the timeless eternity he postulated as the ground of being to that experiential becoming which he sought to comprehend." Rudolf Hermann Lotze (1817-1881) saw time as "the human mode of understanding the real relations of the continuity of becoming that <u>is</u> reality." He argued against the idea of an ultimately objective time which contained events. Sherover wrote that in the end Lotze "carried forward the long tradition of subsuming time under some notion of a somehow timeless eternal, if now dynamic, order." Henri Bergson (1859-1941) believed that the question of time was "<u>the</u> essential question of philosophic inquiry." He wrote that a distinction must be made between conceptualized time and lived time.[2] "Real duration is experienced; we learn that time unfolds and, moreover, we are

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[1] Ibid., p. 549-550.

[2] Ibid., p. 157-174.

unable to measure it without converting it into space and without assuming all we know of it to be unfolded."[1] Whereas Bergson "started from the process of experiencing itself," Samuel Alexander (1859-1938) apparently started "from the pervasive characteristics of the world as it is experienced." For Alexander, time and space were inseparable. Not only were time and space "the two forms through which the human mind receives data for understanding," they were "the two discernible ways in which our minds participate in, and reflect, the nature of the data itself" and "the two ways in which the mind receives information and becomes aware of external reality which is so constituted." According to Sherover, "despite important and often brilliant insights" these post-Kantian philosophers left us "with new puzzles" making necessary a more careful preparation for investigation of the question of time.[2]

John Ellis McTaggart, Bertrand Russell, Alfred North Whitehead, and Hans Reichenbach each sought to learn more about the nature of temporal experience by analyzing time concepts. McTaggart (1866-1925) attempted to demonstrate that time is "unreal" by subsuming time "under the sovereignty of a presumably timeless logic." Sometimes an event may be past, present or future depending on its relationship to the person describing it. Events described in this subjective mode he classified as being in "A series." McTaggart believed that these same events could be classified in a tenseless, objective way that

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[1]Henri Bergson, Duration and Simultaneity, trans. Leon Jacobson (Indianapolis, Ind.: Bobbs-Merrill, Co., 1965), p. 62.

[2]Sherover, The Human Experience of Time, p. 174-182.

does not change with time. He called this "B series." After proclaiming "the complete priority of the A series," he subjected it to logical analysis and found that it was "inherently contradictory" because three tense predicates applied to the same event "are logically incompatible with each other." He finally rooted time "as a perceptual illusion of an invariable and non-temporal cosmic order which he termed 'C series.'" Russell (1872-1970), dissenting from McTaggart's thesis, believed that A series is "'merely' psychological and derived" and therefore "B series is fundamental" since "it is readily adaptable to rules of logical consistency and implication."[1] Reichenbach (1891-1953) believed "that the study of time is a problem of physics." The subjective experience of time "cannot give us sufficient information about the time order that connects physical events." "We must turn to physics, if we wish to understand time itself, rather than mere psychological reactions to it."[2] Whitehead (1861-1947) believed that the central problem of philosophic thought was the relationship of particulars to time and space. He pointed out that somehow the past and future intermingle in the experiential present "in a way that cannot be explained in terms of mere sequentiality or serial order." "If Whitehead's thesis of spread-present holds," according to Sherover, "then it would seem that it is experientially primary and that only within its spread can the whole notion of sequence emerge." These analyses of time concepts, then, enable us to understand how the

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[1]Ibid., p. 261-269.

[2]Hans Reichenbach, The Direction of Time, ed. Maria Reichenbach (Berkeley: University of California Press, 1956), p. 8-9.

experiencing of time gives rise to the development of varying concepts as well as increase our understanding of temporal experience.[1]

Albert Einstein (1879-1955) was "the discoverer of cosmic laws that have changed man's conception of physical reality." His theories of Relativity, over and above their scientific importance, have also affected man's philosophical outlook. "Along with absolute space, Einstein discarded the concept of absolute time--of a steady, unvarying, inexorable universal flow, streaming from the infinite past to the infinite future."[2] According to Einstein, "every reference body (or coordinate system) has its own particular time; unless we are told the reference body to which the statement of time refers, there is no meaning in a statement of the time of an event."[3] In order "to describe the phenomena of nature in terms that are consistent for all systems throughout the universe," a scientist "must regard measurements of time and distance as variable quantities."[4] Albert Einstein, then, through his theories of Relativity, has affected the philosophy of time.

The development of pragmatism, a distinctively American contribution to twentieth-century philosophy, gave expression to an American concern with the seriousness of the temporal. "Conceived in the

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[1]Sherover, The Human Experience of Time, p. 269-277.

[2]Lincoln Barnett, The Universe and Dr. Einstein, rev. ed., with a Foreword by Albert Einstein (New York: Bantam Books, 1957), p. 1, 46.

[3]Albert Einstein, quoted in Lincoln Barnett, The Universe and Dr. Einstein, rev. ed., with a Foreword by Albert Einstein (New York: Bantam Books, 1957), p. 53.

[4]Barnett, The Universe and Dr. Einstein, p. 54.

religious ethos of puritanism, it saw real moral significance in present activity as it tried to redeem the past while yet looking to the future for vindication." Each of the prime figures in the development of pragmatism sought to find meaning and truth through examining "experiential time upon which experience is based."[1] Focusing on how we experience time, William James (1842-1910) defined the present as not a "knife-edge, but a saddle-back, with a certain breadth of its own on which we sit perched, and from which we look in two directions into time." He wrote that "the original paragon and prototype of all conceived times is the specious present, the short duration of which we are immediately and incessantly sensible."[2] James believed that our one direct experiential link to the world was time-awareness. According to Sherover, James accomplished "a systematic and empirical examination of just what is involved in the experience of time-awareness." For Charles Sanders Peirce (1839-1914), meaning, significance and rationality could only be understood in terms of the future. By taking "the whole notion of purpose as a fundamental index to human rational behavior," Peirce "made it necessary to rethink the nature of the temporal perspective." From his analysis of Peirce's work, Sherover wrote that what immediately became apparent was "the requisite centrality of temporal considerations in the understanding of human experience." Josiah Royce (1855-1916) believed that conceptual time was needed to understand perceptual time. For Royce, the present was "but the way in which the continuing

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[1]Sherover, The Human Experience of Time, p. 347-348.

[2]William James, The Principles of Psychology, vol. 1, chapt. XV (New York: Henry Holt & Co., 1904), p. 609, 631.

reality of the world and of the self are presented to consciousness" which was, itself, "an interpretive awareness of meaning in patterns of change." Time, then, was "the form of the self." In addition, Royce noted the importance of the social in the understanding and formation of the temporality of experience. Working from Royce, George Santayana (1863-1952) noted that "temporal meaning is not merely an intellectual affair." It is also a matter of the emotions for it is from these, as well as from the will, that individual impulses to action come. John Dewey (1859-1952) took up Peirce's shift to the future as the source of cognitive meaning necessarily tied to action. Sherover's interpretation of Dewey suggests that "if nature is seen as an interacting system of temporally defined individuals, then the meaning of time is the key to the meaning of the individual self as it is to the meaning of the whole." For Dewey, "if time is the form of experience, it is also the form of the experiencer." For James, Peirce, Royce, Santayana, and Dewey, then, "human experience is essentially and pervasively temporal."[1]

The temporal structure of a person's experiential outlook is "a fundamental condition of the nature of his consciousness, of awareness, of his capacities and their limitations." Two distinct methods of studying the structuring of experiential time have developed. The genetic epistemology developed by Jean Piaget (1896-), an eminent Swiss psychologist, "appears to honor man's essential temporality while attempting to understand it" by recording "the progressive development

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[1]Ibid., p. 351-367.

of the concept of time in the time of the child's development." His approach to the study of the development of time concepts in children was a result of his belief in the importance of subjecting philosophic issues which contain psychological and social factors "to experimental examination instead of merely speculative consideration." For Piaget, the idea of time "is itself an intellectual construction based upon our reflective abstractions from the coordination of actions in dealing with varying velocities." Distinguishing "'empirical' time, which is the passive observation of sequences of events," from "'rational' time, which is the intellectual grasping of time conceptually," Piaget found that awareness of time in conceptual form "emerges in the seven- or eight-year-old child by abstraction from the concrete unity of his lived experience." The phenomenological examination of the structuring of experiential time is concerned more with the internal structuring of the developed adult's temporal outlook than the stages of development of the concept of time. The phenomenological method was developed by Edmund Husserl (1859-1938) "to reveal the essential experiential structuring of ways in which we . . . help to form our own experiences."[1] Merleau-Ponty, in a summary of Husserl's study, referred to "the field of the presence as the primary experience in which time and its dimensions make their appearance." Here the future slides into the present and on into the past. Husserl used the terms protentions and retentions for the intentionalities which anchor a person to his environment. The person's perceptual field itself "draws along in its wake its own

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[1]Ibid., p. 437-447.

horizon of retentions, and bites into the future with its protentions." "With the arrival of every moment, its predecessor undergoes a change." "When a third moment arrives, the second undergoes a new modification." By adding the symmetrical perspective of protentions, it can be seen that "time is not a line, but a network of intentionalities."[1] Perception, then, "bears the referential intentionalities of our cognitive processes." According to Sherover, Husserl showed "how our experience of time is itself intrinsically structured in temporal terms, how fundamental to human consciousness in its perceptual behavior is its essentially temporal and temporalizing constitution."[2] Genetic epistemology and the phenomenological method, then, are two distinct methods which have developed for studying the structuring of experiential time.

Eugène Minkowski and Martin Heidegger were prominent among those who carried Husserl's time analysis forward. They "succeeded in existentializing phenomenology and thus making it directly relevant to lived experience." Minkowski (1885-), a French phenomenologist, is known for "his pioneering efforts to bring phenomenological and psychiatric studies into contact with each other." Stressing the priority of futurity in the formation of human temporality, he believes the importance of the future is found in activity since activity is a temporal phenomenon oriented toward the future. Minkowski finds significance in death in that "it finitizes our living and enables us to

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[1] M. Merleau-Ponty, Phenomenology of Perception, trans. Colin Smith (New York: Humanities Press, 1962), p. 416-417.

[2] Sherover, The Human Experience of Time, p. 445-451.

live as active beings."[1] Noting that the living present opens "the horizon of the future before us," Minkowski also believes that the living past enters the present as remembrance, as "the past [that] not only has been but is no longer."[2] Heidegger's (1889-) prime argument, according to Sherover, "is that human existence, the nature of the individual self, our conception of history, and our ordinary modes of reckoning with time as with space are all grounded and grounded together in the human mode of organizing its temporal perspectives." Taking "Husserl's analysis of the observational present forward into the analysis of lived duration," Heidegger, rather than focusing on "the 'observer' as paradigmatic," works on the thesis of the individual's involvement in the situations which he defines for himself. "Heidegger points out that the being-structure of an individual's outlook is the ontology fundamental to his structuring of his world." "This is to contrast the traditional use of 'ontology' to describe the being structure of the world as it presumably really is in itself." Heidegger, according to Sherover, "has given us an understanding of how future and past merge into the 'extended' present that is a field and not a point, how we construct our experiences in forward-reaching temporal terms."[3] For Heidegger, "'time' is called the first name of the truth of Being,

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[1]Ibid., p. 439-453.

[2]Eugène Minkowski, Lived Time: Phenomenological and Psychopathological Studies, trans. Nancy Metzel (Evanston, Ill.: Northwestern University Press, 1970), p. 165-167.

[3]Sherover, The Human Experience of Time, p. 455-465.

and this truth is the presence of Being and thus Being itself."[1] "If Heidegger's understanding of the nature of temporality rings true," wrote Sherover, "we have the beginning of an explanation of the integrity of our temporalizing experience and of our present attempt to understand it as well."[2]

The search for an understanding of time continues. As indicated by the literature, throughout history this search not only involved various foci of inquiry but also yielded different conceptions of time. It is clear, however, that the question of time is "not merely a problematic for an esoteric and inherently pedantic conceptual understanding" but rather a "ground question, which accompanies and forms all human concerns."[3]

Psychology of Time

After Immanuel Kant, the problem of time gradually shifted "from the plane of knowledge to that of psychology," from the notion of time to our awareness of time.[4] In this period, according to Ornstein, there was little coherence in empirical and theoretical work. Citing Nichols who, in 1891 in the first review of time in psychology,

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[1]Martin Heidegger, "The Way Back into the Ground of Metaphysics," in Kaufman, ed., Existentialism from Dostoevsky to Sartre, quoted in Charles M. Sherover, The Human Experience of Time: The Development of Its Philosophic Meaning (New York: New York University Press, 1975), p. 465.

[2]Sherover, The Human Experience of Time, p. 465.

[3]Ibid., p. 556-557.

[4]Fraisse, The Psychology of Time, p. 5.

noted "the wide variety of explanations offered for the time-mystery,"[1] Ornstein wrote that incoherence "was to become the leitmotif of many reviews of time."[2]

Development of the Concept of Time

Turning from Kant, who "regarded our idea of time as an invariable mental framework with no evolutionary history," Guyau, in La Genèse de l'Idée de Temps published in 1890, considered the actual development of the concept of time. He "suggested that the idea of time arose when man became conscious of his reactions towards pleasure and pain and of the succession of muscular sensations associated with these reactions." Needs imply the possibility of satisfaction, and "the aggregate of these possibilities leads to our concept of 'the future.'" Guyau believed that "the psychological origin of the concept of time is therefore to be found in the conscious realization of the distinction between desire and satisfaction."[3]

Wallace and Rabin, in reviewing later literature on developmental aspects of the concept of time, noted two major lines of approach: psychoanalytically oriented theorizing and extensive empirical investigation.[4] Psychoanalytic theory tends generally "to stress the

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[1]Herbert Nichols, "The Psychology of Time," American Journal of Psychology 3 (1891): 453-529, cited by Robert E. Ornstein, On the Experience of Time (Middlesex, England: Penguin Books, 1969), p. 16.

[2]Robert E. Ornstein, On the Experience of Time (Middlesex, England: Penguin Books, 1969), p. 16.

[3]G. J. Whitrow, The Natural Philosophy of Time (London: Thomas Nelson & Sons, 1961), p. 51-53.

[4]Melvin Wallace and Albert I. Rabin, "Temporal Experience," Psychological Bulletin 57, 3 (1960): 213-217.

important connection between both feeding and toilet training and psychological development. The child's time development is equated with reality training in contrast to the 'timelessness of the unconsciousness.'"[1] Several empirically oriented studies are compatible with the views of psychoanalytic theorists.[2] For example, Piaget, who was cited earlier, suggests that "the most elementary form of time is found at the sensory-motor level" in such experiences as the waiting period between feedings.[3] Ames, who carried out a detailed study of the development of the sense of time in children, found that "time concepts come into use in a relatively uniform sequence from child to child, and at about the same relative time in the life of every child."[4] Others, also, have investigated the development of time concepts and time perception.[5] Even though there has been some disagreement, the following summary of findings can be drawn:

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[1]J. E. Orme, Time, Experience and Behaviour (New York: American Elsevier Publishing Co., 1969), p. 51.

[2]Wallace and Rabin, "Temporal Experience," p. 215.

[3]Jean Piaget, The Child's Conception of Time, trans. A. J. Pomerans (New York: Basic Books, 1969), p. 255-261.

[4]Louise Bates Ames, "The Development of the Sense of Time in the Young Child," The Journal of Genetic Psychology 68 (1946): 122.

