Mood and Memory from a Logical Learning Theory Perspective: Effects of Idiographic Rating Versus Mood Induction

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INTRODUCTION

Why do we remember some events or experiences, yet forget others? Are we more likely to remember our positive experiences, or those that are negative? The question of how human memory works, and how it occasionally fails to work, has recently been of great interest to psychologists. This question is not something new, of course. In fact, it is a question that has intrigued scientists and philosophers since long before the field of modern cognitive psychology emerged--a field which some currently believe holds great promise for clarifying the nature of the functioning of the human mind. Science has advanced significantly since early researchers first explored this area. Yet, despite a vast repository of knowledge crystallized from the work of literally thousands of scientists--chemists, physicists, psychologists, biologists, etc.--the precise nature of the relationship between emotion/mood and memory remains unclear. It is--to borrow the words of Winston Churchill (1959)--"a riddle, wrapped in a mystery, inside an enigma." Among the problems intricately woven into the question of how mood affects memory is the question of how memory itself "works." For example, just how do we remember? How, we might ask, is remembering "caused"? Further, what effects do such feeling states as depression, elation, and anxiety have on the ability to recollect experiences from the past?

Recent examinations of the relationship of mood to memory have generally adopted formulations from within the domain of cognitive psychology, a field built around what is essentially a computer metaphor.

The theoretical bases of current descriptions of the cognitive, affective, and behavioral aspects of human behavior can, it is hoped, be tested through methods similar to those used to test the physical models found in the sciences mentioned above. In accord with this machine metaphor, recent attempts to explain the relationship between mood and memory typically employ a "bottom-up" (i.e., inductive) approach. This push for an inductive science has a history which dates back many centuries. The goal of such approaches is to gather up as much "basic" information as possible, and then to build upward toward an evolved understanding of mental functioning. Important in this respect are network theories of emotion and memory, which seek to delineate nodal connections after the presumed functioning of the neurons in the brain (or the bytes of memory found in a computer). Another feature common among current memory models is the belief that memory can be divided into more or less discrete stages corresponding to so-called "storage" and "retrieval" operations. In the former phase, information is encountered and assimilated into existing knowledge structures. In the latter phase, information in the ongoing cognitive, emotional, and physical environment is used in the acquisition of memory from the memory network. Such concepts make sense if we view the human being as essentially responding to input stimuli, stimuli which "activate" the individual in potentially predictable ways.

Two primary areas of research into the nature of mood/emotion and memory have explored the phenomena known as mood-state-dependent

memory and mood-congruent memory. In the former case, any similarities in the context of "encoding" are expected to facilitate memory when present again at the time of retrieval. In the latter case, congruence between the learner's mood and the affective valence of the material is expected to facilitate memory. What emerges, however, is anything but a picture of clarity. Though there are patches of consistency in the empirical literature, particularly in the case of mood congruence, the mechanistic theories (and their attendant learning theories based on frequency and contiguity) that have been proffered to account for such findings have generally been unable to subsume and hence bring order to these diverse results. Why have such formulations failed?

In what follows, we contrast mechanistic or non-teleological notions such as Bower's (1981) nodal network theory with Rychlak's (1981) Logical Learning Theory, the latter of which may be seen as a Kantian phenomenological perspective. Logical Learning Theory takes a more individualistic perspective by opposing predication to traditional cognitive mediational formulations. This is a broad-based theoretical conception, capable of subsuming (and lending order to) the domains of both affect and memory. In accord with this more Kantian alternative we offer the conception of affective assessment to more adequately account for methodological findings on the functioning of the human mind, and, in particular, those relating mood and emotion to memory. Of primary importance is the fact that rather than using nomothetic

averages in testing our hypotheses about mood and memory, Logical Learning Theory takes an idiographic (i.e., individually-oriented) approach. It is expected that by taking into consideration the manner in which a subject affectively frames a task (i.e., positively or negatively), and by having subjects individually rate learnable items along a bipolar dimension of like-dislike, greater order and understanding can be brought to the diverse methodological findings alluded to above. Suggestions of the utility of this construct in the extant literature will also be discussed. By employing this idiographic methodological approach in concert with a non-mechanistic theoretical understanding of the functioning of mind, we hope to render a more cogent account of the nature of mood and memory.

CHAPTER 1

A CONCEPTUAL FRAMEWORK

In order to make clear the crucial differences in the accounts to be presented, time is here taken to delineate some of the fundamental distinctions in the terminology to be employed.

The Grounds of Explanation in Psychological Science

The notion of <u>causation</u>, particularly as it relates to human behavior, is extremely important to the present discussion. Theories of causation can form part of, or be derived from, broad metaphysical doctrines, and in this light it may be seen that such doctrines delineate for their authors what sorts of things may be taken to be causes. This is important, insofar as what one takes to be a cause has great significance for what kind of theory of causation one finds acceptable. As suggested above, scientists have all too often failed to conceptualize even the <u>possibility</u> of intentional human behavior. Royce (1988), commenting on this predicament, has stated:

> Psychologists can easily discover free choice. Their problem is to explain it, and the attempt is doomed to failure at the outset if you start with confused philosophical concepts of causality, chance, predictability, and the like. To understand choice requires a philosophical competence, including what Aristotle called 'first philosophy' or metaphysics, to which few psychologists ever aspired. The dilemma was this: the facts of free choice kept reappearing, but the psychologists were unable to handle them in terms of the only philosophy they knew. To deny fact is

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unscientific, yet philosophical ineptitude seemed to be forcing them to do just that. (p. 378)

Much of early Greek philosophy was concerned with the categorization of knowledge into various classes. In fact, Greek philosophers sought to formulate a finite number of categories or predicates (another means of referring to such highly abstract, broadly conceived predicates is to speak of universals) which might then be brought to bear for the purpose of ordering the world in some logical fashion: "It was because they believed that some such abstract predicates lent meaning to all of experience that the Greek thinkers sought to devolve meanings 'from the universal to the particular'" (Rychlak, 1991, p. 16). In this regard the Greeks, and particularly Aristotle, were successful in delineating a causal framework capable of subsuming all things known or knowable. We turn now to a brief examination of this framework, put forth originally by Aristotle and employed with slight modification by Rychlak (1981). The utility of the four-causal framework to be discussed here is found in its ability to help clarify the grounds "for the sake of which" anything can be explained.

The Four Causes

The first of the causes employed by Aristotle is the material cause, or "the passive receptacle on which the remaining causes act" (Bunge, 1963, p. 32). The material cause is taken to be the literal substance which goes to comprise anything. Thus, for example, a chair might be said to be made of wood. It may be noted that in employing Aristotle's concept

in this way we are not following his strict usage of the term (see Rychlak, 1988, p. 5). This is in line with the realization that we have not set out to adopt Aristotelian philosophy en toto.

The second cause is the efficient cause, which reflects the impetus in events. Formulated in extraspective terms this suggests external compulsion, or an antecedent-to-consequent flow over time in which the former causes the latter. Thanks to the success of the natural sciences, it is this meaning of cause that is generally most readily brought to mind in discussions of causation (Rychlak, 1988, p. 5). The efficient cause-effect sequence (antecedent-to-consequent) may be contrasted with accounts which forego this push across time. Important to considerations of meaning and meaning-extension, for example, is a precedent-sequacious flow of events (to be discussed below), which reflects a logical ordering of events sans time.