[5]Stephen L. Klineberg, "Changes in Outlook on the Future between Childhood and Adolescence," Journal of Personality and Social Psychology 7, 2 (October 1967): 185-196; David E. Schecter, Martin Symonds, and Isidor Bernstein, "Development of the Concept of Time in Children," The Journal of Nervous and Mental Disease 121, 4 (April 1955): 301-310; Elizabeth J. Smythe and Sanford Goldstone, "The Time Sense: A Normative, Genetic Study of the Development of Time Perception," Perceptual and Motor Skills 7, 1 (March 1957): 49-59; Doris Springer, "Development in Young Children of an Understanding of Time and the Clock," The Journal of Genetic Psychology 80 (1952): 83-96.

> . . . it appears that an individual's concept of time emerges early in childhood and develops gradually. By the time a child is two or three years old, he has acquired a notion, more or less limited, of a past, a present, and a future time, but until the eighth year, the child is primarily concerned with his immediate present. The time concept, with ever widening past and future references, continues to develop through the thirteenth or fourteenth year when the adult concept first emerges. At that time the notion of continuity of time and its relatively accurate estimation are reached.[1]

The concept of time, then, does not develop autonomously but rather concomitantly with the individual's growth and development.

As a person grows older, "a unit of physical time becomes a smaller and smaller fraction of" his total past life. This fosters the illusion that as one grows older "time tends to race by ever more rapidly."[2] Bortner and Hultsch in studies of personal time perspective in adulthood found that people in their 50's thought they had made and would continue to make progress. "By the 60's, the past, present and future were evaluated equally. By the 70's, the past seemed better than the present, and the present seemed better than the future."[3] These differences in personal time perspective during adulthood, Bortner and Hultsch concluded, were "related to age (cohort) rather than cultural change."[4] The concept of time, then, changes throughout the life of the individual.

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[1]Wallace and Rabin, "Temporal Experience," p. 217.

[2]Whitrow, The Natural Philosophy of Time, p. 67.

[3]Rayman W. Bortner and David F. Hultsch, "Personal Time Perspective in Adulthood," Developmental Psychology 7 (1972): 102.

[4]David F. Hultsch and Rayman W. Bortner, "Personal Time Perspective in Adulthood: A Time-Sequential Study," Developmental Psychology 10, 6 (November 1974): 837.

Temporal Experience

The experimental psychology of time began, according to Cohen, "with an attempt by Ernst Mach in 1860 to measure apparent duration in the sphere of auditory experience" and has been occupied almost entirely "with the measurement of apparent duration as such--that is, with how long an interval seems to be with what the clock tells us."[1] Gilliland, Hofeld and Eckstrand;[2] Woodrow;[3] Bindra and Waksberg;[4] and Wallace and Rabin[5] have reviewed a number of experiments on time perception and time estimation. In their review, Wallace and Rabin wrote that "as a result of considerable variation both in definition of concepts and in methodology, the results obtained are contradictory and confusing."[6]

Bindra and Waksberg examined "the problem of the equivalence or lack of equivalence of the different methods and terms." They listed three main methods commonly used in time estimation experiments. In verbal estimation E presents an interval (the standard) and S is asked to estimate verbally its duration (the judgment) in terms of minutes or

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[1] John Cohen, Psychological Time in Health and Disease (Springfield, Ill.: Charles C. Thomas, 1967), p. 13, 40.

[2] A. R. Gilliland, Jerry Hofeld, and Gordon Eckstrand, "Studies in Time Perception," Psychological Bulletin 43 (1946): 162-176.

[3] Herbert Woodrow, "Time Perception," in Handbook of Experimental Psychology, ed. S. S. Stevens (New York: John Wiley & Sons, 1951), p. 1224-1236.

[4] Dalbir Bindra and Hélène Waksberg, "Methods and Terminology in Studies of Time Estimation," Psychological Bulletin 53, 2 (1956): 155-159.

[5] Wallace and Rabin, "Temporal Experience," p. 213-236.

[6] Ibid., p. 217-218.

seconds. In production S is instructed by E to produce an interval (the judgment) of a given duration (the standard) indicated verbally by E. In reproduction E operatively presents an interval (the standard) and then asks S to operatively reproduce an interval (the judgment) of the same duration. Confusion occurs when the results of time estimation experiments are expressed in a number of different ways. Terms used to express results include "over- or underestimation of elapsed time," "the relative speed of the 'internal' and 'external' clocks," and "the relative magnitude of subjective and objective temporal units." Confusion also occurs when similar results are obtained using different methods. For example, "an identical difference may signify faster internal clock in the methods of verbal estimation, slower internal clock in the method of production, and slowing down of the internal clock in the method of reproduction." Thus, "a given difference between standard and judgment may signify quite different underlying events in the different methods" and may be expressed in a number of different ways causing contradictions and confusion.[1]

Woodrow reported on another group of studies on time perception dealing with "introspective descriptions of experiences of single temporal stimuli." Among these were studies dealing with the thresholds of unitary duration, that is, with "the physical time over which stimuli may be spread and yet all be perceived as present." After noting the work of others, Woodrow concluded that the upper limit of the psychological present probably lies between 2.3 and 12.0

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[1]Bindra and Waksberg, "Methods and Terminology in Studies of Time Estimation," p. 155-159.

seconds.[1] The lower limit or threshold, according to Durup and Fessard, for continuous light varies around 0.12 second and for continuous sound varies around 0.01 to 0.05 second.[2] Others have studied the interval at which successive impressions fuse into a single experience. Based on the findings of four investigators Wundt gave the following mean interval values for essentially instantaneous stimuli: sound, 0.002 to 0.016 second; touch, 0.027 second; and light, 0.043 second.[3] Even though these studies deal with experiences of single temporal stimuli rather than with two time intervals, they too study time perception as an isolated phenomenon.

Personality Correlates of Temporal Experience

More recent research in the psychology of time has been directed toward the investigation of "the relationships between temporal experience and other personality phenomena, normal and abnormal."[4] "Observations of behavior and clinical experience," according to Calabresi and Cohen, "suggest basic features of the personality are reflected in the individual's attitude toward time."[5] Schneider wrote

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[1]Woodrow, "Time Perception," p. 1229-1230.

[2]G. Durup and A. Fessard, "Le Seuil de Perception de Durée dans l'Excitation Visuelle," Année Psychol. 31 (1930): 52-62, quoted in Herbert Woodrow, "Time Perception," in Handbook of Experimental Psychology, ed. S. S. Stevens (New York: John Wiley & Sons, 1951), p. 1230.

[3]W. Wundt, Grundzüge der physiologischen Psychologie, 5th ed., vol. 3 (Leipzig: Wilhelm Engelmann, 1903), p. 46, quoted in Herbert Woodrow, "Time Perception," in Handbook of Experimental Psychology, ed. S. S. Stevens (New York: John Wiley & Sons, 1951), p. 1231.

[4]Wallace and Rabin, "Temporal Experience," p. 213.

[5]Renata Calabresi and J. Cohen, "Personality and Time Attitudes," Journal of Abnormal Psychology 73, 5 (October 1968): 431-439.

that "the manner in which a person handles time . . . is very closely linked to the structure of his character."[1] "Interruption in proper psychic functioning," wrote Coheen, "is reflected in . . . alteration or distortion of the time structure. The efficiency of the time apparatus, therefore, becomes an index of the existing efficiency or health of the psychic structure."[2] Even though they involved different experimental designs and terminology, the studies in this section, then, correlated personality variables with temporal experience.

Several studies involved the healthy personality. Getsinger found that subjects who perceived temporal zones as being more interrelated demonstrated "greater self-actualization" and evaluated "the present time mode more positively" than those who perceived temporal zones as being more discrete.[3] Yonge also studied the relationship between time experiences and self-actualization.[4] Lessing found that whenever significant relationships were found between length of future time perspective (FTP) and other variables, "the longer FTP was always associated with more favorable psychosocial attributes (e.g., higher intelligence, higher academic achievement, higher socioeconomic status

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[1]Daniel E. Schneider, "Time-Space and the Growth of the Sense of Reality: A Contribution to the Psychophysiology of the Dream," The Psychoanalytic Review 35, 3 (July 1948): 250.

[2]Jack J. Coheen, "Disturbances in Time Discrimination in Organic Brain Disease," The Journal of Nervous and Mental Disease 112 (1950): 124.

[3]Stephen H. Getsinger, "Temporal Relatedness: Personality and Behavioral Correlates," Journal of Personality Assessment 39, 4 (August 1975): 405.

[4]George D. Yonge, "Time Experiences, Self-Actualizing Values, and Creativity," Journal of Personality Assessment 39, 6 (December 1975): 601-606.

and healthier personality test scores)." The relationships, however, "were not stable across differing indices of length of FTP."[1]

Other studies involved the cognitive and affective dimensions of personality. Kahn found that time orientation in children was "significantly related to cognitive organization and to a lesser degree to perceptual organization." On one measure of time orientation, time perception (judgment of intervals), "overestimation was associated with low organization and underestimation with high organization." On the other measure of time orientation, time span (future time perspective), "projecting into the future was related to high organization."[2] Bauer and Gillies found that a momentary experience of success or failure in a laboratory task by persons of global-passive cognitive style "appeared to have, at least temporarily, a diffuse effect on the global-passive Ss' affective view of the future." "The global-passive success group viewed the future as more hopeful than the global-passive failure group." Therefore, they suggested that "the global-passive S's affective view of the future may be a partial function of his present experience of success and failure."[3] In another study Bauer and Gillies pointed out the "need for a measure of intensity that reflects a person's affective

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[1]Elise E. Lessing, "Demographic, Developmental, and Personality Correlates of Length of Future Time Perspective (FTP)," Journal of Personality 36, 2 (June 1968): 199-200.

[2]Paul Kahn, "Time Orientation and Perceptual and Cognitive Organization," Perceptual and Motor Skills 23, 3 (December 1966): 1059.

[3]Rudolph Bauer and John Gillies, "Cognitive Style and Influence of Success and Failure on Future Time-Perspective," Perceptual and Motor Skills 34, 1 (February 1972): 79-82.

view of the future."[1] Wohlford tested the hypotheses that "positive affect tends to lengthen protension" and "negative affect tends to shorten protension." His hypotheses were supported by personal association measure data but not by TAT data.[2]

Knapp, in a factor analysis of responses to a questionnaire dealing with the management of time and with attitudes toward time, identified a time-servant vs. time-master factor and a time efficient vs. time oblivious factor. The time servant-master factor, he discovered, related significantly to aesthetic preference for Scottish tartan designs with "time-driven" persons preferring somber blue and green designs while brighter designs of predominantly red and yellow were preferred by individuals with reported ease in the management of time.[3]

Several researchers studied temporal correlates of achievement and anxiety. Cottle found that the achiever seemed "to accept the idea of the unknown and to regard the shaping of the future as a challenge." The anxious person, however, seemed "to turn away from the future" and preferred "to be involved with familiar people, events, and symbols of the past."[4] Achievement was related "to perceiving an

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[1]Rudolph Bauer and John Gillies, "Measure of the Affective Dimensions of Future Time Perspective," Perceptual and Motor Skills 34, 1 (February 1972): 181.

[2]Paul Wohlford, "Extension of Personal Time, Affective States, and Expectation of Personal Death," Journal of Personality and Social Psychology 3, 5 (May 1966): 559.

[3]Robert H. Knapp, "Attitudes toward Time and Aesthetic Choice," The Journal of Social Psychology 56 (February 1962): 86-87.

[4]Thomas J. Cottle, Perceiving Time: A Psychological Investigation with Men and Women (New York: John Wiley & Sons, 1976), p. 160-161.

'integration' between past, present, and future" while anxiety functioned "in decreasing the sense of relatedness between time zones."[1] Teahan also found that high academic achievers "tend to look mostly to the future."[2] In research involving the relation of anxiety to psychological perception of time, Kraus et al. discovered that normal Ss appear to "respond to stress by emphasizing present time." They "tentatively suggested that this behavior may serve as a coping or problem-solving function."[3] Knapp and Garbutt found that the preferred selection of those metaphors, from a list of metaphors describing time, "embodying images of swift, directional movement correlated positively with high academic achievement motivation; conversely, static, or slow-moving images correlated negatively."[4] A study by Epley and Ricks of prospective and retrospective time spans using the TAT showed that prospective span was related "to high academic achievement, low anxiety, and empathetic involvement with others. Retrospective span was shown to relate to narcissism, sensitive imaginativeness and openness to experience."[5] In a study of the efficiency of doctoral students in

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[1]Thomas J. Cottle, "Temporal Correlates of the Achievement Value and Manifest Anxiety," Journal of Consulting and Clinical Psychology 33, 5 (October 1969): 541.

[2]John E. Teahan, "Future Time Perspective, Optimism, and Academic Achievement," Journal of Abnormal and Social Psychology 57, 3 (November 1958): 380.

[3]Herbert H. Krauss et al., "Anxiety and Temporal Perspective among Normals in a Stressful Life Situation," Psychological Reports 21, 3 (December 1967): 721.

[4]Robert H. Knapp and John T. Garbutt, "Time Imagery and the Achievement Motive," Journal of Personality 26, 3 (September 1958): 434.

[5]David Epley and David R. Ricks, "Foresight and Hindsight in the TAT," Journal of Projective Techniques 27, 1 (March 1963): 57.

promoting their progress toward dissertation completion and recall by these students of past experiences, Goldrich found that efficiency was "related to a median degree of avowed recall and inefficiency to the extremes of recall." "The efficient group and the median recall group introduced future referents significantly more often on the TAT than did their peers."[1]

In research involving the preference for delayed reward and future time perspective, Klineberg found that "the capacity to prefer a larger reward, delayed for a short and specified time, over a smaller reward available immediately" is related to "the degree to which images of personal future events in general are endowed with a sense of reality" and "the degree of everyday preoccupation with future rather than present events."[2]

Thayer et al. in a study dealing with locus of control, found that reported time experiences and orientations of external control subjects were "significantly more harrassed and pressured, discontinuous and undirected, procrastinating and inefficient, and inconsistent and changeable than those of internal control subjects."[3] Platt and Eisenman found that subjects with internal control reinforcement "typically had more active, fuller time perspective, were better adjusted and less

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[1]Judith March Goldrich, "A Study in Time Orientation: The Relation between Memory for Past Experience and Orientation to the Future," Journal of Personality and Social Psychology 6, 2 (1967): 216.

[2]Stephen L. Klineberg, "Future Time Perspective and the Preference for Delayed Reward," Journal of Personality and Social Psychology 8, 3 (March 1968): 253.

[3]Stephen Thayer et al., "The Relationship between Locus of Control and Temporal Experience," The Journal of Genetic Psychology 126 (June 1975): 275.

anxious."[1]

In distinguishing between open and closed belief systems, Rokeach and Restle indicated that "a narrow, future-oriented time perspective, rather than a more balanced conception of past, present, and immediate future in relation to each other, is . . . seen to be a defining characteristic of closed systems."[2] Cottle, in research on dogmatism, found that "for men and women, dogmatism relates to anxiety about time, a reduction in the present's and future's importance and emphasis on the past."[3]

King and Manaster in a study of marijuana use found that "a significant relationship exists between marijuana use and past orientation."[4] Roos and Albers found that "alcoholics differed from normals in having shorter future extension, perceiving the past as more pleasant and experiencing the present as more unpleasant."[5]

Several studies involved the unhealthy personality. May, Angel and Ellenberger noted a "close interrelationship between the

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[1]Jerome J. Platt and Russell Eisenman, "Internal-External Control of Reinforcement, Time Perspective, Adjustment, and Anxiety," The Journal of General Psychology 79 (July 1968): 127.

[2]Milton Rokeach and Frank Restle, "A Fundamental Distinction between Open and Closed Systems," in The Open and Closed Mind: Investigations into the Nature of Belief Systems and Personality Systems, Milton Rokeach (New York: Basic Books, 1960), p. 64.

[3]Thomas J. Cottle, "Temporal Correlates of Dogmatism," Journal of Consulting and Clinical Psychology 36, 1 (1971): 70.

[4]Marc R. King and Guy J. Manaster, "Time Perspective Correlates of Collegiate Marijuana Use," Journal of Consulting and Clinical Psychology 43, 1 (February 1975): 99.

[5]Philip Roos and Robert Albers, "Performance of Alcoholics and Normals on a Measure of Temporal Orientation," Journal of Clinical Psychology 21, 1 (January 1965): 36.

disturbance of the time function and neurotic symptoms. Repression and other processes of the blocking off of awareness are in essence methods of ensuring that the usual relation of past to present will not obtain."[1] Goldfarb et al. found that "use of temporal concepts in abstract reasoning and estimates of unfilled intervals" differentiated alcoholics and psychiatric patients from normal controls. The psychiatric patients did more poorly than the controls on the Abstract Reasoning task and drew shorter lines on the Interval Estimate-Line task.[2] As a result of work with schizophrenics, Minkowski learned that they had "a very profound dislocation of the phenomenon of time, with a prevalence of the past."[3] On the basis of his study, Wallace suggested that "future time perspective, in its extension and coherence aspects, is influenced by the schizophrenic process to such an extent that both the length of the future time span and the organization of its contents are significantly reduced for a sample of schizophrenic patients as compared to a group of normal controls."[4] Foulks and Webb, however, found that "although temporal orientation was disturbed in schizophrenic Ss, this disturbance was less (more nearly similar

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[1]Rollo May, Ernest Angel, and Henri F. Ellenberger, ed., Existence: A New Dimension in Psychiatry and Psychology (New York: Basic Books, 1958), p. 68.

[2]Stephen Goldfarb et al., "Time Perception in Alcoholics and Other Psychiatric Patients," The Journal of Genetic Psychology 125 (December 1974): 315-318.

[3]Minkowski, Lived Time, p. 284.

[4]Melvin Wallace, "Future Time Perspective in Schizophrenia," Journal of Abnormal and Social Psychology 52, 2 (March 1956): 245.

to normal Ss) than occurred in alcoholics and depressed Ss."[1] According to Braley and Freed, results of their study "amply confirm those speculations and few empirical data characterizing psychiatric patients as markedly deviant in a future temporal orientation."[2] DuBois suggested that "time agnosia may be an outstanding symptom in the psychoses and to a lesser degree in the neuroses where it may operate as one of the manifestations of personality disorder."[3] Therefore, according to Schilder, "by analyzing the psychology of time we gain insight into the way the mind is working."[4]

These studies, then, correlated personality variables with temporal experience. However, as also noted by Wallace and Rabin in their review of such research, "variability in experimental design and terminology make it virtually impossible to compare various findings, or to draw definite conclusions of a general nature from them."[5]

"The interest of modern psychology in the experience of time . . . dates back to the last century."[6] With the work of Guyau and

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[1]Jimmy D. Foulks and James T. Webb, "Temporal Orientation and Diagnostic Groups," Journal of Clinical Psychology 26, 2 (April 1970): 159.

[2]Loy S. Braley and Norman H. Freed, "Modes of Temporal Orientation and Psychopathology," Journal of Consulting and Clinical Psychology 36, 1 (1971): 37.

[3]Franklin S. DuBois, "The Sense of Time and Its Relation to Psychiatric Illness," The American Journal of Psychiatry 111, 1 (July 1954): 49.

[4]Paul Schilder, "Psychopathology of Time," The Journal of Nervous and Mental Disease 83 (1936): 544-545.

[5]Wallace and Rabin, "Temporal Experience," p. 223.

[6]Ibid., p. 213.

later empirical studies, the concept of time was found to develop concomitantly with the individual's growth and development. Early research dealing with the accuracy with which time is perceived is confusing due to considerable variation in definition of concepts and methodology. More recent research has involved the study of the relationship of temporal experience to personality factors. Generally, this research supports the idea that basic features of the personality are reflected in the individual's experience of time. However, modern research is still faced with the problems of variability in experimental design and terminology making it difficult to draw conclusions of a general nature. Incoherence, then, is still the leitmotif of studies of the experience of time.

Physiological Time

Physiological time differs from psychological time in that psychological time is influenced primarily by conscious factors, such as mental attitude, whereas physiological time is influenced primarily by physical (bodily) factors. Physiological time differs from physical time in that physiological time "is essentially an inner time associated with a region of space inhabited by living cells which are relatively isolated from the rest of the universe." The response of these cells to such changes as the accumulation of waste occurring inside this region controls physiological time.[1]

Physiological Locus of Time Sense

Although man's time sense has generally not been associated

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[1]Whitrow, The Natural Philosophy of Time, p. 67-68.

with any particular body organ, Henri Piéron and others have suggested that "man's estimation of time probably depends mainly on central nervous processes, in particular on cerebral rhythm."[1] William Gooddy wrote that "the nervous system provides both the anatomical structure and the physiological activity essential for clock mechanisms, and may be regarded as a clock."[2] As a result of research dealing with the alpha-rhythm of the brain, Norbert Wiener discovered a narrow band of frequencies in the centre of the alpha-rhythm, which he maintained constitutes a clock with a precision of about three minutes per day.[3] However, Jasper and Shagass, found that the alpha-rhythm of the brain was not related to conscious estimates of time.[4] In addition, Coheen wrote that the structure of temporal organization "is not localizable to some one portion of the brain." Instead "involving as it does memory, attention, reasoning, awareness, and association," it "is inextricably interwoven with the entire psychic organization."[5] Gardner, in research on the thyroid gland's influence on time consciousness, found that "the evidence at hand is against the view that bodily rhythms of pulse or metabolism as influenced by the thyroid gland from [sic] a basis of the

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[1]Ibid., p. 68.

[2]William Gooddy, "Time and the Nervous System--The Brain as a Clock," The Lancet 1, 7031 (May 31, 1958): 1141.

[3]Whitrow, The Natural Philosophy of Time, p. 69-71.

[4]Herbert Jasper and Charles Shagass, "Conscious Time Judgments Related to Conditioned Time Intervals and Voluntary Control of the Alpha Rhythm," Journal of Experimental Psychology 28 (1941): 507.

[5]Coheen, "Disturbances in Time Discrimination in Organic Brain Disease," p. 124.

temporal judgments."[1] Research, then, does not conclusively specify a physiological locus of time sense.

Physiological Factors Affecting Time Sense

Several writers have pointed to the association between physiological factors and time sense. It would appear that time sense, as used by these writers, is synonymous with psychological time. In his investigation of "the chemical basis of our sense of time," Hudson Hoagland found that time seemed to pass more slowly for his wife who was ill with influenza. In experiments he tested the hypothesis that "this might be due to an elevated temperature from fever since, if some form of chemical reaction acted as a timing mechanism, the increased body temperature should make this 'chemical clock' run faster." Time as judged by objective clocks would then "appear to go by more slowly." After further study he concluded that psychological time "seems to depend directly upon the velocities of certain chemical processes, the psychological and physiological events forming different aspects of the same thing."[2] Bell, in an attempt to replicate Hoagland's study, found "that there may be some influence of increases in body temperature on some aspects of time estimation," but even though it is probably not possible to replicate exactly experimental investigations conducted thirty years earlier by other research workers, "the

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[1]William A. Gardner, "Influence of the Thyroid Gland on the Consciousness of Time," The American Journal of Psychology 47 (1935): 701.

[2]Hudson Hoagland, Pacemakers in Relation to Aspects of Behavior (New York: Macmillan Co., 1935), p. 107-120.

conclusions of the original and present studies must stand to cast doubt on the universality of Hoagland's conclusions and on the utility of the 'chemical clock' concept in the understanding of human time estimation."[1] However, Pfaff found that due to normal circadian variations in body temperature, "Ss produced instructed time intervals faster (method of production) and overestimated the length of presented time intervals (method of estimation) during the afternoon, when their body temperature was highest." According to Pfaff, "these correlations of time judgments with normal circadian temperature variations support Hoagland's conclusion that subjective time judgment depends partly on an internal 'clock' which accelerates when body temperature is raised."[2] Lecomte du Nüoy in studies of the rate of healing of superficial wounds found that "at different ages it takes different lengths of time to accomplish the same amount of work: the cicatrization of one square centimetre of a wound." For example, the time needed for healing was about four times greater at fifty years of age than at ten. Everything, therefore, occurred "as if sidereal time flowed four times faster for a man of fifty than a child of ten."[3] This "gradual slowing down of our physiological processes gives rise to the illusion that, as we grow older, time tends to race by ever more rapidly."[4] Coheen discovered

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[1]C. R. Bell, "Time Estimation and Increases in Body Temperature," Journal of Experimental Psychology 70, 2 (1965): 234.

[2]Donald Pfaff, "Effects of Temperature and Time of Day on Time Judgments," Journal of Experimental Psychology 73, 3 (1968): 419.

[3]P. Lecomte du Noüy, Biological Time, with a Foreword by Alexis Carrel (New York: Macmillan Co., 1937), p. 145-177.

[4]Whitrow, The Natural Philosophy of Time, p. 67.

that "in diffuse cortical disease, with its attendant deterioration, there are manifest varying degrees of time agnosia, at least roughly proportional to the degree of deterioration."[1] Schaefer and Gilliland attempted to "determine a physical basis for the estimation of short time intervals." The physiological processes selected for study were pulse rate, heart work, breathing rate, breathing work and blood pressure changes. They found that there was "seemingly no definite relationship between the physiological factors studied and the amount of direction of error in the estimation of short intervals of time." They concluded, therefore, that "the problem of time perception stands as a challenge to further investigation."[2] An analysis of the above studies, then, indicates that the relationship between physiological factors and time sense has not yet been clearly determined.

External Factors Affecting Time Sense

External factors can affect physiological time and in turn time sense. Some studies have dealt with the effect of drugs on time sense. For example, Fischer found that psychotomimetic central stimulants such as LSD, mescaline, and psilocybin, produce an overestimation of time in contrast to tranquilizers of the phenothiazine type, such as chlorpromazine, which produce an underestimation of time.[3]

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[1]Coheen, "Disturbances in Time Discrimination in Organic Brain Disease," p. 124.

[2]Vernon G. Schaefer and A. R. Gilliland, "The Relation of Time Estimation to Certain Physiological Changes," Journal of Experimental Psychology 23 (1938): 546-552.

[3]Roland Fischer, "Biological Time," in The Voices of Time, ed. J. T. Fraser (New York: George Braziller, 1966), p. 364.

Wallace and Rabin[1] and Orme[2] reviewed other research in this area. Wallace and Rabin concluded that "a number of drugs have a distorting effect upon the experience of time," but, "the effects do not appear to be clear-cut or unidirectional in all instances."[3]

Even though research does not conclusively specify a physiological locus of time sense and the relationship between physiological factors and time sense has not been clearly determined, physiological time does affect time sense. Further research is needed before a theoretical framework can be developed to account for the relationship between physiological time and time sense.

Sociology of Time

Sociology, as defined by Georges Gurvitch, a major figure in contemporary sociology, "is a science which studies total social phenomena as a totality of their aspects and their movements, capturing them in a dialectic of microsocial, group and global types, in the process of becoming and disintegrating." "Out of this dynamic conception of sociology, emerges the problem of time in which the life of the social frameworks, total social phenomena and their products, and particularly their structure unfolds." The problem of time, according to Gurvitch, "is absolutely primary to sociology." Gurvitch "defined Social Time as the convergency and divergency of movements of the total

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[1]Wallace and Rabin, "Temporal Experience," p. 213-236.

[2]J. E. Orme, Time, Experience and Behaviour, p. 84-86.

[3]Wallace and Rabin, "Temporal Experience," p. 226.

social phenomena, giving birth to time and elapsing in time."[1] As Sorokin and Merton wrote, "social time expresses the change or movement of social phenomena in terms of other social phenomena taken as points of reference."[2] Gurvitch constructed the following eight different kinds of social time: (1) Enduring Time (2) Deceptive Time (3) Erratic Time (4) Cyclical Time (5) Retarded Time (6) Alternating Time (7) Time pushing forward (8) Explosive Time.[3] Using his theoretical framework for the study of social phenomena, Gurvitch unified these kinds of time into scales or hierarchies and related them to manifestations of sociability, groupings, classes and different types of inclusive societies.[4] His analysis highlights "the great multiplicity of social times, their many possible combinations, and the time scales they form in relation to global societies of different types."[5] It is evident, then, that social time can not be treated as a unity when in fact it is multiple.[6]

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[1]Georges Gurvitch, The Spectrum of Social Time, trans. Myrtle Korenbaum (Dordrecht-Holland: D. Reidel Publishing Co., 1964), p. 11, 30.

[2]Pitirim A. Sorokin and Robert K. Merton, "Social Time: A Methodological and Functional Analysis," The American Journal of Sociology 42, 5 (March 1937): 618.

[3]Gurvitch, The Spectrum of Social Time, p. 13-14.

[4]Myrtle Korenbaum, "Translator's Preface," in The Spectrum of Social Time, Georges Gurvitch (Dordrecht-Holland: D. Reidel Publishing Co., 1964), p. XXVI.

[5]Gurvitch, The Spectrum of Social Time, p. 151.

[6]Myrtle Korenbaum, "Translator's Preface," in The Spectrum of Social Time, Georges Gurvitch, p. XXII.

Development of Time Concepts in Primitive Cultures

For primitive people time "is not so much an abstract measure of order as a moment embedded in the whole concrete activity and social life of the tribe."[1] In matters of chronology, primitive man "finds his way not by counting but by referring to the concrete phenomena the recurrence of which in definite succession experience has taught him to expect." For example, a day may be called "a sun" and a night "a sleep." "The hours of the day are denoted by the concrete phenomena of the twilight, dawn, sunrise, etc., and the equally concrete position of the sun or the occupations of the day." Even though phenomena may extend over periods of varying length, due to their regular occurrence primitive man may come to "feel the necessity of counting these periods." "The only natural phenomenon which from the very beginning meets the demands" of continuous time-reckoning "is the moon." As a period of fixed length, the lunar month is divisible into parts of equal length, days, each of which is distinguishable from its predecessor and successor. A month is distinguishable by the natural conditions which occur in it. By using empirical intercalation (that is, the insertion of a month into a calendar as is done in the Hindu calendar) "the series of months could be kept in fair agreement with the phases of nature, and also, especially when the phases of the stars were used as an aid, with the solar year."[2] This, then, describes the development

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[1] Heinz Werner, Comparative Psychology of Mental Development, rev. ed. (New York: International Universities Press, 1948), p. 182.

[2] Martin P. Nilsson, Primitive Time-Reckoning: A Study in the Origins and First Development of the Art of Counting Time among the Primitive and Early Culture Peoples (Lund: C. W. K. Gleerup, 1920), p. 355-362.

of time concepts in primitive cultures. In general though, the primitive temporal concepts lack "that central focus, that continuity and consistency in counting which mark a fully abstract, quantitatively determined temporal system."[1]

Cultural Differences in Temporal Frames of Reference

According to Hallowell, man's "temporal concepts are always culturally constituted." "Like other cultural phenomena, temporal frames of reference vary profoundly from society to society."[2] Kluckhohn and Strodtbeck in illustrating variations in temporal focus wrote that Spanish-Americans "place the Present time alternative in first-order position." They pay little attention to the past and "regard the Future as both vague and unpredictable." "Historical China was a society which gave first-order value preference to the Past time orientation." Such things as ancestor worship, a strong family tradition, and the attitude that nothing new ever happened in the present or would happen in the future because it all had happened before in the distant past were expressions of this preference. "Many modern European countries," according to Kluckhohn and Strodtbeck, "also have strong leanings to a Past orientation." England, to the extent that it has been dominated by an aristocracy and tradition, has shown a preference for the past. "Americans, more strongly than most peoples of the world, place an emphasis on the Future--a Future which is anticipated

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[1] Werner, Comparative Psychology of Mental Development, p. 185.