The third cause of interest is the formal cause, a patterned meaning which may be seen as "the essence, idea, or quality of the thing concerned" (Bunge, 1963, p. 32). The objects and patterns of the world become "recognizable styles of this or that significance to the viewer, who comes to know them as much by these features as by their substantial nature (material cause) or the fact that they are assembled (efficient cause)" (Rychlak, 1988, p. 6). It is important to recognize that in our efforts to construct or abstract a theoretical system to account for the world around us, our reasoning inevitably culminates in a meaningful pattern of conceptions and designations. In fact, although no one cause

by itself can account for all things, it may be seen that, ultimately, the material cause mentioned above breaks down to become what we have here called formal causality. In this sense, the material cause cannot be taken as most "basic" to explanation (as some theorists, such as the materialists, have claimed). Alan Watts (1963) has summarized the situation as follows:

> ...when the scientist investigates matter or stuff, he describes what he finds in terms of structured pattern. When one comes to think of it, what other terms could he use? The sensation of stuff arises only when we are confronted with patterns so confused or so closely knit that we cannot make them out. To the naked eye a distant galaxy looks like a solid star and a piece of steel like a continuous and impenetrable mass of matter. But when we change the level of magnification, the galaxy assumes the clear structure of a spiral nebula and the piece of steel turns out to be a system of electrical impulses whirling in relatively vast spaces. The idea of stuff expresses no more than the experience of coming to a limit at which our senses or our instruments are not fine enough to make out the pattern. (pp. 12-13, italics added)

The fourth of the causes of interest here is the final cause, which Aristotle himself coined and made central to his physics (Rychlak, 1988, p. 6). It was Aristotle's belief that in order to render a full account of anything, we must state the reason or purpose "for the sake of which" something exists or is created: "Aristotle took organic development as his paradigm for explaining all material change, and he saw this in terms of development toward a mature form (e.g., the adult oak tree). He was prepared to apply this idea to the development of minerals in the ground and to the whole cosmos" (White, 1990, p. 4). It was this unwarranted assigning of final causes to nature, as when Aristotle proposed that

leaves existed for the sake of shading fruit on trees, that later theorists were to find distasteful. Rychlak (in press) has spoken of the "Baconian criticism" in this regard:

> It was Francis Bacon (1561-1626) who led the assault on such final-cause description in science. Pointing his guns at Aristotle, Bacon (1605/1952) said that it is bad scientific explanation to suggest that leaves on trees are "for the sake of " shading fruit, or that skeletal bones are "for the sake of" holding up the fleshy parts of the body (p. 45). Since we can fully explain trees, leaves, bones, and flesh using material and efficient causes, with the possible addition of occasional formal causes, any such final-cause phraseology is unnecessary. Thus, the Baconian Criticism holds that telic description in natural science adds nothing to the account! Bacon admitted final causation into the realm of metaphysics. But he definitely thought it was superfluous in physical description. (Rychlak, 1994)

In the present account we will argue that while this is true enough when we are speaking about the inanimate objects of the world--and, perhaps, some lower organisms as well--the value of the final-cause in accounting for human behavior is readily demonstrated.

The Nature of Theoretical Explanation

In general, our theoretical conceptions come first, providing the grounds upon which we subsequently base our methodological attempts at validating our conceptions of reality. We must avoid the tendency, however, to assume that what has been observed and recorded in the experimental context necessarily provides a complete description (explanation) of the phenomenon under study. All too often the precedent meanings framed in an experimental context are assumed to

be the only ones capable of explaining the events observed. Unless we keep separate our methodological descriptions and our theoretical accounts, we are open to committing the "affirming the consequent" fallacy, or what has also been called the "empiricist's error" (Rychlak, 1988, p. 274). Regardless of the outcome of our well-controlled experimental outcome, there are always, in principle, $\underline{N}$ possible explanations for any observation. It follows from this that none of the four causes can be effectively "ruled-out" of a theoretical account on an $\underline{a}$ $\underline{priori}$ basis.

As will become more apparent in the discussion to follow, there has been a general tendency to ground or reduce explanatory accounts to what we shall be calling mechanistic (material- and efficient-) causation. Yet, the material and efficient cause grounds are not the only ones which can be employed to explain the various aspects of the world. Indeed, from the perspective of a teleological theory of mankind, they are neither desirable nor complete. As we shall see, though such extraspective mechanistic accounts have proven quite helpful in the study of the inanimate world, such conceptions leave much to be desired in the study of the human being. Consistent with good science, much of evidence adduced by current mechanistic theories of the person is to be used here to provide support for a teleological conception of human behavior.

CHAPTER 2

THE FAILURE OF TELEOLOGICAL PSYCHOLOGY

A primary concern of those studying the relationship between mood and memory during the first portion of the twentieth century involved explaining the methodological finding of a relatively greater ease of recall for positive as opposed to negative memories (Singer & Salovey, 1988). Freudian theory, with its accompanying concept of *repression,* seemed to some to provide a theoretical context within which such notions might be validated. Thus, a portion of the original work in the area of mood and memory, viewed broadly, found its impetus in Freud's psychoanalytic psychology.

According to Freudian theory, some memories or experiences were intentionally, albeit unconsciously, repressed owing to the nature of their content. Using his or her knowledge of the workings of the mind, as well as any clues provided by the individual, the job of the psychoanalyst was then to subtly cue the client into remembering these repressed associations. That is, the psychoanalyst sought to look at the patient from an introspective or "first-person" perspective, and from the scattered fragments of the patient's recollections, cull an explanation of present functioning; in so doing he or she sought to recreate that long-forgotten emotional context, the remembrance of which would lead to insight--and, perhaps, cure.

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It would not be going too far to say that Freud conceptualized an intentional being. Oatley (1988) has eloquently described the manner by which Freud encompassed a teleological outlook:

> Memory does indeed have a central place in psychoanalysis, but the key to Freud's theorizing about it is his treatment of it as related to human goals, wishes as he called them: how we sometimes act as if we had an intention but deny it. Freud's methods were methods for investigating goals and plans, by listening to patients' stories. A story makes sense only when the goals and plans of the actors are understood. Yes, Freud was interested in restoring memories, but the interpretations that psychoanalysts offer to fill gaps in a story do not fill any old gaps. They fill specifically those gaps left by missing intentions. They suggest goals that might have been forgotten or denied, but which might make sense of otherwise incomprehensible sequences of action. (p. 11)

Though he originally sought to align himself with the extraspective meanings devolving from the primary influences of the day, including the medical model, natural science, mathematics, and evolutionary theory (Rychlak, 1981), Freud found himself sorely pressed to do so. In fact, though he ultimately settled on an awkward mental energy conception called "libido," Freud had strayed far from the theoretical conceptions of men such as Brucke, Helmholtz, and other prominent figures of the day.

Freudian conceptions of human mental processes, including memory, eventually fell from favor as individuals sought to examine reality in a presumably more objective and empirical--hence extraspective--fashion. Introspection, though considered by many of the time (e.g., Wundt, Brentano) to be a viable method of studying the human being, was faced with the increasing successes of the physical sciences in explaining the

world using extraspective and non-teleological scientific theory. According to Tageson (1982), perhaps the greatest factor in the demise of introspection and the study of consciousness was the discovery of the "conditioned reflex" by Ivan P. Pavlov in the early part of the twentieth century: "Objectively induced under rigid laboratory controls, quantifiable, publicly observable in terms of related stimuli and responses, the conditioned reflex was seized upon as the new building block for empirical psychology" (p. 4). The metaphysical framework of psychology was now cast in stone.