[2] A. Irving Hallowell, "Temporal Orientation in Western Civilization and in a Preliterate Society," American Anthropologist 39 (1937): 647.

to be 'bigger and better.'" The past is not considered good just because it is past, and middle-class Americans are seldom content with the present.[1] In her study of ego extension, that is, "cultural definitions, according to which the ego is conceived to extend beyond the organism to the surrounding world," Smith found that "the Western ego may extend into the future--at any rate it is importantly involved in future events." The Hindu ego extends "infinitely into both past and future--with a definite understanding of the beginning in the past and the eventual end of the individual soul." "Chinese egos start their extensions not from remote time but from the present, flowing into both past and future, with individuality becoming more and more tenuous."[2] Polak, in an historical analysis of images of the future in Western culture, found "the positive image of the future at work in every instance of the flowering of a culture, and weakened images of the future as a primary factor in the decay of cultures." He also found that "the potential strength of a culture could be measured by measuring the intensity and energy of its images of the future."[3] In a study of disadvantaged subcultures, Indian and Mexican Americans, Shannon found that "Anglo-Americans depicted more extended futures and shorter presents than did Indian and Mexican Americans." According to

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[1]Florence Rockwood Kluckhohn and Fred L. Strodtbeck, Variations in Value Orientations (Evanston, Ill.: Row, Peterson & Co., 1961), p. 13-15.

[2]Marian W. Smith, "Different Cultural Concepts of Past, Present, and Future: A Study of Ego Extension," Psychiatry 15, 4 (November 1952): 395-400.

[3]Fred Polak, The Image of the Future, trans. Elise Boulding (San Francisco: Jossey-Bass, 1973), p. 300.

Shannon, this difference may be due to a realization by members of the disadvantaged subcultures that they are not likely to realize the substantial reward in the future that is expected by the more affluent majority culture.[1] Even though temporal frames of reference differ from culture to culture, from their research Greene and Roberts have concluded, however, that a cultural group should not be stereotyped "as emphasizing one temporal perspective over another" since this "can only serve to mask and cloud significant differences in values and orientations."[2]

Socialization in Western Culture

Frank, in 1939, was the first to present a detailed consideration of the concept of time perspective.[3] He wrote that cultural time perspectives are imposed on the individual during socialization.[4] Cottle and Pleck suggested that at least two temporal socialization periods exist. The child during the first socialization period "learns that others possess personal histories some of which have been experienced long before the time of his birth." Around puberty a second major period occurs when the adolescent is required "to expand his orientation to and definition of time, according to social system

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[1]Lael Shannon, "Development of Time Perspective in Three Cultural Groups: A Cultural Difference or an Expectancy Interpretation," Developmental Psychology 11, 1 (January 1975): 114-115.

[2]Alan H. Roberts and Joel E. Greene, "Cross-Cultural Study of Relationships among Four Dimensions of Time Perspective," Perceptual and Motor Skills 33, 1 (August 1971): 172.

[3]Wallace and Rabin, "Temporal Experience," p. 227.

[4]Lawrence K. Frank, "Time Perspectives," Journal of Social Philosophy 4, 4 (July 1939): 293-312.

requirements, traditions, customs, or simply the appropriate means and ends of action."[1] Each culture, then, "presents its own time perspective and emphasizes the necessity of patterning human conduct in its focus."[2]

Western culture, specifically that of America, is composed of different groups. Each group influences in its own way the socialization of its members, and in turn their time perspectives. The following three areas illustrating the effects of differences in socialization on individuals' time perspectives may be studied: juvenile delinquency, social class differences, and sex role differences.

In research involving juvenile delinquents and non-delinquents, Stein, Sarbin and Kulik found that "the more socialized sample showed a more extended personal future time perspective than the less socialized Ss." They concluded that these results indicate that "the extent of development and differentiation of the personal temporal structure is related to socialization outcomes."[3] Davids, Kidder and Reich in their study of juvenile delinquents found that there "was a significant difference between time orientation in delinquent and

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[1]Thomas J. Cottle and Joseph H. Pleck, "Linear Estimations of Temporal Extension: The Effect of Age, Sex, and Social Class," Journal of Projective Techniques and Personality Assessment 33, 1 (February 1969): 92.

[2]Frank, "Time Perspectives," p. 299.

[3]Kenneth B. Stein, Theodore R. Sarbin, and James A. Kulik, "Future Time Perspective: Its Relation to the Socialization Process and the Delinquent Role," Journal of Consulting and Clinical Psychology 32, 3 (June 1968): 262.

normal children."[1] Barndt and Johnson found also that delinquent boys "produce stories with significantly shorter time spans than the control boys."[2] Thus, most research indicates a difference in time perspective between juvenile delinquents and non-delinquents.

LeShan hypothesized that "there are different personal time orientations in different social classes." He wrote that data "from child-rearing practices in the various classes of American society" and "from the greater time span of the action in stories told by middle-class children as compared with those told by lower-class children" tend to confirm this hypothesis.[3] After evaluating LeShan's study, Greene and Roberts wrote that "it appears that LeShan's findings are equivocal and should not be interpreted as clearly showing a difference in time perspective between middle and lower class children."[4] Judson and Tuttle also concluded that "our results provide no support for LeShan's hypothesis, but our techniques may be inadequate."[5] Kendall and Sibley wrote that their research supported LeShan's finding

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[1]Anthony Davids, Catherine Kidder, and Melvyn Reich, "Time Orientation in Male and Female Juvenile Delinquents," Journal of Abnormal and Social Psychology 64, 3 (1962): 240.

[2]Robert J. Barndt and Donald M. Johnson, "Time Orientation in Delinquents," Journal of Abnormal and Social Psychology 51, 2 (September 1955): 345.

[3]Lawrence LeShan, "Time Orientation and Social Class," Journal of Abnormal and Social Psychology 47 (1952): 592.

[4]Joel E. Greene and Alan H. Roberts, "Time Orientation and Social Class: A Correction," Journal of Abnormal and Social Psychology 62, 1 (1961): 141.

[5]Abe J. Judson and Cynthia E. Tuttle, "Time Perspective and Social Class," Perceptual and Motor Skills 23, 3 (December 1966): 1074.

that middle-class children's stories cover a longer time span, but "analysis of the results indicated that time span may have been an artifact of story length."[1] To determine class-linked differences in social time perspective, O'Rand and Ellis compared a sample of college freshmen with largely middle class backgrounds to a sample of Job Corpsmen with lower class backgrounds. They found that "lower-class youth in the Job Corps have a more circumscribed notion of future time than youth from the middle class and their outlook on the future is less systematically ordered." As concluded by O'Rand and Ellis, "studies providing the most consistent evidence of class-linked differences in temporal perspectives tend to be rich in substantive detail but lacking in methodological rigor." "Those studies attempting to offer more precise evidence often turn up inconsistent results, partially because the methodology employed is inadequate for the task at hand."[2]

Cottle, in an investigation of how people perceive time, found that "society, through the imposition of social roles, influences the way men and women perceive time." "Men consider expectations of future achievement to be more important than personal achievements experienced in the present," whereas "women tend to experience immediate gratification from their present efforts and work." "Social roles, in other words, demand that men learn how to deal with the future and women with the present."[3]

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[1]Martha B. Kendall and Ralph F. Sibley, "Social Class Differences in Time Orientation: Artifact?" The Journal of Social Psychology 82 (December 1970): 190.

[2]Angela O'Rand and Robert A. Ellis, "Social Class and Social Time Perspective," Social Forces 53, 1 (September 1974): 53.

[3]Cottle, Perceiving Time, p. 80, 183.

Socialization, then, affects an individual's time perspective. Due to differences in socialization in culture, individuals acquire different time perspectives, but for the most part this socialization enables individuals to live together as a part of the same culture. Thus, as stated by Frank, "it has been the great office of culture . . . to provide the major time perspective of conduct."[1]

As has been indicated, "social life always takes place in divergent and often contradictory manifestations of social time."[2] From the development of time concepts in primitive cultures through the imposition by more developed cultures of their time perspectives on their individual members during socialization, societies have sought to unify the plurality of their social time. An understanding of the multiple manifestations of social time as well as of the different ways in which each society attempts to unify the plurality of its social time contributes significantly to an understanding of the society itself.

Implications from the Literature for this Research

As the literature indicates, man has sought an understanding of time for centuries. This search has ranged from speculative consideration of the nature of time to empirical studies of the individual's experience of time. Since human experience is temporally constituted, an understanding of the human experience of time is necessary for an understanding of human experience.

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[1] Frank, "Time Perspectives," p. 299.

[2] Gurvitch, The Spectrum of Social Time, p. 13.

Research on the human experience of time, taken as a whole, lacks coherence. It has been characterized by intra-disciplinary problems of imprecise terminology, varied methodology, and inadequate theoretical underpinnings. Conceptual entanglements have also caused confusion; a good example is time perspective which has been comprehensively analyzed by Clifton.[1] The fragmentation of research efforts also prevents coherence across disciplines. As a result of these intra- and inter-disciplinary problems, results of research on the human experience of time have not been conducive to broad generalizations. It is from this point that the present research begins.

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[1]Audrienne Kay Clifton, "A Theory of Time Perspective and a Test of Crucial Hypotheses" (Ph.D. dissertation, The University of Iowa, 1971).

CHAPTER III

METHODOLOGY

As the literature indicates, individuals differ in their experience of time. They also differ in their functioning within time. As a basis for research on human functioning within time, the following Temporal Definition of Functioning was developed. The general systems theory construct of information-flow, as explicated by Ervin Laszlo, was used as the conceptual base. Systems concepts used in general systems theory "permit a more adequate interpretation of a greater range of phenomena in a more consistent and unitary manner than any other."[1] Therefore, use of the general systems theory construct of information-flow as the conceptual base for a Temporal Definition of Functioning enables an elucidation of the manifold differences of humankind.

Temporal Definition of Functioning

A fundamental characteristic of systems is that they "can be nonreductively treated in reference to invariant constructs."[2] One

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[1] Laszlo, Introduction to Systems Philosophy, p. 15.

[2] Ervin Laszlo, System, Structure, and Experience: Toward a Scientific Theory of Mind (New York: Gordon & Breach Science Publishers, 1969), p. 1.

such system is the "'Cognitive System': a system constituted by mind-events, including perceptions, sensations, feelings, volitions, dispositions, thoughts, memories and imagination--i.e., anything 'present in the mind.'"[1] One such invariant construct is information-flow which Laszlo charts in reference to the human mind as follows:

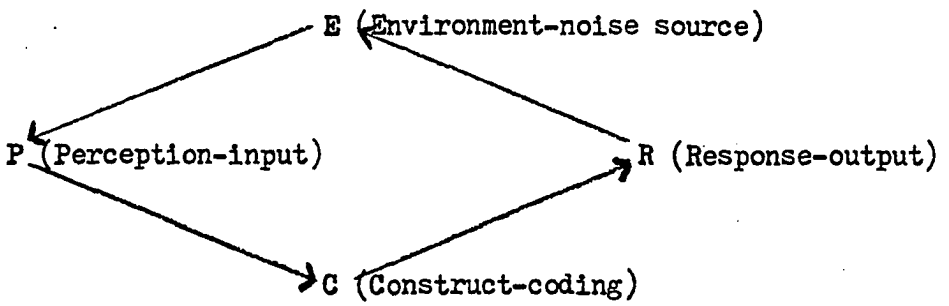

Fig. 1. Information-flow[2]

The environment (E) provides noise "which is potentially reducible to invariant messages." Perception (P), acting "as a filter," admits "some elements of the noise provided by E" and excludes others. "The admitted elements are conduced to R via C." That is, the system's output "occurs as a specifically coordinated response of the relevance" of the filtered information (P) to the coding in C. From response (R), the flow of information goes back to the environment (E) and then once again "through the other elements of the circuit."[3]

"Message for the system consists in the matching of" the coding (C) by the input (P). "Such a 'matched flow' corresponds to the intrinsic standard of the system and . . . represents 'intelligibility'

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[1]Laszlo, Introduction to Systems Philosophy, p. 120.

[2]Laszlo, System, Structure, and Experience, p. 2.

[3]Ibid., p. 2-3.

for it." "The occurrence of this matched flow is merely a matter of chance," however, unless "the system can make provisions for the greater probability of" its occurrence. It does this through self-stabilization and self-organization. To maintain a "matched flow," the system is manipulatively self-stabilizing. It "projects" "its code into the environment." Through negative feedback "the output conditions the input to maximize the chances of the input satisfying the code on the basis of which the output was produced." However, "as a result of changes in E, a code which functioned adequately at one time may cease so to function at another time." To adjust "its codes to the type of input it tends to receive," the system is adaptively self-organizing. "Positive feedback explorations locate new codes" resulting in once again a match between input and codes. In this way "the system continually maps its changing environment in its codes." Thus, through self-stabilization and self-organization, the system "brings about the continual correlation of" its "codes and environment, signalled through the match of input and code."[1]

Several levels of information-flow in human experience exist. These are L_0 Homeostatic Feedback (Physiological Activity), L_1 Sensory Feedback (Perceptual-Cognitive Activity), and L_2 Meta-Sensory Feedback (Cultural Activities).[2] Each level involves both self-stabilization and self-organization as defined above. Each level, however, involves "a particular transformation" of this invariant construct, information-flow, which is "imbedded in their common structure."[3]

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[1]Ibid., p. 3-6. [2]Ibid., p. 29. [3]Ibid., p. 29-77.

"The most basic of the levels of controlled information-flow in the human organism" is homeostatic feedback. Homeostatic feedback is "the self-stabilizing and self-organizing processes of the human (as well as animal) body" which regulate and maintain "its internal states in reference to its incorporated norms." However, "purely homeostatic feedback-stabilization, for the purposes of such complex organisms as the human" is limited since "changes are externally induced." "If precise control over the internal environment is to be maintained," the external environment must be taken into account. "Thus the organism must constitute its regulative processes in view of the fact that it is an environmentally interacting open system." "Homeostatic mechanisms are not surrendered, but become components in exteroceptive, extradermal environment encompassing regulative circuits, making the human being a multilevel feedback controlled system."[1] Integration in an autonomic nervous system of the basic homeostatic regulations of the organism paves the way for the sensory level activity of cognition.[2]

Information-flow on the sensory level provides the basis for past-orientation and present-orientation, two temporally defined modes of functioning. The meta-sensory level, the third level of information-flow, involves the most complex level of human activity. Information-flow on the meta-sensory level provides the basis for future-orientation, the third temporally defined mode of functioning.

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[1]Ibid., p. 29-36.

[2]Laszlo, Introduction to Systems Philosophy, p. 184.

Sensory Self-Stabilization

On the sensory level "we inform ourselves of our environment through our exteroceptive" (relating to stimuli impinging on the organism from outside) senses. These "give us perceptually cognizable information when the signals may be analyzed by, reduced or assimilated to, our Gestalt-systems." Gestalten or "sense-codes" "constitute the norms of perceptual intelligibility." "Our behavior is directed at the environment" so as to provide "us with sensory signals which remain invariant with respect to our already acquired elements of sensory knowledge." "Indeed, we surround ourselves with things that we recognize, and tend to reduce that contingent of our experiential sphere which may be puzzling and unfamiliar."[1] This is manipulative self-stabilization on the sensory level.