The Lockean Paradigm

In a very real sense, the momentum of the early physical sciences in making sense of the world was sufficient to carry its paradigmatic conceptions fully over and into the theoretical outlook of psychology. By affecting the foundational assumptions of this growing field, psychology's conception of the nature of the human being--and for our purposes, the relationship of mood/emotion and memory--was radically altered. The result was an attempt to firmly ground theoretical explanations in terms of material and efficient causation, then seen as most basic in nature. Sherif (1992) has commented on this occurrence as follows:

> Undeniably, the prestigious and successful sciences in the late nineteenth and early twentieth century were those securely focused on the physical world and the physical processes of the organic world. Psychologists, in their strivings to gain status with other scientists, did not pause long on issues raised by the differences between studying a rock, a chemical compound, or an animal, on the one hand, and a human individual, on the other. Instead,

methods that had been successful in the physical and biological sciences were embraced as models for psychology. Researchers were soon deep into analogy, comparing the human individual to the chemical compound or to the animal as the subject of research, with all of the power that such an analogy gives to the scientific investigator, at least if the animal is captive and small. Unlike the natural scientist, however, the psychologists had only social power over the research subject, not the greater power to explore, observe, and analyze that had unlocked so many of nature's secrets for the physical sciences. (p. 115)

Though this exclusively extraspective stance is perhaps not surprising, given the historical antecedents, its legacy has been a progression of mechanical or machine accounts--to the exclusion of teleological accounts such as the one to be offered below.

It was perhaps the British empiricist tradition which did the most to contribute to the formation of models of learning and development which presumed that the origin of knowledge could be traced back to the sense organs. There was much carryover from the British Empiricist position to the growing behavioral paradigm in the United States:

> [British Empiricism] has a certain aesthetic appeal and has been the typical choice of the tough-minded theorist. Most behavioral scientists have considered the British Empiricist position to be the more "scientific" position. Thus, when American psychology shifted to Behaviorism, there was a drastic shift in the subject matter of psychology (from phenomenal experience to behavior), but no change in each of the assumptions outlined above. On these fundamental issues stimulus-response psychology was in total agreement with British Empiricism. (Brewer & Nakamura, 1984: p. 98)

The position thus taken delineated a tabula rasa intellect, or what was defined by Popper (1972) as "the bucket theory of the mind." In other words, the mind is considered to be an empty or almost empty container into which "information" procured through the senses is accumulated

and later assimilated.

Such a portrayal pointed back to the naive realism of John Locke (1632-1704), an important figure in our understanding of the historical antecedents of what we take to be the contemporary opposing theories to be discussed in this paper. Such models shall henceforth be spoken of as Lockean conceptions. It was Locke who spoke of the mind as existing along the lines of an empty cabinet, into which experience deposits sensory datum in linear fashion. Locke, who aligned himself with the British Empiricists and thus against nativistic thinking, noted that "if truth is native to the human mind, it is useless to search for it outside of the mind by observation and experimentation" (Jacobson, 1982). He appealed for scientists and thinkers to examine the world external to themselves in order to discover the true source from which all ideas originated.

Locke's philosophy held several basic tenets with regard to the human being. First of all, as is perhaps already clear, all knowledge was seen as being derived from the environment. Thus, it followed that the mind was composed of simple elements, elements which had been input, as into the cabinet mentioned above. And, according to the Lockean perspective, the fundamental mechanisms of learning are associationistic, relying therefore upon frequency and temporal contiguity. One consequence of these considerations was that the human being was seen as a mere bystander, the passive recipient of signals/elements arising from the environment. Indeed, what we have here is a precursor to the notion of

the "black box" which was to become prominent during the reign of behavioral psychology in the United States. Locke felt that all things, human beings included, could be best explained (that is, in accord with the Baconian criticism, with the least "theoretical baggage") in a demonstrative fashion:

> How comes [the mind] to be furnished? Whence comes it by that vast store which the busy and boundless fancy of man has painted on it with an almost endless variety? Whence has it all the *materials* of reason and knowledge? [italics in original] To this I answer, in one word, from *experience* [italics added]. In that all our knowledge is founded; and from that it ultimately derives itself. (Jacobson, 1982, p. 10)

Accordingly, meaning for Locke arises only as a sign, activated by the senses to represent the relations between successions of events. This is to say that we as human beings are born without "content" (without Platonic forms), and that as we grow older and receive more and more input from the environment, our behavior subsequently becomes more and more complex (in additive fashion). The Lockean conception of the human being was thus very much an extraspective account, as it viewed all meaning as arising outside of the individual. Rather than the outer world being meaningfully construed by the human being beginning at birth (a top-down process), all meaning arrives as input at whatever time the individual serendipitously comes into contact with various aspects of his or her world (a bottom-up process). Rather than viewing behavior from the perspective of a person who behaves "for the sake of" some goal, the account shifted explanation to those forces in the environment which pushed the hapless individual from state to state in an efficient

cause manner.

An important consequence of the Lockean conception was the notion that all ideas were input from the environment over time. Thus, for the newborn to come to know any aspect of the world, he or she would have to exist in it for some indeterminate period, thereby inputting stores of information as he or she bumped and scraped along a narrow reality consisting mostly or entirely of the immediately sensible environment. Locke spoke of the newborn infant as follows:

> He that attentively considers the state of a child, at his first coming into the world, will have little reason to think him stored with plenty of ideas, that are to be the matter of his future knowledge. It is *by degrees* that he comes to be furnished with them. And though the ideas of obvious and familiar qualities imprint themselves before the memory begins to keep a register of time or order, yet it is often so late before some unusual qualities come in the way, that there are few men that cannot recollect the beginning of their acquaintance with them. [italics in original] (Taylor, 1961, p. 11)

Thus, concepts like "mama" came to have meaning after being associated contiguously over repeated occurrences with positive and negative encounters. In this manner concepts like "good" and "bad" were also learned. Rather than being seen as two elements unified under one context in oppositional fashion (hence lending meaning one to the other), such evaluative notions were considered apposites--no more related to one another than concepts such as grass and concrete. Below we shall have more to say about the ideas of John Locke, ideas which were picked up by scientists eager to carry forward the empirical torch of knowledge. With alacrity and zeal, a great majority of thinkers since

Locke have adopted and then furthered the assumption that theory poses more of a barrier to scientific knowledge than a means of attaining it.

CHAPTER 3

A KANTIAN ALTERNATIVE: LOGICAL LEARNING THEORY (LLT)

The contemporary "problem" confronting the Logical Learning Theory advocate is this: spurred on by the successes of the natural sciences (e.g., physics, biology, etc.) in discovering relationships among the constituents of the outer world, contemporary psychology seems to have largely adopted a machine metaphor for explaining human behavior. As the so-called "natural" sciences relied upon extraspective observation of events, it seemed plausible to look at the human being in this same extraspective and "empirical" fashion. Indeed, this appeared to many to be the most parsimonious means of explanation. However, significant portions of this thinking, which has provided the underpinnings for much of the theorizing in the field of psychology, are being rendered obsolete by contemporary understanding of the human being. Thus, much of what is to be presented here will serve to elucidate by way of contrast the position espoused by Logical Learning Theory, as against this machine metaphor. The goal is to render a cogent account of the need for a revision in contemporary thinking about the human being. It is hoped that from an explication of such problems as arise from what we have been calling the Lockean perspective, the tenets of LLT will follow smoothly, logically, and, perhaps, even necessarily.

The Nature of Cognition

In contrast to the mechanistic images of man examined above, Rychlak (1986) has proposed a teleological conception of the human being which he calls Logical Learning Theory (LLT). A teleological theory holds that the item under description, for our purposes the human being, intentionally chooses among alternatives before opting for any course of behavior. A framework of this sort entails the formulation of a more active and therefore introspective account of cognition, one in which "free-will" need not be reduced to or "explained away" as mere mechanism. Underwriting the LLT conceptualizations of the human being are formal- and final-cause constructs which, in contrast to the material- and efficient-cause constructs which underlie the great majority of contemporary cognitive theories, allow for a true freely-willing organism. Though not employing Kantian philosophy per se, LLT draws extensively from Kant's work in order to frame an intentional organism. It was Kant who argued that the mind imposes a "structure" on the world, in *a priori* fashion. Thus, any truths

> derive their necessary character from the inherent structure of our minds, from the natural and inevitable manner in which our minds must operate. For the mind of man (and here at last is the great thesis of Kant) is not passive wax upon which experience and sensation write their absolute and yet whimsical will; nor is it a mere abstract name for the series or group of mental states; it is an active organ which moulds and coordinates sensations into ideas, an organ which transforms the chaotic multiplicity of experience into the ordered unity of thought. (Durant, 1926, p. 291)

The perspective offered by Rychlak may be said to be a predicational,

rather than mediational, account. Predication is here to be understood as an act of affirming, denying, or qualifying precedently broader patterns of meaning in relation to narrower or targeted patterns of meaning (Rychlak, 1986). A key feature of LLT is a belief that some of the meanings confronted by the individual are dual, such that they present the person qua conceptualizer with two or more alternatives in any act of cognition. Such an account meets what is here taken to be the requirement of showing how it is possible for the human being to frame alternatives in an act of cognition, choose from among these, and then behave for the sake of such premises or affirmations. The presence of such alternatives, arising naturally via a dialectical (or oppositional) reasoning capacity, necessitates the rendering of a predication (affirmation, choice, etc.), and hence opens the way for a teleological account.

Theory of Learning

The key to a teleological theory is meaning, as understood introspectively by the individual under consideration. Meaning therefore arises not from pre-patterned wholes input from the environment as suggested by John Locke, but rather from the meaningful affirmations "for the sake of which" the individual comes to understand and act upon the world. Thus, stimulus inputs from the environment are not taken in and stored as such, but rather must be rendered significant by the person concerned. The ability to predicate is innate, so that we do not

learn to predicate, but rather predicate in order to learn. Further, the passage of time, so necessary to mechanistic accounts of learning, is superfluous to the account of LLT, relying as it does on a principle of meaning-extension.

From the LLT perspective, cognition itself is an ordered sequence of patterned meaning, flowing from the broader to the narrower realms of understanding (Rychlak, 1986, p. 740). Such a process involves predication, and necessarily makes use of formal- and final-causation in accounting for the flow of human mentation (Rychlak, 1986). That is, in order to understand the behavior of another, we must see this individual as he or she introspectively frames (patterns, renders meaningful) some aspect of the world, and then acts "for the sake of" this affirmation (predication) in moving towards a desired end.

In order to escape the problems posed by mechanistic explanations, LLT looks to the tautology as a fundamental aspect of the principle of meaning-extension. A tautology, from this perspective, is

> ...a patterned relationship of identity between items (things, words, outlines, arguments, numerical values, shapes, etc.); this relationship is not created by antecedents thrusting consequents along, but obtains when the patterns related meaningfully fall into line as 'more or less' identical. (Rychlak, 1984, p. 400)

Tautology is commonly understood from an extraspective perspective as mere repetition. However, when seen from an introspective perspective, tautology becomes a fundamental aspect of the predicational process, by which "known" or predicated meanings (contents) are sequaciously extended (via a telosponsive process; see below) to other so-called

"targets" of meaning. Partial tautology can be seen in both analogy and disanalogy, from which follow also such notions as metaphor, allusion, etc. By way of example, metaphor occurs when a figure of speech that ordinarily designates an item or idea is used to designate a dissimilar object or idea for the purpose of suggesting a comparison or analogy, as when one speaks of the "evening of life." Such extensions of meaning can be logical or illogical, of course, and LLT seeks to explain both rational and irrational thoughts and behaviors via this broad-ranging process.

In light of the trap set by much of the common nomenclature of psychology, a term was needed to replace the traditional response conceptions mentioned above. To meet such a need, Rychlak (in press) has formulated the concept of telosponsivity, defined as follows:

> A telosponse is the affirmation or taking of a position regarding a meaningful content (image[s], word[s], judgmental comparison[s], etc.) relating to a referent acting as a purpose for the sake of which behavior is then intended. Affirmation encompasses predication.

The predication, or predicate meaning, is the content of the predicational process, and is extended, either in whole or in part, via the person's ability to tautologize. Such conceptualizations are anchored at the protopoint, or the point of meaning-extension at which the affirmation is made. As suggested earlier, this is a necessary part of any cognitive act, because the dialectical (oppositional) reasoning capacity of the individual provides alternatives in each life event. Opportunities in life are not "out there" in the external world so much as they are "in here,"

framed within the cognizance of the person in question. We shall see below that dialectical contrasts, consisting as they do of an intrinsic relational tie (rather than an extrinsic relational tie), are often of an evaluative nature. That is, in contrast to demonstrative (Lockean) formulations, which concentrate more or less upon quantitative relations, dialectical relations take as their primary (though not exclusive) focus the qualitative aspects of lived experience. Computers, which reason exclusively in demonstrative fashion, are not capable of consciousness. Human consciousness, on the other hand, which always presents the individual with contrasting implications in experience, arises precisely because of the need to "take a position."

Protopoint Affirmation and Memory

Above we noted that the affirmation in telosponsivity is made at a protopoint, at which time that meaning is framed which will be extended tautologically into ongoing cognition. The logical ordering here is from a precedent meaning to its sequacious (i.e., necessary) extension. A fundamental premise of LLT is that the meanings framed in the telosponsive process extend necessarily once they have been affirmed as relevant to the circumstances facing the individual. Prior to this affirmation the meaning or meanings may be countered by uncertainties, ambivalences, and the like. The research literature in the field of psychology has reflected precedent-sequacious meaning-extensions in such various notions as inference, attribution, implication, impression

formation, induction, and deduction (Rychlak, 1994). We now turn to some of the many examples of predication and telosponsivity to be found in psychology.

Turning back to the short-lived Wurzburg School of Imageless Thought, established just after the turn of this century, we find precedent-sequacious meaning extension in such concepts as "aufgabe" and "einstellung." The aufgabe, or the experimenter's predication via task instruction, could be seen to establish a precedent einstellung (predicating bias) for the subject under study, a bias which was then extended sequaciously into the findings of the ongoing experiment. Asch (1946), in an early study examining impression-formation, found that if subjects were told that a person was "intelligent, industrious, impulsive, critical, stubborn, and envious" they were predisposed to evaluate this individual more positively than if the same characteristics were conveyed in the opposite order. The initial affirmation of the individual as intelligent appears to have framed a precedent set (einstellung) that extended sequaciously into the ongoing impression in the face of some contrasting evidence, which seems then to have been re-predicated in terms of this more positive protopoint affirmation (Asch, 1946, p. 69).

The importance of the manner in which experience is predicated is also well demonstrated by the work of Sperling (1960), in his investigations of sensory memory. In his earlier research, Sperling had subjects view an array of letters which were presented for brief periods of time. They were then asked to recall as many of the letters they had seen

as possible. Sperling found that no matter how many letters were presented, subjects were limited in their recall to four or five letters using this whole report procedure. He then used a partial report procedure which asked subjects to recall only a portion of the array of letters (a single group of letters in either a row or column). Using a tone, subjects were cued regarding which row or column was to be recalled. Interestingly, Sperling found that subjects could recall any row or column virtually without error, even when the tone was presented up to 300 milliseconds after the termination of the visual display. Clearly, the entire array was available for recall by the subjects. But what they would or could recall was not stimulus bound. While critics might argue that the subjects' retention was "determined" by the experimenter, upon reflection we might see that it is only because the subjects' themselves consented to the procedure that the results came out in the pattern of interest. Given an unwillingness to follow the procedures outlined by the experimenter (the "aufgabe"), subjects might easily have predicated the task differently ("einstellung"), leading to other than the anticipated results (See Page,1972, who found examples of subjects who did not conform to a response-reinforcement contingency, despite clearly understanding the experimental expectations).