Sensory Self-Stabilization as Past-Orientation

Past-orientation, as a mode of temporal functioning, is best defined as manipulative self-stabilization on the sensory level. A person who is primarily past-oriented attempts to build and maintain "a milieu in the image of previous conceptions," thus enabling him "to live in the 'assumed form-world' he evolved through his past experiences." "New sets of events are reinterpreted in the light of previous conceptions and, if possible, manipulated to conformity with those conceptions." "Examples of such manipulations range from the spontaneous positioning of one's head for stereoscopic vision and

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[1]Laszlo, System, Structure, and Experience, p. 38-44.

stereophonic hearing, to highly calculative environment-modifications, such as creating objects and streams of events in the image of one's conceptions." "Behavioral" responses are "activated purposively, with the objective of bringing about those experiences which correspond to the requirements of the system." Puzzles are eliminated, "not by learning to see them as something new and hitherto unknown, but by rearranging the puzzling percept-pattern." In these ways, past-oriented people "build worlds around them which satisfy . . . their conceptions of the world," and in turn, tend to confirm these conceptions.[1] All persons are to some degree past-oriented; however, to be primarily past-oriented in today's society may be dysfunctional.

Sensory Self-Organization

A cognitive system may maintain itself in an adapted state until it must deal with "experiences which remain anomalous with respect to all existing constructs." In such cases "self-stabilization around the steady states of existing cognitions is dysfunctional, since it maintains the system in a state of maladaptation."[2] "Learning signifies a reorganization of the cognitive system to accomodate [sic] the puzzling aspects of the received information." When a perception and a construct do not match, the sensory signals can not be "cognized by means of an intelligible Gestalt." Various ways of fitting the sensory information to such Gestalten are attempted. "The envisaged Gestalten represent the hypotheses." "A new Gestalt can be confirmed by the trial

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[1]Laszlo, Introduction to Systems Philosophy, p. 128.

[2]Ibid., p. 129.

and error process involving a behavioral response and the renewed perception of the effects." When a "new Gestalt is confirmed, the perceptual-cognitive system accepts it as the proper representation of the given environmental state or object." The new Gestalt "is mapped into the codes of the system and henceforth the system functions in reference to it, rather than the previous Gestalt."[1] This is adaptive self-organization on the sensory level.

Sensory Self-Organization as Present-Orientation

A person may remain past-oriented until he must deal with experiences for which he does not yet have adequate constructs which enable him to understand these experiences. When he is faced with new experiences, a person may either remain dysfunctionally past-oriented which results in maladaptation and possible eventual death or become present-oriented, a more desirable mode of temporal functioning, by dealing with new experiences through self-organization. A present-oriented person "seeks, not lessened stimulation, but a match between" his inputs and constructs, that is, "'intelligible' stimulation." When he is faced with something new, a present-oriented person formulates hypotheses in an attempt to understand the new experience. These hypotheses are then tested. When an hypothesis is confirmed, the "something new" "becomes built into the cognitive system as something which is now familiar, and can be utilized, or stored in memory for possible use later."[2] The outcome of this learning for the present-oriented

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[1] Laszlo, System, Structure, and Experience, p. 45.

[2] Laszlo, Introduction to Systems Philosophy, p. 130-131.

person is a greater array of constructs from which the person can choose to match with experiences in his environment in order to understand these experiences. The present-oriented person, then, is better adapted to his environment; however, being primarily present-oriented in today's society may not be sufficient.

Meta-Sensory Self-Stabilization/ Self-Organization

"If ordinary perception has serious limitations as to its intelligibility, maintaining a correspondence between inputs and codes may motivate meta-perceptual cognitive processes. For, the input-code correspondence must be maintained." "A cultural man is one who demands more information concerning his environment than he can obtain by means of assimilating his sensory input to sensory Gestalten." Sensory Gestalten "fail him in two principal regards."[1]

> First, they do not permit him to formulate deductively certain interrelations between his environmental events, thus making it impossible for him to predict their behavior with any semblance of certainty. Second, the familiar Gestalten of perceptual cognition fail to organize into a coherent and intelligible sequence the elements of feeling which permeate his apprehensions of his surroundings.[2]

Cultural man "undertakes 'cultural activities' in function of rendering his experience more intelligible." These cultural activities are science, art and religion. Cultural activities, operating "on the level of autonomous circuits," stabilize and organize themselves isomorphically with the lower circuits. Their codes, though, "are not sensory but meta-sensory 'constructs,' 'intuitions,' 'visions,' and the like."

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[1] Laszlo, System, Structure, and Experience, p. 47, 50.

[2] Ibid., p. 50.

These codes "deal either with relations between Gestalten or the connoted feelings of the latter." Through manipulative self-stabilization and adaptive self-organization, "the circuits of cultural activity (science, art, religion and their various combinations) provide for a more accurate 'projection' of the system's codes into the environment, as well as for the precise 'mapping' of the states of the changing environment in the codes." "Thus culture signifies a more detailed knowledge of the environment in relation to the person and as such has distinct survival value for the species." Cultural circuits, however, "gain autonomy, and cultural man engages in science, art, religion and related activities not merely to live, but also to understand himself and his world. Intelligence is generated by a survival need but becomes self-perpetuating and self-improving in the process." Science, art, and religion, then, "constitute the 'pure' modes of cultural activity, i.e. those which can be conceptually analyzed to distinct circuits of controlled information-flow" on the meta-sensory level.[1]

Meta-Sensory Self-Stabilization/Self-Organization as Future-Orientation

A person may remain present-oriented until he needs more information than can be obtained in present-orientation. With the accelerating rate of change in today's society,[2] more information is needed to keep pace with this change, therefore, a present-orientation may no longer be adequate. To enlarge one's horizons and develop

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[1] Ibid., p. 46-77.

[2] Alvin Toffler, Future Shock (New York: Bantam Books, 1970).

"increasingly wide ranges of progressively more refined meanings,"[1] a future-orientation, the most developed and the most complex mode of temporal functioning, is needed. A future-oriented person, that is, one who operates on the meta-sensory level, is able to understand more about himself and his environment from more points of view. As has been indicated in the discussions of sensory level self-stabilization and self-organization, "gestalts code the meaning of most of the recurrent configurations of percepts in our everyday surroundings." Meta-sensory "scientific constructs code the meaning of many events beyond the range of the directly perceivable world." Meta-sensory aesthetic constructs code the "large segment of experience for which" scientific "constructs are inadequate."[2] The meta-sensory level is the only mode that permits these operations. As a result, a future-oriented person is able to make predictions about his environment as well as give meaning to his environment through an understanding of the feelings it invokes. Religious constructs attempt to give meaning to "realities lying beyond the perceived world of everyday experience."[3] The meta-sensory constructs, then, provide "correlations between inputs from and to the environment in more instances and with more precision" enabling the adapted cognitive system to be "also the more efficiently manipulative one: it can act on its environment in more ways and with more control, than the relatively non-adapted (uninformed or misinformed)

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[1] Laszlo, Introduction to Systems Philosophy, p. 132.

[2] Ibid., p. 224.

[3] Laszlo, System, Structure, and Experience, p. 69-70.

system."[1] Therefore, the future-oriented person need not merely react to his environment but can have some degree of control over it in order to meet his own goals. Thus, due to the "fulfillment of survival functions by readily mastered cognitive processes," relatively autonomous cognitive modes are free to evolve, pursuing goals of their own. As a result, the future-oriented person, even though "he must still perform his existential transactions," is able to pursue his own goals as "an autonomous, self-directed agent."[2]

The above discussion, then, elucidates three temporally defined modes of functioning. These are past-orientation, sensory self-stabilization; present-orientation, sensory self-organization; and future-orientation, meta-sensory self-stabilization/self-organization. These constitute the Temporal Definition of Functioning.

Individual Differences in Functioning

Individuals differ in their temporally defined modes of functioning. Differences in functioning may be due to differences in the mental development of individuals. "Mental development occurs in an ordered, multi-stage sequence, analogously to organic morphogenesis."[3] "Evidence has been gathered for two general stages of mental development, termed 'concrete-associative' and 'abstract-conceptual' thinking." According to Laszlo, transition from one to the other ordinarily occurs between the ages of five and seven. "These stages do not displace one another, but form a hierarchically integrated structure."[4] Therefore,

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[1] Laszlo, Introduction to Systems Philosophy, p. 132.

[2] Ibid., p. 189. [3] Ibid., p. 134. [4] Ibid., p. 201.

until a person reaches the abstract-conceptual level of development, he is unable to function as a future-oriented individual; he can only function as a past or present-oriented person until his development moves beyond, at whatever age, the concrete-associative gestalt-cognitive, that is, sensory level.

Just as "individual differences among the cognitive abilities of mature individuals can be wide, and are accounted for by genetic as well as socio-environmental factors,"[1] so too are differences in functioning temporally defined. Mature individuals may function primarily in any one of the temporal orientations as well as function differently from another individual functioning in the same orientation. The temporal orientation in which an individual functions is determined by the individual's cognitive processes, that is, sensory or meta-sensory level. His cognitive processes determine as well the range of degrees of freedom he may possess. Differences in functioning in the same orientation are due to differences in degrees of freedom possessed by the individual. Freedom "is the same as freedom of choice."[2] The more a person "knows, the more freedom of choice he has, and the more he knows that he knows, the more he can make purposive use of his freedom."[3] Therefore, a person who has more degrees of freedom is able to function at a higher level than an individual in the same temporal orientation who has fewer degrees of freedom; a person with higher level cognitive processes, for example, meta-sensory level, is able to function in a more complex temporal orientation with more degrees of freedom than a

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[1]Ibid., p. 201-202. [2]Ibid., p. 234. [3]Ibid., p. 247.

person who can only function on a lower cognitive level, for example, sensory level.

Involved in the cognitive processes of each temporal orientation are specific constructs. These constructs (sensory level gestalts and meta-sensory level rational, aesthetic and religious constructs) "represent the limits of human cognition, given the kind of perceptions, cognitive organizations and effective output channels at our disposal."[1] According to Laszlo,

> the many forms of human experience do not constitute disjunctive culture-conditioned categories, but a set of universal structures which transcends individual and cultural differences and relativities, and accommodates, as sub-classes, the many varieties of cognitive patterns as environment-mappings and constructions of natural-cognitive systems on the specifically human level of nature's inclusive hierarchy.[2]

The constructs, sensory level gestalts and meta-sensory level rational, aesthetic and religious constructs, then, are "universally human in principle but variously evolved in different real individuals."[3] Therefore, the above specifications of temporally defined modes of functioning, based on the invariant information-flow design, transcends cultural differences and may be used to assess differences in functioning of individuals as natural-cognitive systems regardless of their culture.

Temporal Definition of Optimum Functioning

"The basic goal of natural-cognitive systems is their continued existence." This "is assured through adaptation in the appropriate state of organization--not necessarily the highest one." "The two generally go together," however; "a high level of organization

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[1] Ibid., p. 202. [2] Ibid. [3] Ibid.

usually means a high level of intensive adaptation to the environment."[1] "The complexification of the structures," however, "is not due exclusively to the challenge of the differentiated, enduring orders of the environment, but results already from the 'homeorhetic' realization of potentials in the human mind."[2] Different individuals, because of different potentials, "have different capacities for adapting to their environment." The quality of this individual adaptation, though, "is reflected in an objective state." "A state of the system in which its percepts match its constructs is a value-state."[3]

> Negative values attach to those states of the cognitive system wherein he is unable to meet the challenge of the environment: the experience remains anomalous--chaotic and unintelligible. Such a state, if prolonged, leads to the disorganization of the cognitive system, as experiments on sensory overload, deprivation and randomization demonstrate.[4]

For the individual, functioning that is defined as past-orientation is of negative value when the individual must deal with "experiences which remain anomalous with respect to all existing constructs."[5]

> States of less value are those where experience is not fully matched by cognitive constructs but is within the threshold of adaptability of the system--for example, when the perception of an unfamiliar object or event calls for learning by the system.[6]

Functioning that is defined as present-orientation is of less value when the individual needs more information than can be obtained in present-orientation.

> Optimal value correlates with the cognitive organization through which the system can successfully predict and compensate for most of the relevant environmental variables. Such an organization maps conditions in the environment with the highest degree of

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[1] Ibid., p. 269. [2] Ibid., p. 134. [3] Ibid., p. 264.
[4] Ibid., p. 265. [5] Ibid., p. 128. [6] Ibid., p. 265.

> precision attainable by the level of development of the system. Systems that evolve such optimal organizations have maximum freedom in the high level of redundancy of their construct-sets, and have maximum leeway in tolerating, and purposively correcting for, environmental changes. Such systems are optimally adapted to their environment, and their states of adaptation signify their states of value.[1]

Functioning that is defined as future-orientation, by this rationale, is of optimal value since it enables the individual to live fully in today's complex world. Future-orientation may be termed optimum functioning.

Temporal Functioning Index

To assess functioning temporally defined, an instrument based on the above definition must be developed. As the first step in the development of such an instrument, a Temporal Functioning Index, composed of original instrumentation as well as certain related established measures, was used. Research beyond the scope of this study is necessary to complete the development of an instrument to measure functioning temporally defined.

Development of the Temporal Functioning Index involved the listing of the behavioral indicators of a past-oriented person, a present-oriented person and a future-oriented person, based on the above definitions; a listing of the characteristics to which these indicators point; and a listing of instruments that measure these characteristics. This information has been explicated as a continuum and is charted in figure 2 on pages 65-66. The Abstract Reasoning Test of the Differential Aptitude Tests was used to measure concrete/abstract thinking; the

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[1]Ibid., p. 264-265.

THE CONTINUUM OF TEMPORAL ORIENTATION

PAST-ORIENTATION Sensory Self-Stabilization	PRESENT-ORIENTATION Sensory Self-Organization	FUTURE-ORIENTATION Meta-Sensory	INSTRUMENTATION
←Concrete Thinking→ 1)Deals with gestalts a)Purposively manipulates its stream of experience to stabilize itself in the steady state of its actual cognitive organization 1)Surrounds himself with familiar 2)Reduces contingent of unfamiliar	Concrete Thinking 1)Deals with gestalts a)Reorganizes its existing construct sets to fit the actual stream of sensory experience; new constructs are acquired b)Able to evaluate constructs	Abstract Thinking→ 1)Deals with relations between Gestalten or the connoted feelings of the latter 2)Operates with a high order of clarity and rationality 3)More analytic 4)Seeks meaning beyond directly perceivable	Abstract Reasoning Test from the Differential Aptitude Tests 25 min.
←Less Intelligent→ 1)Less perceptive 2)Does not seek new knowledge 3)Is less able to understand self 4)Is less able to understand environment a)Victimized by environment; can only react to it; has low coping ability	1)Desires to learn 2)Possesses constructs which match most perceptual experience	More Intelligent→ 1)More perceptive 2)Acquires knowledge for knowledge's sake 3)Understands himself better 4)Understands environment better a)Is able to make predictions b)Has some degree of control over environment in order to meet his own goals 5)Understands felt experience	Quick Word Test 15 min.
←Less Creative→ 1)Less open to experience 2)Has difficulty perceiving relationships 3)Has external locus of evaluation	1)Open to some experience 2)Is able to perceive some relationships	More Creative→ 1)More open to experience 2)Is able to perceive novel relationships 3)Has internal locus of evaluation	Remote Associates Test 40 min.
←High Dogmatism→ 1)Closed minded 2)Strives to confirm own ideas a)Manipulative b)Denies new information when it conflicts with already held beliefs c)Is not persuaded from a previously held belief by reason 3)Conservative		Low Dogmatism→ 1)Open minded 2)Does not think stereotypically 3)Liberal	Rokeach's Dogmatism Scale 30 min.