Another example of the importance of the manner in which the task is predicated is provided by the work of Pichert and Anderson (1977). In a series of experiments, these researchers had subjects alter the perspective from which they read and then recalled a story. In one

instance, they had readers adopt the perspective of either a homebuyer or a burglar when attempting to recall information associated with a house. They found that subjects who, for example, had adopted the perspective of a burglar were more likely to recall having seen a color television, while subjects who had adopted the homebuyer stance were more likely to recall information about a leak in the roof. The point is that the recall of material was not caused in mechanical (material- and efficient-cause) fashion, either by the sensory stimulus, or the instructions of the experimenter. The recall observed reflected the subjects' unique predication of the task ("aufgabe") at hand. Logical Learning Theory would argue that though such examples of precedent-sequacious meaning-extension are legion in the everyday activities of all individuals, the fact that they are often clothed in mechanistic garb renders them difficult (or impossible) to see.

One area of particular difficulty for traditional mechanistic theories of learning occurs in cases similar to those just mentioned, but in which oppositionality is involved. We have thus far been mostly concerned with the "inside" of a Euler circle arrangement (circles within circles, we might say) as meaning is extended from the broader to the narrower realm of understanding. But as has been suggested above, we have also to consider the "outside" of this logical arrangement. According to LLT, the intrinsic relational tie of inside to outside should facilitate memory performance under some circumstances. Schema theory predicts that what is familiar (in the sense of having been encountered repeatedly) is

what will be ingrained in mind, hence remembered. The schema is the inside of our Euler circle arrangement, and its meaning is extended to some target. But the advantage to be gained in having familiarity (in LLT terms, a meaningful predicating framework) with some item or experience extends beyond this, to include the effects of contrast and/or negation on memory.

In an experiment by Hastie and Kumar (1979), for example, subjects were given trait descriptions establishing a target person as "honest." This was done in order to have subjects formulate a particular schema of this individual. Subjects were then given information which was either consistent, inconsistent, or irrelevant to the question of the target individual's honesty. It was found that subjects recalled significantly more inconsistent information than consistent or irrelevant data. A similar finding occurred when Pezdek, Whetstone, Reynolds, Askari, and Dougherty (1989) had subjects study the layout and contents of either an office or a preschool classroom and then recall what they had seen. Within each of these settings, some subjects saw items inconsistent with what their "schemas" would lead them to expect (for example, an ashtray in a preschool classroom). At recall, subjects were once again found to recall significantly more items inconsistent with the setting than items consistent with it. This occurs because contrast and negation are a part of every predication, so that even inconsistent or unexpected information contributes meaningfully to what is being framed.

The notion that meaning is extended from a "broader" realm of

meaning to a "narrower" realm of meaning leads us to expect other specifiable patterns of results in the area of memory research; more specifically, in the area that we may call "predicate cueing" (Rychlak, 1994). For example, if the sentence "A pan can be used as a drum" has been seen before but is presently "forgotten," cueing the subject with either the word "pan" or "drum" will be seen to improve memory over what it would otherwise be (Rychlak, 1994). However, from the LLT perspective a further distinction is possible, in that we would expect a greater facilitation to occur with the cue "drum" than with the cue "pan." This relates to our principle of meaning-extension, wherein a broader expanse of knowledge or meaning (here, the broader predicate meaning) is brought to bear conceptually "onto" a narrower or more focused target.

In order to demonstrate such cueing effects, while showing that such effects are not simply the result of linguistic conventions, Stilson (1988) gave subjects word triplets, each consisting of three words. Within each triplet, one word was broader in meaning (relative to the other two words), and therefore capable of sequaciously extending meaning to the remaining words. So, for example, if given the triplet "nose, face, smile," the word "face" would be most likely to be employed as the predicate meaning. Given that a subject has read this triplet, but now cannot bring it to mind, do we expect a greater facilitation from the use of "face" as a cue, one of the other two possible words, or should it not make any difference? According to traditional cognitive psychological theories, this should not make any difference, since ease of recall is presumed to be

based on frequency and contiguity measures. However, according to LLT, since "face" is capable of subsuming and hence lending meaning to both "smile" and "nose," we would expect a greater facilitation from the cueing of this term. This is what was found. Although cueing subjects with any of the three relevant words aided memory, the greatest facilitation was shown with words judged to be broader in context meaning.

In the ways mentioned above, we see the importance of what the subject "brings to bear" both inside and outside of the experimental context. We next turn to a consideration of "affection," which LLT takes to be the most "basic" precedent dimension utilized to frame experience.

A Basic Dimension on which to Build

As stated above, LLT is based on conceptions which allow for a freely-willing organism. As a first step toward the formulation of such a teleological conception of the human being, there began a search for a cognitive process which could not itself be reduced to traditional mechanistic explanations of learning (Rychlak, 1988). Such a conception would need to be capable of demonstrating a unique and unlearned contribution of the individual to the process of knowledge acquisition. We said above that an individual must essentially "know" in order to "know." But we have already rejected the idea of inherited mental ideas or "contents." If the individual is not born with innate contents, then how is it possible for the individual to extend a first predicating meaning? The realm of affection offered some hope of

formulating such a construct.

Based upon our dialectical account of human reason, the term affective assessment was chosen to denote the unique contribution of the individual to his or her thought processes. A purely cognitive act, affective assessment referred to the ability of the individual to sort (organize) the varying contents of the world (including literally anything known or knowable) along a bipolar dimension of like-dislike. Affection is involves, not activation, but predication. Such a capacity is made possible by transcending telosponsivity, or the innate capacity of the individual to "step back" and reflexively construe (i.e., evaluate) the meanings of his or her predications (cognitions). In so doing, the person characterizes all such meaningful contents as either liked (positive evaluation) or disliked (negative evaluation) in quality.

This affective conception is taken to be the broadest possible frame of reference by which an individual may sort the varying aspects of his or her world. One benefit of an idiographic conception such as affective assessment is that it allows for an examination and explanation of behaviors dating back to the very earliest days of life, as the newborn infant begins ordering and rendering cogent various aspects of the reality with which he or she is faced.

> The assumption made by LLT advocates in this research is that so-called stimulus inputs or encodings of experience are not simply 'recorded' conceptually as given, but that they must be predicated in the process of telosponsivity. In having to frame precedents of experience--and especially of highly unique experience, as in the task faced by infants--the dialectically reasoning human being falls back on the broadest possible meaningfulness to accomplish the

conceptual task. There is no broader range of meaning than a person's unique preferences, his or her 'likes' and 'dislikes' which can frame all possible experience as a kind of preferential predicate." (Rychlak, 1986, p. 746)

For our purposes, the importance of this conception lies in its essential tie to LLT assertions regarding both mood and memory, to which we now turn.

Research on Affective Assessment

The concept of affective assessment is underwritten by the construct of telosponsivity, and is operationalized by asking subjects to render a judgment of "like versus dislike" in regard to some item in experience. In having the subject render such a judgment, we assume that the individual can meaningfully frame items such as pictures, faces, words, etc., along this bipolar dimension of "likability." An item thus considered becomes a "that for the sake of which" an evaluation (affective assessment) is rendered. Once such an evaluation has been made, the individual is likely to carry out the steps necessary to further his or her purposes, for as Rychlak (in press) states: "Affection orients the person to the future through choice."

In the methodological context, subjects' telosponses are recorded on a four-point bipolar scale which ranges from "like much" and "like slightly," to "dislike slightly" and "dislike much." This provides a dialectical context within which is situated the individual's judgment. A variant, albeit congruent, way of thinking about the dimension of

affective assessment is to bring to mind the differences between the denotative and connotative meanings of any word. The denotative meaning of a word is that which can be sought in any dictionary. The connotative meaning, on the other hand, reflects a more individual assessment of the value of a word or concept for conveying an intended meaning.