←High Intolerance of Ambiguity		Low Intolerance of Ambiguity→	
1)Being limited to sensory cognition, he perceives today's complex environment as a threat; is out of place in his environment 2)Attempts to impose rigid structure on his environment a)Desires routine, order	1)Prefers a structured environment 2)Being limited to sensory cognition at best, he can only make a literal translation of his environment	1)Is less threatened by ambiguous situations 2)Is able to transcend environmental stricture 3)Is able to deal with ambiguity as a result of meta-sensory cognition, which yields a more refined knowledge of the environment	Intolerance of Ambiguity Scale[2] (Martin & Westie 1959) 5 min.
←Prefers Familiar		Seeks New Experience→	Semantic Differential Technique Concept--Change 10 min.
1)Surrounds himself with familiar a)Isolationist 2)Wants things to remain the same a)Prefers good old days b)Believes there is nothing new under the sun c)Places great importance on tradition 3)Attempts to understand in terms of past experience only a)Attempts to solve new problems with old solutions	1)Seeks meaning (intelligibility)	1)Demands more information concerning his environment than he can obtain by means of assimilating his sensory input to sensory Gestalten 2)Is able to live fully in present but yet transcend present through planning, projecting, etc.	

[1]Carl R. Rogers, "Toward a Theory of Creativity," in A Source Book for Creative Thinking, ed. Sidney J. Parnes and Harold F. Harding (New York: Charles Scribner's Sons, 1962), p. 67-68.

[2]Developed by James G. Martin and Frank R. Westie. Reprinted in Measures of Social Psychological Attitudes, John P. Robinson and Phillip R. Shaver (Ann Arbor, Michigan: Institute for Social Research, 1970), p. 322-324.

Fig. 2. The Continuum of Temporal Orientation

Quick Word Test was used to measure intelligence; creativity was assessed by the Remote Associates Test; Rokeach's Dogmatism Scale was used to assess dogmatism; and intolerance of ambiguity was assessed by the Intolerance of Ambiguity Scale[1]. The semantic differential technique was used to measure the connotative meaning of the concept "change" in order to determine an individual's position on the continuum of "Prefers Familiar/Seeks New Experience." These instruments, then, constitute the Temporal Functioning Index.

Sources of Data

A variety of subjects were chosen to participate in the study. They were selected to maximize differences in age, educational background, socioeconomic level, and present affiliation with an institution of post-secondary education. Because of cultural differences and possible language problems, international students were excluded. This sampling procedure was selected for two reasons: (1) Each person would have a particular combination of scores on the Temporal Functioning Index. This study is concerned primarily with this combination of scores and with its relation to the person's score on the Personal Orientation Inventory. Therefore, maximum variability in subjects' characteristics is necessary in order to get the most different combinations of scores. (2) Generalizations from the data to larger populations would not be made. It is for this reason that randomization per se would not contribute to this study. The number of subjects

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[1]James G. Martin and Frank R. Westie, "Intolerance of Ambiguity Scale," 1959. Permission granted by James G. Martin. See Appendix.

needed in the study is dependent upon the requirements of the statistical treatments used in the analysis of data. Kerlinger states that factor analysis requires "ten subjects for each variable (item, measure, etc.)."[1] Therefore, since six instruments were used in the factor analysis of data, at least sixty participants were required.

Collection of Data

The battery of instruments constituting the Temporal Functioning Index as well as the Personal Orientation Inventory were administered to the subjects. In addition, before beginning the testing session subjects were asked to read and sign the Informed Consent Form (See Appendix) and to provide the requested demographic data. Appropriate instructions for each instrument were given. The Remote Associates Test, the Differential Aptitude Tests--Abstract Reasoning Test and the Quick Word Test each had time limits of forty minutes, twenty-five minutes and fifteen minutes respectively.

Analysis of Data

The data were analyzed through the use of factor analysis, multiple linear regression and stepwise regression. Factor analysis was used to determine the underlying factors of the Temporal Functioning Index as well as to define these factors through an analysis of the loading of each instrument on each factor. This information served as a check back to the Temporal Definition of Functioning to determine

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[1]Fred N. Kerlinger, Foundations of Behavioral Research, 2nd ed. (New York: Holt, Rinehart & Winston, 1973), p. 681.

if the underlying factors of the Temporal Functioning Index are also the underlying constructs of the Definition. An analysis of the correlation matrix determined if the components of the Definition relate as presented in the chart (for example, high intelligence correlates highly with low dogmatism). This information was useful in determining the construct validity of the Temporal Functioning Index. It will also assist further research efforts to develop a single instrument which will assess functioning temporally defined.

The Temporal Functioning Index was correlated with the Personal Orientation Inventory through the use of multiple linear regression and stepwise regression. A simple combination of Inner-Directed and Time Competence raw scores was used as "the best predictor of an overall measure of the POI."[1] Combined raw scores above 122 (indicating one or both scores is above 60 on the standard scale) were not used since these indicate attempts by subjects to present a picture of themselves which is "'too' healthy."[2] Multiple linear regression yielded R, "the multiple correlation coefficient," which "is the product-moment correlation between the dependent variable and another variable produced by a least-squares combination of the independent variables." "R^2 is an estimate of the proportion of the variance of the dependent variable," self-actualization as assessed by the Personal Orientation Inventory, "accounted for by the independent variables," the components

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[1]Robert R. Knapp, Handbook for the Personal Orientation Inventory (San Diego: Educational & Industrial Testing Service, 1976), p. 78.

[2]Profile Sheet for the Personal Orientation Inventory (San Diego: Educational & Industrial Testing Service, 1963, 1965).

of the Temporal Definition of Functioning measured by the instruments of the Temporal Functioning Index.[1] The F ratio was computed to determine if the relation between the dependent variable and the independent variables could have occurred by chance. Stepwise regression determined the amount of variance of the dependent variable that each independent variable contributed. This information was used to determine the concurrent validity of the Temporal Functioning Index. Factor analysis, multiple linear regression and stepwise regression, then, were used to statistically analyze the data.

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[1]Kerlinger, Foundations of Behavioral Research, p. 618.

CHAPTER IV

RESULTS AND DISCUSSION

Characteristics of Subjects

Seventy persons participated in the study, 26 males and 44 females. One subject was under 18 years of age, 26 were 18 to 22 years old, 28 were 23 to 35 years old, 12 were 36 to 50 years old, and 3 were over 50 years of age. The ethnic origin of the subjects was varied. Sixty-one were White, 5 were Black, and 4 were American Indian. Fifteen of the subjects had completed 12 years of formal education. Thirty-seven subjects had completed 13 to 16 years, 8 had completed 17 to 18 years, and 10 had completed over 18 years of formal education. The socioeconomic level of 13 of the subjects was under $10,000. The socioeconomic level of 28 of the subjects fell within the $10,000 to $20,000 range, 14 fell within the $20,001-$30,000 range, and 14 subjects had a socioeconomic level of over $30,000. Seventeen subjects listed their political orientation as liberal, 28 as middle of the road, and 23 listed a conservative political orientation.

Results of Statistical Analyses

Biomedical Computer Programs P-series 1977 were used to

statistically analyze the data.[1]

Factor Analysis

Six variables, the instruments of the Temporal Functioning Index, and seventy cases were used in factor analysis. Varimax (orthogonal) rotation was used since it maintains "the independence of factors;" that is, "the correlation between the factors is zero."[2] The preassigned criterion for the number of factors was the number of factors with eigenvalues greater than one. Other values or options specific to P4M were also preassigned, including Kaiser's normalization. As table 1 shows, two factors were rotated out. Factor 1 accounts for 40.8% of

TABLE 1

SORTED ROTATED FACTOR LOADINGS (PATTERN)

		FACTOR 1	FACTOR 2
QWT	4	0.810	-0.420
RAT	1	0.805	0.0
DATAR	3	0.693	-0.263
CHANGE	2	-0.536	-0.253
RDOG	5	0.0	0.830
IOA	6	0.0	0.791
	VP	2.084	1.625

[1] M. B. Brown, ed. 1977 edition, BMDP-77-Biomedical Computer Programs P-Series (Berkeley: University of California Press, 1977). The programs were revised December 1977. The programs were developed at the Health Sciences Computing Facility, UCLA which is sponsored by NIH Special Research Resources Grant RR-3.

[2] Kerlinger, Foundations of Behavioral Research, p. 673.

the total variance; Factor 2 accounts for 21% of the total variance. Taken together the two factors account for 61.8% of the total variance. Since the Quick Word Test (a measure of general mental ability[1]), the Remote Associates Test ("a measure of the ability to think creatively"[2]), and the Differential Aptitude Tests-Abstract Reasoning Test are highly loaded on Factor 1, Factor 1 may be defined as an ability factor. Since Rokeach's Dogmatism Scale and the Intolerance of Ambiguity Scale are highly loaded on Factor 2 and the Quick Word Test and the Abstract Reasoning Test of the Differential Aptitude Tests are negatively loaded on Factor 2, Factor 2 may be defined as a closedmindedness factor. The semantic differential technique used to measure the connotative meaning of the concept "change" loaded -0.536 on Factor 1 and -0.253 on Factor 2. This indicates that a negative connotation of "change" exists in each factor, more so in Factor 1 than in Factor 2. However, as indicated in table 2, this instrument has the lowest squared multiple correlation with the factors. The negative connotation of "change" is not congruent with the definition of Factor 1 as defined by the loadings of the other variables on the factor; that is, persons high in ability are expected to have a positive connotation of "change." The "Prefers Familiar/Seeks New Experiences" is an important component of the Temporal Definition of Functioning. Many of the subjects, though, were resistant to the semantic differential technique which was used to

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[1]Edgar F. Borgatta and Raymond J. Corsini, Quick Word Test Manual: Directions for Administering, Scoring, and Interpreting (Harcourt, Brace & World, 1964), p. 4.

[2]Sarnoff A. Mednick and Martha T. Mednick, Examiner's Manual: Remote Associates Test--College and Adult Forms 1 and 2 (Boston: Houghton Mifflin Co., 1967), p. 1.

assess this component. Due to the difficulty they experienced in completing this instrument and the questionable results, other types of instruments that measure this component should be used before statements are made concerning the role of this component in the Temporal Definition of Functioning.

TABLE 2

SQUARED MULTIPLE CORRELATION OF EACH VARIABLE WITH THE FACTORS

1 RAT	0.6490
2 CHANGE	0.3515
3 DATAR	0.5494
4 QWT	0.8326
5 RDOG	0.6943
6 IOA	0.6314

Table 3 shows the correlation of each variable with each of the remaining variables. An analysis of the matrix indicates that,

TABLE 3

CORRELATION MATRIX

		RAT 1	CHANGE 2	DATAR 3	QWT 4	RDOG 5	IOA 6
RAT	1	1.000					
CHANGE	2	-0.146	1.000				
DATAR	3	0.390	-0.179	1.000			
QWT	4	0.658	-0.249	0.558	1.000		
RDOG	5	-0.132	-0.073	-0.170	-0.397	1.000	
IOA	6	-0.019	0.048	-0.250	-0.337	0.412	1.000

for the most part, the components of the Temporal Definition of Functioning relate as presented in figure 2 on pages 65-66. Creativity (measured by the Remote Associates Test), abstract reasoning (measured by the Abstract Reasoning Test of the Differential Aptitude Tests), and general mental ability (measured by the Quick Word Test) correlate positively with each other. Dogmatism (measured by Rokeach's Dogmatism Scale) and intolerance of ambiguity (measured by the Intolerance of Ambiguity Scale) correlate positively with each other and negatively with the above three. It was anticipated, though, that this negative correlation would be greater than the correlation matrix indicates. The semantic differential technique used to measure the connotative meaning of the concept "change" did not correlate highly with any of the other variables. It was expected that this variable would correlate positively with the Remote Associates Test, the Abstract Reasoning Test of the Differential Aptitude Tests, and the Quick Word Test and negatively with the Intolerance of Ambiguity Scale and Rokeach's Dogmatism Scale. Table 4 shows the squared multiple correlations (SMC)

TABLE 4

SQUARED MULTIPLE CORRELATION OF EACH VARIABLE WITH ALL OTHER VARIABLES

1 RAT	0.48910
2 CHANGE	0.10239
3 DATAR	0.32480
4 QWT	0.65554
5 RDOG	0.28704
6 IOA	0.26267

of each variable with all other variables. The semantic differential technique used to measure the connotative meaning of the concept "change" has a low squared multiple correlation. This variable, therefore, has little in common with the other variables.

An assessment of the construct validity of the Temporal Functioning Index can be made by determining if the underlying factors of the Temporal Functioning Index are also the underlying constructs of the Temporal Definition of Functioning. As discussed above, the two factors of the Temporal Functioning Index are an ability factor and a closedmindedness factor. Closedmindedness and ability also seem to be the underlying constructs of the Temporal Definition of Functioning. A past-oriented person through manipulative self-stabilization on the sensory level attempts to build a world around himself which satisfies his ideas of the world, and in turn, tends to confirm these ideas. A present-oriented person through adaptive self-organization on the sensory level learns to deal with new experiences. A future-oriented person (optimum functioning person) operating on the meta-sensory level is not only better able to understand himself and his environment but is also able to have some control over his environment in order to meet his own goals. A future-oriented person also possesses more degrees of freedom than the past-oriented person. Since the underlying factors of the Temporal Functioning Index are also the underlying constructs of the Temporal Definition of Functioning, the Temporal Functioning Index has construct validity.

The Temporal Functioning Index also has content validity. As already indicated, development of the Temporal Functioning Index

involved a listing of the behavioral indicators of a past-oriented person, a present-oriented person, and a future-oriented person, based on the Temporal Definition of Functioning; a listing of the characteristics to which these indicators point; and a listing of instruments that measure these characteristics. The instruments of the Temporal Functioning Index, therefore, are representative of the components of the Temporal Definition of Functioning, and these components relate, for the most part, as hypothesized. However, as already indicated, it is suggested that other instruments be used to assess an individual's position on the continuum of "Prefers Familiar/Seeks New Experience."

Not only was this information useful in determining the construct and content validity of the Temporal Functioning Index, it will also further research efforts to develop a single instrument which will assess functioning temporally defined. Discussion of the development of such an instrument will be presented in Recommendations for Further Study.

Multiple Linear Regression and Stepwise Regression

Sixty-nine cases were used in the multiple linear regression and stepwise regression computations. One case was omitted due to a Personal Orientation Inventory score beyond the maximum limit. The minimum acceptable tolerance level for both statistical analyses was set at 0.0100 and the maximum acceptable level was set at 1.000. That is, "an independent variable is not entered into the regression equation" "if its squared multiple correlation (R^2) with the independent variables already in the equation exceeds 1.0-TOLerance or if its entry will cause

the squared multiple correlation of any previously entered variable with the independent variables in the equation to exceed 1.0-TOLerance."[1] In multiple linear regression all data was considered as a single group. The Multiple R, "the product-moment correlation between the dependent variable and another variable produced by a least-squares combination of the independent variables,"[2] was 0.5448. The Multiple R^2, "an estimate of the proportion of the variance of the dependent variable . . . accounted for by the independent variables,"[3] was 0.2968. The F ratio of 4.361, at six and sixty-two degrees of freedom, is statistically significant at the 0.00098 level. Therefore, 29.68% of the variance of the Personal Orientation Inventory, which assesses self-actualization, is accounted for by the instruments of the Temporal Functioning Index, which assess the components of the Temporal Definition of Functioning.

The stepping algorithm used in the stepwise regression was "F," that is, "the variable with the smallest F-to-remove is removed if its F-to-remove is less than the F-to-remove limit. If no variable meets this criterion, the variable with the largest F-to-enter is entered if the F-to-enter exceeds the F-to-enter limit."[4] The preassigned minimum acceptable F to enter was 4.000 and the preassigned maximum acceptable F to remove was 3.900. In Step 1, Rokeach's

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[1]Brown, BMDP-77, p. 391 & 410.