Findings on positive affection. Though originally understood in biological and mechanical (material- and efficient-cause) terms, there were suggestions in the extant literature that something like affective assessment was to be seen in human learning (Rychlak, 1981). Tait (1913), for example, had subjects rate a series of colors for pleasantness and unpleasantness and then measured their reaction time using a color recognition test. The findings indicated that subjects performed better on those items which they had rated as pleasant. Fluegel (1917, 1925) had subjects keep a diary for a period of one month, during which time they recorded the duration, intensity, and quality of their experiences. Once again, the findings showed subjects listing more pleasant than unpleasant experiences. Though much of this early research was criticized on methodological and interpretational grounds (Singer & Salovey, 1988), the general finding of a learning superiority of pleasant over unpleasant and indifferent words continued to show through in most such studies (Rychlak, 1981).

From the very beginnings of his work in this area, Rychlak (1966)

found that college students learned their liked CVC trigrams more readily than their disliked trigrams. Matlin and Stang (1978) were subsequently to call this effect the "Pollyanna principle." Unfortunately, their explanation of this phenomenon fell back upon a positive reinforcement notion, in which the individual would form stronger associative bonds between the liked items to be learned and other liked information in memory based on mere exposure to the material. Similarly, it might be suggested that the learner expended more energy memorizing a positive item than a negative item, with a consequent stronger associative bonding hence better memory for the former than the latter. Thus, the meaningfulness of the material was determined externally "for" the person, who passively mediated such input and output relationships. This thinking is, of course, not consistent with LLT premises of how human mentation "works."

In order to expand upon the premises of LLT, a great deal of work was carried out in this area. The pattern results showing a facilitation for positive affection was extended to work involving colors and personal experiences, and in the learning of words (Andrews, 1972), abstract designs (McFarland, 1969), and names-to-faces (Galster, 1972). As the earlier research on pleasantness had suggested, subjects learned their liked trigrams more readily than their disliked trigrams. This robust finding obtained whether the experiments employed mixed lists (i.e., both liked and disliked trigrams included) or unmixed lists (i.e., either all liked or all disliked trigrams included) in paired-associates and serial

learning formats, and whether the rate of learning was tested using trials-to-criterion, recognition, or free recall (Abramson, 1967; Laberteaux, 1968; Rychlak, 1966).

After having subjects prerate their study topics in an introductory psychology course, Slife and Rychlak (1981) found that students did better on those subjects they rated positively (liked) than those they did not (disliked). Similarly, underachievers typically learn what they like dramatically better than what they dislike, while those individuals who might be characterized as overachievers seem not to have great difficulty with this factor; that is, they perform well with both sorts of materials (Rychlak & Tobin, 1971). Subjects have been found to correctly identify "good" (liked) words at a shorter tachistoscopic exposure rate than "bad" (disliked) words (Johnson, Thomson, & Frincke, 1960).

Researchers have also found the effects of positive affection extending beyond the context of learning (i.e., memorizing, recalling). Adults who predicate themselves and the world around them positively tend to see themselves as causes of positive outcomes to a greater extent than they perceive themselves as causes of negative outcomes (Mirels, 1980; Sherman, 1980). Lott and Lott (1970) found that children who drew a picture of a liked peer gave it more detail than a drawing of a peer whom they disliked. Children with a favorable affective (positive or "happy") outlook may be seen to extend help to others to a greater extent than children with an unfavorable affective (negative or "unhappy") outlook (Strayer, 1980).

Another area of interest and relevance for the present study concerns what are known as "transfer" effects in learning. In the area of affective assessment, it has been found that there is a dramatic order-effect when subjects are given successive unmixed lists of either positive or negative materials (e.g., trigrams, words) to be learned. For example, in one study all 32 subjects moving from a disliked to a liked list manifest improvement in performance on the second list, while only 13 of the 32 subjects reflected such improvement when moving from liked to disliked lists (Rychlak & Tobin, 1971). This is known as <u>positive nonspecific transfer</u>. It is "nonspecific" because the two lists of materials to be learned did not share any features in common. In order to extend these findings by showing that such results are not a consequence of linguistic considerations, Rychlak, Tuan, and Schneider (1974) contrasted association value (AV) with affection across lists of learnable items. They found that moving from lists high in meaningfulness to lists low in meaningfulness (and vice versa) did not effect transfer, whereas in moving from a disliked to a liked list subjects once again showed significantly greater improvement. Rychlak (in press) has pointed to the work of Premack (1965, 1971) as having relevance here also. Premack found that individuals will perform a disliked activity in order to then be able to engage in a liked activity. Similarly, Bolger, DeLongis, Kessler, and Schilling (1989) report that the termination of a stressful event (by definition an affectively negative occurrence) tends to leave people in better moods than if these events had not occurred. Such studies, which

essentially reproduce the disliked-to-liked ordering of the first study mentioned above, add support to the notion of a general positive nonspecific transfer. In LLT terms, the move facilitates the learning of "normal" individuals, who employ their personal evaluative preferences to frame a context of meaning in which positive or "liked" meanings are more readily extended to the task at hand than negative or "disliked" meanings. In the process of telosponding the individual tautologizes from his or her ongoing understanding (evaluative preference) "to" the situation at hand.

Findings on negative affection. The LLT concept of affective assessment posited more than just a facilitation in the learning of liked items. If affection provides a broader context within which the individual situates his or her life experiences, it should also follow that individuals who predicate themselves, the task at hand, or materials involved in the task at hand negatively, might learn their disliked materials more readily than their liked materials. This follows from the nature of sequacious meaning-extension: negativity creates and/or facilitates the extension of negative meanings, just as we saw above that positivity creates and/or facilitates the extension of positive meanings. Affection serves as a potent conceptual organizer of this nature.

The relationship between affective learning style and ease of learning is dependent upon a combination of factors which, together, determine the facilitation or seeming inhibition of learning. Rychlak has carried

out numerous studies designed to demonstrate the effects of precisely these factors. This work sought to examine not only "normal" subjects, who might be expected to predicate the world in a more or less positive fashion, but also individuals who might be expected to predicate in a negative fashion. Among other things, Rychlak and others showed that adult patients given diagnoses such as schizophrenia, depression, and alcoholism, collapsed or even reversed the learning superiority for positively assessed items in the direction of favoring negative items (Mosbacher, 1984; Rychlak, McKee, Schneider, & Abramson, 1971; Slife, Miura, Thompson, & Shapiro, 1984). These findings were extended also to elementary, high school, and college students with negative self-images (August & Rychlak, 1978; August, Rychlak, & Felker, 1975; Rychlak, Carlsen, & Dunning, 1974), and high school students who were forced to perform a learning task that they disliked (Rychlak & Marceil, 1986, 1992).

Again, not all subjects display significantly better performance for disliked than liked materials. In some cases the difference between the liked and disliked items is attenuated, with the result that there is no longer a significant advantage for the former items. This came to be known as a diminution of the ordinary "positive" effect. Others do, however, achieve a reversal, meaning that they learn significantly more disliked than liked items (August & Rychlak, 1978). In some cases, one gender subgroup in a sample might achieve a reversal, whereas the other would simply reflect a diminution (August, Rychlak, & Felker, 1975;

Rychlak, McKee, Schneider, & Abramson, 1971). In a study on high school students which crossed the factors of high or low self-image with ratings of "liking" or "disliking," an enforced paired-associates learning task was performed. The results indicated that although neither of these factors was by itself sufficient to achieve a reversal, when subjects were negative in self-image *and* forced to perform a disliked learning task, they did indeed learn significantly more disliked than liked CVC (consonant-vowel-consonant) trigrams (Rychlak & Marceil, 1992).