[2]Kerlinger, Foundations of Behavioral Research, p. 618.

[3]Ibid.

[4]Brown, BMDP-77, p. 405-406.

Dogmatism Scale was entered. It had a Multiple R of 0.4501 and a Multiple R^2 of 0.2026. Therefore, 20.26% of the variance of the Personal Orientation Inventory is accounted for by Rokeach's Dogmatism Scale. After Step 1, the F-levels of the remaining variables were insufficient for further stepping.

Multiple linear regression and stepwise regression, then, were used to determine the concurrent validity of the Temporal Functioning Index. The single greatest difficulty in this type of validity, though, is selecting the criterion.[1] The question "Is the Personal Orientation Inventory an appropriate criterion?" must be answered before statements can be made concerning the concurrent validity of the Temporal Functioning Index. Chapter V will deal with this question.

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[1]Kerlinger, Foundations of Behavioral Research, p. 459-460.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The flow-chart, figure 3 on the following page, summarizes the contributions of the statistical analyses of data. To complete this flow-chart the question "Is the optimum functioning person also the self-actualizing person?" as well as the question "Is the Personal Orientation Inventory an appropriate criterion in determining the concurrent validity of the Temporal Functioning Index?" must be answered. In order to answer the former, individuals' scores on an instrument developed directly from the Temporal Definition of Functioning must be correlated with individuals' scores on an instrument developed directly from Maslow's definition of self-actualization. One instrument to measure functioning temporally defined has not yet been developed. That the Personal Orientation Inventory was not developed directly from Maslow's definition of self-actualization (See p. 93-94) compounds the difficulty of determining if the optimum functioning person is also the self-actualizing person as well as renders suspect the appropriateness of using the Personal Orientation Inventory as a criterion in determining the concurrent validity of the Temporal Functioning Index. Research beyond the scope of this study, then, is needed to complete this flow-chart.

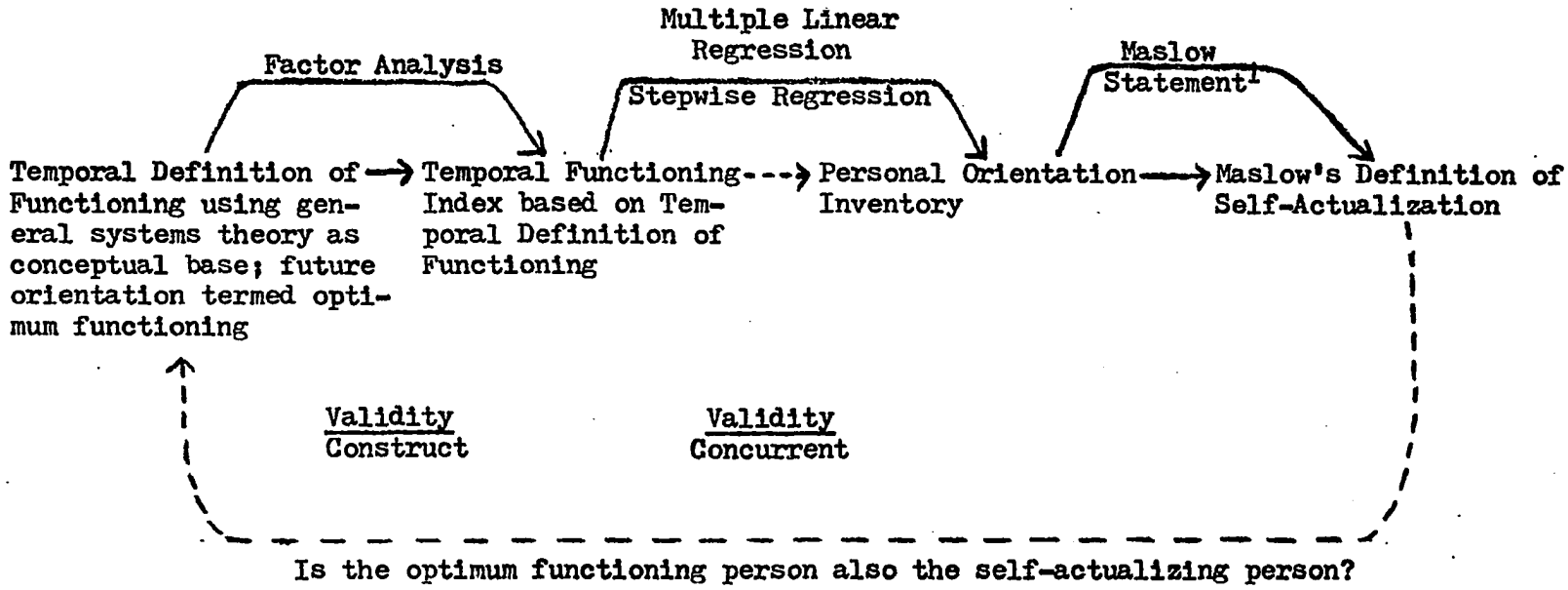

Fig. 3. Flow-chart summarizing contributions of statistical analyses of data

[1]"Self-actualization is what that test [Personal Orientation Inventory] tests." In Abraham H. Maslow, The Farther Reaches of Human Nature (New York: Viking Press, 1971), p. 28.

Both Maslow's definition of self-actualization and the Temporal Definition of Optimum Functioning are attempts to answer the question "What is the potential of the human in today's society?" Abraham Maslow, as a result of his study of self-actualizing individuals, laid the groundwork for this and other studies dealing with human potential. As such, his work is both a foundation and an appropriate criterion for this study. As an attempt to determine if the present study provides a more sound and more assessable definition of human potential, the following comparison of Maslow's definition of self-actualization with the Temporal Definition of Optimum Functioning is necessary.

Comparison of Maslow's Definition of Self-Actualization with Temporal Definition of Optimum Functioning

Developmental Bases of Definitions

Self-Actualization

In Motivation and Personality Abraham Maslow gives a detailed description of subjects and methods used in the development of his definition of self-actualization. Using iteration as the selection technique, Maslow started "with the personal or cultural nontechnical state of belief," collated "the various extant usages and definitions of the syndrome," and then defined it "more carefully, still in terms of actual usage . . . with, however, the elimination of the logical and factual inconsistencies." On the basis of this corrected folk definition, the first groups of subjects were selected "from among personal acquaintances and friends, and from among public and historical figures." Using the data collected from study of the subjects, the

original corrected folk definition was "further changed and corrected" yielding the first clinical definition. The first clinical definition "had a positive as well as a merely negative side. The negative criterion was an absence of neurosis, psychopathic personality, psychosis, or strong tendencies in these directions." "The positive criterion for selection was positive evidence of self-actualization (SA), as yet a difficult syndrome to describe accurately." For "purposes of this discussion, it may be loosely described as the full use and exploitation of talents, capacities, potentialities, etc." Using this new definition, the original group of subjects was reselected, some being retained, some dropped and some new ones added. This second level group of subjects was then studied which in turn caused "modifications . . . of the first clinical definition, with which in turn a new group of subjects" was selected and so on. "In this way," according to Maslow, "an originally vague and unscientific folk concept can become more and more exact, more and more operational in character, and therefore more scientific."[1] This process, then, was the basis for the development of the definition of self-actualization.

Temporal Definition of Optimum Functioning

The developmental basis of the Temporal Definition of Optimum Functioning can best be explicated through the use of the framework, developed by Sutherland, of analytical modalities contained within the general systems theory repertoire which is shown as figure 4 on the following page. By using the general systems theory construct of

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[1]Abraham H. Maslow, Motivation and Personality, 2nd ed. (New York: Harper & Row, 1954, 1970), p. 150-151.

ANALYTICAL STATE	INDETERMINACY	SEVERE STOCHASTICITY		MODERATE STOCHASTICITY	DETERMINACY
ANALYTICAL MODE	Development of Heuristics →	Development of Deductive Hypotheses →	Validation of Hypotheses and Refinement →	Employment of Inductive Models →	Development of Optimization Algorithm

Fig. 4. Framework of analytical modalities contained within the general systems theory repertoire[1]

[1]Sutherland, A General Systems Philosophy for the Social and Behavioral Sciences, p. 187.

information-flow as the conceptual base, the Temporal Definition of Functioning was developed. General systems theory is "an interdisciplinary doctrine 'elaborating principles and models that apply to systems in general, irrespective of their particular kind, elements, and "forces" involved.'"[1] "General systems theories are one species of 'world hypothesis'; they find their use and justification in the elucidation of otherwise chaotic patterns of events in the natural world." General systems theory constructs "appear to provide the greatest range of invariance and are hence best suited to grasping a general order, recurring in locally differentiated transformations."[2] The heuristic modality acts "as an entirely opportunistic but formally disciplined attempt to impose some manageability on" an a priori chaotic situation.[3] In this situation there was "no data base from which to work which" had "any relevance for the problem at hand, but only isolated and unintegrated scraps of historical-empirical evidence."[4] The general systems theory construct of information-flow, then, served as the heuristic.

A heuristic is "in existence prior to the development of the deductively-generated hypothesis," and is in fact "a prerequisite to its development" if the phenomenon at hand is "indeterminate in its

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[1]Ludwig von Bertalanffy, "Foreword," in Introduction to Systems Philosophy, Ervin Laszlo (New York: Harper & Row, 1972), p. xvii.

[2]Laszlo, Introduction to Systems Philosophy, p. 15, 16.

[3]Sutherland, A General Systems Philosophy for the Social and Behavioral Sciences, p. 185.

[4]Ibid., p. 160.

immediate properties."[1] With the general systems theory construct of information-flow as the conceptual base (heuristic), the Temporal Definition of Functioning was developed. This deductively-predicated model imputes "behaviors which are logically as opposed to statistically probable." It provides "mutually exclusive categories which, when united into an event-array, effectively" exhaust "the state-events which might occur." With such an array, the entity at hand can better be treated, reacted to, or controlled than would be possible were such categorizations not available.[2] By applying Laszlo's explication of "the states with which value correlates for cognitive systems"[3] to the Temporal Definition of Functioning, functioning that is defined as future-orientation was determined to be of optimal value and thus termed optimum functioning. Furthermore, characteristics of past-oriented, present-oriented and future-oriented individuals were charted and instruments were selected which assess these characteristics. The deductive modality was most congruent in this situation, then, since there was "no host or reference system which" could "be used to make empirically or inductively predicated inferences about the entity at hand [temporal functioning/optimum functioning], such that its structural and dynamic 'actualities'" were "effectively unprecedented." According to Sutherland, the deductivist "is something of a scavenger, building what often amounts to a work of art out of components which had heretofore never been integrated, leaving some connections

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[1]Ibid., p. 184-185. [2]Ibid., p. 176, 178.

[3]Laszlo, Introduction to Systems Philosophy, p. 264.

unvalidated and often introducing some innovations which even he can hardly rationalize."[1]

The logical conclusion of the efforts of inductivists is "the generation of successively more sweeping generalizations, whose predicates are founded in objectively (or statistically) determined results of empirical analyses."[2] The inductive modality was most congruent for the collection and statistical analysis of data; the results of the statistical analyses contributed through deduction to the validation and refinement of the deductively-predicated hypotheses. Factor analysis of the data yielded the underlying factors of the Temporal Functioning Index which, after being defined, contributed through deduction to the determination of the construct validity of the Temporal Functioning Index. An analysis of the correlation matrix determined if the components of the Temporal Definition of Functioning relate as hypothesized. Multiple linear regression yielded R^2 which is an estimate of the proportion of the variance of self-actualization, as assessed by the Personal Orientation Inventory, accounted for by the components of the Temporal Definition of Functioning, measured by the instruments of the Temporal Functioning Index. Stepwise regression determined the amount of variance of self-actualization, as assessed by the Personal Orientation Inventory, that each component of the Temporal Definition of Functioning, measured by the instruments of the Temporal Functioning Index, contributed. However, as already indicated, the results of

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[1]Sutherland, A General Systems Philosophy for the Social and Behavioral Sciences, p. 173, 177.

[2]Ibid., p. 166.

multiple linear regression and stepwise regression were inconclusive in determining the concurrent validity of the Temporal Functioning Index. The collection and statistical analysis of data involved in the inductivist modality, then, contributed through deduction to the validation and refinement of the deductively-predicated hypotheses.

The developmental basis of the Temporal Definition of Optimum Functioning can best be summarized with the following discussion of general systems theory analytical modalities:

> The appropriate paradigm for science is that which finds us starting our efforts at understanding a phenomenon with the imposition of metahypotheses to initially discipline the subsequent learning processes. Once the boundaries of the entity have been established and the basic range of properties of interest articulated, we can then turn to the deductivist modality to generate some very broad, unspecific arguments which appear, at that point, to have the highest logical probability of being true. These, in turn, give rise to a series of subarguments cast in such a way as to permit empirical treatment . . . Their validation or invalidation, in turn, reflects on the validity of the deductively-predicated argument which spawned them, etc. Finally, when the empirical information base has been developed to the extent possible (or economical), the array of optimization instruments may be brought in under the guise of the positivistic modality and as precise and prescriptive as possible a solution to the problem generated.[1]

As indicated, one modality gradually gives way to another as the analysis proceeds. In the Recommendations for Further Study this process will be taken up again where this study leaves off in order that suggestions for further study can be made.

Comparison of Definitions

Self-Actualization

Abraham Maslow defines self-actualization as

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[1]Ibid., 161.

> an episode, or a spurt in which the powers of the person come together in a particularly efficient and intensely enjoyable way, and in which he is more integrated and less split, more open for experience, more idiosyncratic, more perfectly expressive or spontaneous, or fully functioning, more creative, more humorous, more ego-transcending, more independent of his lower needs, etc. He becomes in these episodes more truly himself, more perfectly actualizing his potentialities, closer to the core of his Being, more fully human.[1]

In self-actualizing people "these episodes seem to come far more frequently, and intensely and perfectly than in average people."[2] Self-actualization is "a development of personality which frees the person from the deficiency problems of youth, and from the neurotic . . . problems of life, so that he is able to face, endure and grapple with the 'real' problems of life."[3] Self-actualization "stresses 'full-humanness,' the development of the biologically based nature of man, and therefore is (empirically) normative for the whole species rather than for particular times and places, i.e., it is less culturally relative."[4] However, "self-actualization is idiosyncratic since every person is different."[5] "Different constitutional types actualize themselves in somewhat different ways (because they have different inner selves to actualize)."[6] According to Maslow, "most people (perhaps all) tend toward self-actualization . . . and . . . in principle at least, most people are capable of self-actualization." However, "self-actualization is a relatively achieved 'state of affairs' in a few people."[7] Maslow lists the following characteristics of self-actualizing people:

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[1] Abraham H. Maslow, Toward a Psychology of Being, 2nd ed. (New York: D. Van Nostrand Co., 1968), p. 97.

[2] Ibid. [3] Ibid., p. 115. [4] Ibid., p. vi. [5] Ibid., p. 33.

[6] Ibid., p. 210. [7] Ibid., p. 158, 160.