It is important to emphasize that we are not dealing with some form of generalized "activation" here, so that even persons with primarily positive self-images will, in some cases, learn along the negative more readily than the positive. We must consider an individual's affirmed premises regarding his or her own areas of strength and weakness; that is, take into account the broader affective predication (positive or negative) which is brought to bear in understanding liked or disliked items of experience. To examine this issue, Rychlak, Carlsen, and Dunning (1974) had college subjects specify a positive and a negative realm of life activity. For example, some subjects rated "aggressively competing with others" as a liked activity, whereas "becoming passively intimate with others" represented a more stressful (disliked) activity. Other subjects were found who displayed an opposite preference: these subjects rated "aggressively competing with others" as a disliked activity, and "becoming passively intimate with others" a liked activity. Words were then found to represent each of these domains. In the area of

competitiveness, such words as "incentive," "decisive," "demanding," and "excelling" were employed, while words such as "sympathy," "pamper," "reverence," and "accepting" were utilized to denote passive-intimacy. Subjects rated these words along the dimension of affective assessment. As predicted, subjects learned according to the positive affective assessment effect within their liked realm, but showed a reverse tendency within their disliked realm.

Finally, we find that this affective dimension is ubiquitous. For even the manner in which a therapist predicates (positively or negatively) the therapeutic situation is also quite important. This was demonstrated in a study of countertransference (Heiskell & Rychlak, 1986). Male medical students were used as subjects, playing the role of "psychotherapists." Male VA patients were used in the role of "therapy client." First, the veterans were videotaped while giving general information about themselves (such things as background, schooling, work history, etc.). Next, the veterans were asked to discuss two specific life concerns, one of a very positive nature and one of a very negative nature (e.g., job success versus sexual inadequacies). Then, in a pretest, and based on their more general comments, the medical students made RV (like-dislike) ratings of the patients. Each medical student was next asked to react verbally to a positive and negative videotaped statement made by a liked and a disliked patient, while acting as if he were in a therapeutic interview with each patient. These verbal statements were electronically recorded and later scored for empathy by judges who were unfamiliar with the medical

student's RV preferences. It was found that the medical students reflected the greatest empathy in their statements when they were responding to the positive life concerns of their liked veterans--but also to the negative statements of their disliked veterans. Thus, we see the rendering of affective judgments to be important on both sides of the therapeutic equation.

According to Logical Learning Theory (LLT), learning occurs not through the frequency of repetitions of an item over time or when two items occur in close proximity to one another, but rather when a person's precedent premises sequaciously order, and hence meaningfully conceptualize whatever task or material is at hand. If the individual's frame of reference is unable to make sense of experience, no learning will take place. Frequency and contiguity measures such as time on task, practice, and rehearsal are all viewed as being of secondary importance, useful more to referentially track the items of experience than as principles of explanation (Rychlak, 1986).

The Relationship of Mood and Memory in LLT

According to Logical Learning Theory, affective assessment is a "cognitive" (predicational) process, and as such is not to be confused with emotion. The latter entity is conceptualized as a physical occurrence, more as something which happens "to" one in life's varying circumstances. Logical Learning Theory (LLT) defines emotion as follows:

Emotion refers to the pattern of physiological feelings in a certain

> life situation, the sum total of which is targeted and thereby organized into meaning by the predications of the person experiencing these feelings and living through the circumstances of the situation involved. Emotions are not telosponses. They are not arbitrarily generated by oppositionality, but occur in unidirectional fashion as do all biological and physical circumstances in experience. Emotional feelings can be stimulated by certain drugs, or by having the person recall an emotionally upsetting life circumstance. (Rychlak, 1994)

That the two are distinct is suggested by the fact that the same emotion can be judged both liked and disliked, depending upon the context in which this judgment is made. Perhaps the best example of this involves anger. While this emotion can be a hindrance in one context, as for example when trying to deal fairly with a disliked other, it can also be utilized to bring about positive ends, as when an individual with a traditional lack of will musters the courage to confront another by whom he or she feels slighted.

The definition of emotion given above is designed to apply across the varying ways in which emotions might be said to function. In other words, whether emotions are the result of precedent cognitive appraisals, or are seen as conscious efforts to render meaningful some pattern of already occurring bodily reactions, the individual must make a unique contribution to the ongoing experience. Because of this requirement for active "participation" (predication) on the part of the person involved, one cannot "pretend" that something is liked when it is not, and thereby hope to sequaciously extend congruent meaning. Similarly, the intention to manufacture a genuine emotion cannot be fulfilled simply through an intention to "have it." As Rychlak (in press) has noted, in

order to capture an emotional mood we must place ourselves back into a situation that we have already experienced, during which time the emotion "came upon us:" "Just as inanimate physical events intrude on our behavior--as when we are suddenly caught in a cold downpour of rain--so too do biological intrusions occur as the person is swamped by a strange sensation during a life circumstance" (Rychlak, 1994, p. 135).

Another characteristic of the distinction between affection (affective assessment) and emotion is that although these processes (Logos-Bios) can be congruent, they can at times also bear an oppositional relationship to one another. As William James (1948) noted long ago:

> The associationists may prate of an idea of pleasure being a pleasant idea, of an idea of pain being a painful one, but the unsophisticated sense of mankind is against them, agreeing with Homer that the memory of griefs when past may be a joy, and with Dante that there is no greater sorrow than, in misery, to recollect one's happier time. (p. 248)

This does not mean, however, that once we are "down" we are constrained to experience this mood indefinitely, or until such time as our "state" of "activation" subsides. As Rychlak (in press) has suggested: "An unpleasant circumstance, once meaningfully framed, often teaches us to do what is necessary to make it pleasant. The concept of emotion does not include such directional suggestions....Based on the intrinsic oppositionality of affection such a strategy is readily suggested" (p. 55). Thus, for example, the individual who is feeling unhappy or depressed can reason to the opposite of what is presently the case and conclude that by visiting a liked friend or reading a liked book, an "elevation" of

mood may be brought about.

Much as the evaluation of an emotion or emotional experience is dependent upon the evaluation rendered by the individual, the same is true of "moods." Moods, which Morris (1989) describes as being both "pervasive" and "global," extend their meanings similarly, in precedent-sequacious fashion. As we shall see, research on mood has shown that how people predicate a circumstance influences what they will recall, learn, or produce as an evaluation in subsequent events. If this is indeed the case, we might then expect that pleasant moods would facilitate the recall of such things as pleasant life situations or previously learned positive word meanings, while the reverse might hold true for those aspects of the world which are predicated negatively. Findings of this sort would be consistent with the precedent-sequacious style of explanation which is essential to LLT (indeed, such findings are taken up in later sections). A "mood" is clearly a context meaning which must be predicated by the person involved; and once affirmed, its meaning extends to what is then under continuing cognitive formulation ("processing") (Rychlak, 1994). Moods, which LLT takes to represent affective assessments, may subtly insinuate themselves into our ongoing awareness, thereby playing a role in determining what we remember (reconceptualize) from the past, as well as perceive in the present. If this is the case, then we would expect to see research findings in the mood and memory literature which are similar to the findings mentioned above (e.g., persons who predicate themselves positively might be expected to

learn liked materials more readily than those who dislike themselves, etc.).

As we have said, affection acts as a significant conceptual heuristic to facilitate the learning of the individual. That is, affection may serve as a wider "context" or predicate meaning which can be extended into what will be known in cognition. This occurs according to the same sequence of meaning-extension discussed above. Such facilitation can occur both at what is called the point of "encoding" and at the point of "retrieval." In LLT terms, the former is equivalent to "affirmation at the protopoint" (Rychlak, 1994), wherein the material to be cognized is actively organized along one or more meaningful dimensions, including the dimension of affective assessment.