1. Superior perception of reality.
2. Increased acceptance of self, of others and of nature.
3. Increased spontaneity.
4. Increase in problem-centering.
5. Increased detachment and desire for privacy.
6. Increased autonomy, and resistance to enculturation.
7. Greater freshness of appreciation, and richness of emotional reaction.
8. Higher frequency of peak experiences.
9. Increased identification with the human species.
10. Changed (the clinician would say, improved) interpersonal relations.
11. More democratic character structure.
12. Greatly increased creativeness.
13. Certain changes in the value system.[1]

Self-actualization, then, can be defined "as ongoing actualization of potentials, capacities and talents, as fulfillment of mission (or call, fate, destiny, or vocation), as a fuller knowledge of, and acceptance of, the person's own intrinsic nature, as an unceasing trend toward unity, integration or synergy within the person."[2]

Temporal Definition of Optimum Functioning

Future-orientation, a component of the Temporal Definition of Functioning, is termed optimum functioning. A future-oriented person operates on the meta-sensory level. He is more intelligent, more creative and more open-minded than others. He also has greater abstract thinking ability and a high tolerance of ambiguity. A more detailed description of the future-oriented (optimum functioning) person is given in Chapter III.

Individuals differ in functioning. As has been indicated, individual differences in functioning are due to the individual's cognitive processes, that is, sensory or meta-sensory level, which in

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[1]Ibid., p. 26. [2]Ibid., p. 25.

turn determine the range of degrees of freedom he may possess. Even though optimum functioning individuals (future-oriented individuals functioning on the meta-sensory level) share a common range of degrees of freedom, they may function somewhat differently due to differences in degrees of freedom each possesses. Since the Temporal Definition of Functioning is based on the invariant information-flow design, the definition of optimum functioning transcends cultural differences and may be used to assess individual differences in functioning regardless of culture.

Role of Environment

Self-Actualization

Abraham Maslow wrote that "the role of the environment is ultimately to permit" man "or help him to actualize his own potentialities, not its potentialities."[1] However, actualization of potentialities is dependent upon "the existence of a good or fairly good environment."[2] For Maslow, "increasing autonomy and independence of environmental stimuli" are "the defining characteristics of full individuality, of true freedom, of the whole evolutionary process."[3] Therefore, he called for "transcendence of the environment, independence of it, ability to stand against it, to fight it, to neglect it, to turn one's back on it, to refuse it or adapt to it."[4]

Temporal Definition of Optimum Functioning

For the cognitive system, the environment is the "realm of

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[1] Ibid., p. 160. [2] Ibid., p. 173. [3] Ibid., p. 35.
[4] Ibid., p. 180.

physical-events, signalled by perceptions and acted upon through volitions."[1] The optimum functioning person (future-oriented person operating on the meta-sensory level) is able to understand more about himself and his environment from more points of view. Meta-sensory level activities "are more 'analytic' of the system's environmental states: they represent more accurate as well as more far-reaching correlations between such states and the system's codes."[2] Therefore, since "the adapted cognitive system is also the more efficiently manipulative one,"[3] the optimum functioning person is able to have some control over the environment in order to meet his own goals.

Conclusion

As stated by Maslow, "it looks as if there were a single ultimate value for mankind, a far goal toward which all men strive." This goal "is called variously by different authors . . . but they all agree that this amounts to realizing the potentialities of the person, that is to say, becoming fully human, everything that the person can become."[4] Both Maslow's definition of self-actualization, and from this study, the Temporal Definition of Optimum Functioning, an extension of work already begun by Maslow, are attempts to clarify this goal through defining human potential. Therefore, the present comparison of Maslow's definition of self-actualization with the Temporal Definition of Optimum

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[1] Laszlo, Introduction to Systems Philosophy, p. 120.

[2] Laszlo, System, Structure, and Experience, p. 76.

[3] Laszlo, Introduction to Systems Philosophy, p. 132.

[4] Maslow, Toward a Psychology of Being, p. 153.

Functioning is in order.

As the above discussion indicates, the developmental bases of the definitions are different. Developmental bases, to a degree, determine the soundness of definitions. According to Sutherland, Maslow offers "us a model-building reference that smacks of subjectivism, such that the fundamental terms employed and the functional connections among their state-variables are often elliptical or downright parabolic in nature."[1] "Maslow's subjectivism marks his work as having a personalistic bias." Therefore, "the scientific utility of the constructs is marred by idiographic and hypostatical overtones."[2] It is also questionable that self-actualization "is less culturally relative"[3] since it was developed primarily through a study of people in Western culture (See p. 152 of Motivation and Personality). These weaknesses in Maslow's definition of self-actualization, then, are due to its developmental basis.

According to Maslow, self-actualization could "be defined quite operationally, as intelligence used to be defined, i.e., self-actualization is what that test [Personal Orientation Inventory] tests."[4] However, the Personal Orientation Inventory was not developed directly from Maslow's definition of self-actualization. "Among concepts incorporated in the initial development of the POI were: Maslow's (1962,

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[1]Sutherland, A General Systems Philosophy for the Social and Behavioral Sciences, p. 31.

[2]Ibid., p. 192.

[3]Maslow, Toward a Psychology of Being, p. vi.

[4]Maslow, The Farther Reaches of Human Nature, p. 28.

1970) hypotheses about self-actualization; Riesman, Glazer, and Denny's (1950) system of inner- and other-directedness; May, Angel, and Ellenberger's (1958), as well as Perls' (1947, 1951), conceptualization of time orientation; and Bach and Goldberg's (1974) theories of acceptance of aggression."[1] Because this group of concepts was incorporated into the development of the POI, Maslow's definition of self-actualization alone can not "'explain' the variance of the test."[2] Therefore, the Personal Orientation Inventory is not valid for use in empirical studies dealing only with Maslow's definition of self-actualization and, as a result, contributes only partially to the validation or invalidation of the definition of self-actualization.

The Temporal Definition of Optimum Functioning overcomes, to some extent, the above specified weaknesses existing in Maslow's work. With the development of one instrument to measure functioning temporally defined, the Temporal Definition of Optimum Functioning may be empirically validated or invalidated, which is "the ultimate arbiter" of its "scientific acceptability."[3] As already indicated (See p. 62), temporally defined modes of functioning, based on the invariant information-flow design, transcend cultural differences. Therefore, the Temporal Definition of Optimum Functioning is not culture-bound. Use of the general systems theory framework of analytical modalities as the developmental basis for the Temporal Definition of Functioning

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[1]Knapp, Handbook for the Personal Orientation Inventory, p. 3-4.

[2]Kerlinger, Foundations of Behavioral Research, p. 461.

[3]Sutherland, A General Systems Philosophy for the Social and Behavioral Sciences, p. 79.

yields a more sound definition of optimum functioning than could otherwise be produced. As noted by Sutherland, "the ultimate ontological significance of the social and behavioral sciences will be inhibited by adherence to any epistemology or methodological platform which either dictates or unconsciously accepts a restricted interpretation of reality, and which thereby seeks to constrain the scientist to any single analytical or instrumental modality."[1] As the above discussion indicates, Maslow's definition of self-actualization and the Temporal Definition of Optimum Functioning overlap considerably but are not synonymous. The Temporal Definition of Optimum Functioning, since it overcomes to some extent the above specified weaknesses existing in Abraham Maslow's work, is, in all probability, a more sound and a more assessable definition of human potential. However, further empirical study is required to validate the Temporal Definition of Optimum Functioning.

Recommendations for Further Study

Further study dealing with the Temporal Definition of Optimum Functioning must begin where this study leaves off. Therefore, additional data must be collected and statistically analyzed in order to further refine and validate the deductively-predicated hypotheses. The development of an instrument to measure functioning temporally defined is needed. Factor analysis of the data yielded by this study indicated that the underlying factors of the Temporal Functioning Index, ability and closedmindedness, appear also to be the underlying constructs of the Temporal Definition of Functioning. Any instrument developed must

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[1] Ibid., p. 188-189.

also have these same underlying factors. The number of instruments involved in the Temporal Functioning Index may be narrowed down to the instrument with the highest loading on the ability factor, the Quick Word Test, and the instrument with the highest loading on the closed-mindedness factor, Rokeach's Dogmatism Scale. A weighted combination of the score on each may be used to yield a temporal functioning score for each individual. To determine their ability to discriminate into groups based on factor scores individuals scoring in the top ten percent on one or the other factor, a stepwise discriminant analysis was run using the Quick Word Test and Rokeach's Dogmatism Scale. The Quick Word Test entered at Step 1 as the variable that discriminates best between groups. All cases were correctly classified. The canonical correlation between the Quick Word Test and dummy variables representing the groups was 0.90401. Rokeach's Dogmatism Scale did not enter into the discriminant function since its F-to-enter was insufficient for further stepping. Therefore, the individual's score on the Quick Word Test should be given a high weight and the individual's score on Rokeach's Dogmatism Scale a lower weight, with the weighted dogmatism score subtracting from the weighted general mental abilities score; that is, a high dogmatism score would take more away from the general mental abilities score yielding a lower temporal functioning score than a low dogmatism score would. After the appropriate weighting of the scores has been determined, ranges of scoring denoting past-orientation, present-orientation, and future-orientation can be established. This, then, paves the way for the development of one instrument which measures functioning temporally defined.

The inductivist modality can then be employed to gather data which may be used to impute characteristics to past-oriented, present-oriented and future-oriented individuals in general on the basis of the analysis of the characteristics of individuals whose temporal functioning scores fall within the specified ranges. Personality, attitude and interest inventories as well as tests of ability may be used. It is in this modality that an instrument other than the semantic differential technique used to measure the connotative meaning of the concept "change" may be administered to determine an individual's position on the continuum "Prefers Familiar/Seeks New Experiences." Individuals' scores on this instrument can be correlated with the individuals' temporal functioning scores to determine the relationship between "Prefers Familiar/Seeks New Experience" and temporal orientation. This information provides a check on the hypothesized relations of the components of the Temporal Definition of Functioning charted in figure 2 on pages 65-66. Data also may be gathered which will answer, to a degree, the question "Is the optimum functioning person also the self-actualizing person?" Individuals' scores on the Jones Self-Actualizing Scale[1] and the Inventory of Self-Actualizing Characteristics,[2] both developed directly from Maslow's description of the self-actualizing individual, can be correlated with the individuals' temporal functioning

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[1]Kenneth Melvin Jones, Jr., "The Construction and Validation of an Instrument to Measure Self-Actualization as Defined by Abraham Maslow" (Ph.D. dissertation, University of Southern Mississippi, 1975).

[2]Anthony G. Banet, Jr., "Inventory of Self-Actualizing Characteristics (ISAC)," in The 1976 Annual Handbook for Group Facilitators, ed. John E. Jones and J. William Pfeiffer (La Jolla, California: University Associates, 1976), p. 67-77.

scores to determine the relationship between self-actualization as assessed by the Jones Self-Actualizing Scale and the Inventory of Self-Actualizing Characteristics and temporal functioning. Induction can also contribute to the determination of the relationship between Cattell's theory of fluid and crystallized general ability and the cognitive processes associated with a particular temporal orientation and the degrees of freedom possessed by individuals functioning in that temporal orientation. Raymond Cattell proposed "that there is not a single g [general ability] but two, and that these should be called 'fluid' and 'crystallized' general ability." He hypothesized that crystallized ability "loads more highly those cognitive performances in which certain initial intelligent judgments have become crystallized as habits" whereas fluid general ability "shows more in tests requiring adaptations to entirely new situations, where crystallized skills are of no advantage because they do not apply to the particular data."[1] It is hypothesized that fluid general ability is closely related to the cognitive processes associated with a particular temporal orientation and crystallized general ability is closely related to the degrees of freedom possessed by individuals functioning in that temporal orientation. According to Cattell, "the traditional intelligence test" measures "a good deal of achievement in the sense of crystallized general ability." Culture-fair tests measure "fluid general ability."[2] Since the Quick Word Test, one component of the Temporal Functioning

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[1]Raymond B. Cattell and H. J. Butcher, The Prediction of Achievement and Creativity (New York: Bobbs-Merrill, 1968), p. 18-19.

[2]Ibid., p. 25.

Index used to assess an individual's temporal functioning, is a traditional intelligence test, culture-fair tests should be administered to determine the relationship between fluid general ability and temporal functioning. This information would be useful in developing a more precise measure of temporal functioning based on the Temporal Definition of Functioning. Thus, as these examples indicate, in the inductivist modality information is collected about specific individuals which may be used to make generalizations about past-oriented, present-oriented, and future-oriented individuals.

At the end of the continuum of analytical modalities is the positivistic modality. "In its social science guise," it "becomes disciplined trial and error, and is appropriate only when we can expect to isolate an optimal event (i.e., eliminate morphological or causal variance between the allegory and the real-world entity) within an extremely limited number of iterations or experimental permutations."[1] Even though the positivistic modality has limited application in this instance, experimental research can be conducted to determine treatments which further development of the individual toward optimum functioning temporally defined. This study along with the recommendations for further study, then, makes use of the array of general systems theory analytical modalities available to the social and behavioral scientist. This repertoire of modalities enables the scientist to draw on the positive contributions which can be made by each and, as a result, enables him "to treat the full range of phenomena he must be prepared

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[1]Sutherland, A General Systems Philosophy for the Social and Behavioral Sciences, p. 165.

to deal with."[1] Finally, as stated by Sutherland, "the only real truth about any phenomenon will be that found in the concatenative nexus which is formed between successively more specific deductive inferences and successively more generalized inductive inferences--in short, at the point where percept and concept collapse and where logical and empirical, and inductive and deductive conclusions become indistinguishable."[2]

Conclusion

As an answer to the question "What is the potential of the human in today's society?" this study involved the development of an empirically assessable definition of the functioning of the individual in terms of temporal orientation by using the general systems theory construct of information-flow, as explicated by Ervin Laszlo, as the conceptual base and the elucidation of optimum functioning via Laszlovian concepts. Differences in functioning defined in terms of temporal orientation encompass and account for the manifold differences of humankind. Future-orientation, optimum functioning, is that mode of living which is characteristic of individuals living fully in today's complex world. Because the application of general systems theory "to the analysis of human experience . . . constitutes systems philosophy,"[3] this study provides the basis for Temporal Orientation: Framework for a Philosophy of Human Potential.

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[1] Ibid., p. 188.

[2] Ibid., p. 189.

[3] Laszlo, Introduction to Systems Philosophy, p. 298.

APPENDIX

UNIVERSITY OF NORTHERN IOWA · Cedar Falls, Iowa 50613

Vice President and Provost
AREA 319 273-2517

October 23, 1978

Ms. Brenda White
630 Parrington
Room 528
University of Oklahoma
Norman, OK 73019

Dear Ms. White:

It was a pleasure talking to you on the telephone the other day and to give my permission to you for use of the "Intolerance of Ambiguity Scale." I trust that you will find this instrument useful in your research. I would enjoy reading any summary of your findings or any publication that may result from them. It was a little nostalgic to have a call from the University of Oklahoma because I was a member of the faculty there in 1957 and was working on research which led to the publication of the Tolerant Personality.

The best of luck to you in your study.

Sincerely,

James G. Martin
Vice President and Provost

JGM:j

INFORMED CONSENT[1]

I understand that the purpose of this study is to learn more about the temporal orientation of individuals.

I confirm that my participation as a subject is entirely voluntary. No coercion of any kind has been used to obtain my cooperation.

I understand that I may withdraw my consent and terminate my participation at any time during this testing session.

I have been informed of the procedures that will be used in the study and understand that participation in the study involves the completion of the following psychological instruments: Remote Associates Test, Intolerance of Ambiguity Scale, Personal Orientation Inventory, Abstract Reasoning Test of the Differential Aptitude Tests, Quick Word Test, Rokeach's Dogmatism Scale, and the semantic differential technique to measure meaning of the concept change to the subject.

I understand that all of my responses will remain completely anonymous.

I wish to give my cooperation as a subject.

Signed:_____

Date:_____

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[1]Adapted from Lawrence F. Locke and Waneen Wyrick Spirduso, Proposals that Work: A Guide for Planning Research (New York: Teachers College Press, Teachers College, Columbia University, 1976), p. 237.

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