If affective assessment is truly a very basic dimension which can be brought to bear at what we have referred to as the point of "encoding," then it should be possible to demonstrate these heuristic properties. Ulasevich (1993) carried out a "Judging John" experiment, in which he showed that subjects in a learning task will likely grasp the affective quality of a word that they do not yet "know" before they can give a word with a similar meaning to it. He did this by having subjects look at a computer screen and attempt to memorize a list of statements concerning "John." Subjects first read through the list on a practice trial, and then were immediately given a recall trial in which sentence stems were presented. If, after a predetermined period of time, the subjects had not been able to give an answer, one of two sets of

instructions appeared on the screen asking subjects either to type a word similar to the one they could not think of, or to type P or N for whether the affective quality of the word was positive or negative. Again, subjects were better able to provide the correct affective quality than a word with similar meaning. In fact, even in the latter case, the incorrect words presented tended to themselves have the correct affective quality.

In order to examine the heuristic value of affective assessment at the point of "retrieval," Hughes (1993) had subjects think of appropriate examples of persons whom they considered to be either "positive" or "negative" in appeal. After bringing to mind such an individual, subjects were asked to read through a list of personality adjectives and mark those that most aptly described the individual in question. Following two recall opportunities, during which subjects were first asked to record in writing all of the adjectives which served as secondary predications to the affirmed (primary) target, followed by any other adjectives that could be recalled, she asked subjects to "reverse" the target of their primary predications. At this point, subjects had presumably exhausted their memory from within the broader context provided by the primary affirmed predication. The new task involved having subjects think of (conceptualize) an individual about whom they felt the opposite of the previous individual (for example, moving from a "liked" to a "disliked" individual, or vice versa). Once this "re-predication" had taken place, subjects were asked to once again think of the initial list of adjectives, and to try to recall any additional words which came to mind.

Specifically, subjects were asked to try to recall any of the previous adjectives which might suitably apply to the <u>new</u> target. It was indeed found that subjects recalled a significant number of additional words, but these words were consistent with the new primary affective predication. This is similar to the experiment reported earlier, in which it was found that cueing subjects with a broader predicate meaning in the case of word triplets showed a greater facilitation effect on memory than cues whose range of meaning was not capable of subsuming the other members of the word triplet. Such a finding is also reminiscent of the work of Sperling (1960) cited above, which demonstrated the importance of the protopoint affirmation made by the individual, above and beyond purely sensory factors. Subjects had clearly "seen" all the words presented in the present experiment, yet what they recalled was sequaciously determined (at least in part) by the precedent framework they brought to bear in the task.

CHAPTER 4

LOCKEAN THEORETICAL PERSPECTIVES ON

MOOD AND MEMORY

Semantic Network and Schema Theories

Bower (1981) has worked extensively with this area, and he interprets the findings of this vast literature in terms of an associative network theory of memory. Within this framework, information is represented in mind in the form of interrelated networks of nodes, these being connected by associative linkages of varying strength. He states:

> Human memory can be modeled in terms of an associative network of semantic concepts and schemata that are used to describe events. An event is represented in memory by a cluster of descriptive propositions. These are recorded in memory by establishing new associative connections among instances of the concepts used in describing the event. The basic unit of thought is the proposition; the basic process of thought is activation of a proposition and its concepts. (Bower, 1981, p. 134)

These nodes themselves represent a vast array of concepts, and also include--in addition to memories--such things as emotions and the contexts of various experiences. When a particular node is activated, either by internal or external stimulation, associated nodes are also activated. If the activation of some particular node or network of nodes reaches a critical threshold, then a memory or feeling may enter conscious awareness. According to Bower, subthreshold excitations can

also add together, so that a number of weak stimuli or cues may also cross the threshold to consciousness. Bower here draws upon a concrete physical analogy to elaborate his point:

> A relevant analogy is an electrical network in which terminals correspond to concepts or event nodes (units), connecting wires correspond to associative relations with more or less resistance, and electrical energy corresponds to activation that is injected into one or more nodes (units) in the network. Activation of a node can be accomplished either by presentation of the corresponding stimulus pattern or by prior activation of an associated thought. (Bower, 1981, p. 134)

This model can account for the finding that mood state-dependent retrieval is most efficient when the individual is undergoing a recall rather than a recognition task. In the former case, multiple-cues are needed to raise activation above the critical threshold, whereas in the latter case, presentation of the stimuli directly may retrieve the stored information without need of additional cueing.

The primary predictions made by the Bower (1981) theory include (1) a mood-dependent retrieval effect, and (2) a mood congruity effect. The former is accounted for by the supposition that mood at encoding becomes associated with the material to be learned, such that reinstatement of that mood acts as an automatic retrieval cue to facilitate recall. That is, activation of the mood node associated with the memory of interest increases likelihood that the relevant memory will also be activated through its close association. The latter effect is presumed to occur when the valence of the affectively-toned material in the environment is congruent with the learner's state. In a situation

such as this, the learner is thought to selectively enhance positive material when in a positive mood, and negative material when in a negative mood. That is, the active emotion node sends activation to those perceptual categories which are associatively linked to it, thus rendering these categories ready for use. In addition, events that lead to pleasant evaluations will enhance a positive mood, while events which elicit a negative evaluation will tend to enhance a negative mood. In both cases, this congruity is hypothesized to lead to greater processing and hence better memory.

The schema theories of mood and memory, which were said to be similar to associative network theories of the sort proposed by Bower (1981), generally adopt the position that people have cognitive schemas which are consistent with their ongoing mood state. Schema theories which examine depression sometimes employ the notion of a negative schema (e.g., Beck, 1967; Beck, Rush, Shaw, & Emery, 1979) through which the individual frames the world and the people in it. Once activated, this negative schema focuses the individual's attention of negative aspects of the environment, which in turn supports and hence perpetuates the generally negative outlook. A schema can be seen as an outline of a commonly occurring event or a prototypical exemplar of a concept. But schemas are not only employed by depressed persons, and another example might be a "restaurant script," consisting of the knowledge of the events that occur when eating at a fancy restaurant (Minsky, 1975). When such a schema is activated during the course of

information processing, attention is automatically directed towards information relevant to the schema. According to schema theory, ambiguous aspects of the environment will be interpreted according to any biases induced by the schema, and information consistent with the schema will be more readily elaborated upon and so better connected to other facts in memory (for a contradictory set of findings, see Pezdek, Whetstone, Reynolds, Askari, & Dougherty, 1989). Differences between network theories such as Bower's and schema theories are perhaps not great, and, indeed, Bower himself frequently speaks of the activation of cognitive schemas within the framework of his own theory. However, schema theories do not employ the notion of spreading activation (Ingram, 1984) and are somewhat more compatible with Logical Learning Theory than Bower's (1981) explication of network theory. Though this is probably not the intent of the majority of authors subscribing to schema theories, a schema may be regarded as similar to a pair of precedent conceptual spectacles which sequaciously "color" what is to follow in experience. So, for example, the depressed individual will tend to (sequaciously) extend negative meanings in experience more readily than positive meanings.

Isen's Cognitive Psychological Perspective

Another of the more prolific contributors to the area of mood and memory research has been Alice Isen. Seeking to take into consideration the difficulties associated with expectancy and demand when doing

research of this sort, Isen has produced a large number of studies outside the laboratory (though by no means exclusively in this realm) in an attempt to obtain greater ecological validity. Typically, this has been done using subtle mood manipulations and indirect measures of mood. It is worth noting, however, that Isen has failed to utilize idiographically evaluated materials, relying instead upon nomothetic evaluations where applicable. For this reason her research suffers from some of the same ambiguities as the more "conventional" research she has sought to improve upon.

Isen's theoretical outlook is firmly grounded in a cognitive psychological framework. It is her belief that mood-related phenomena result from the activation of mood-induced cognitive processes, with important differential effects to be obtained depending upon how aware an individual is of their existence and/or "activation." In line with Posner and Snyder (1975), who introduced the distinction, Clark and Isen (1982) have suggested that the cognitive processes that occur during moods are either "automatic" or "controlled." Automatic cognitive processes are thought to occur without intention or awareness, so that they do not "interfere" with other ongoing cognitive processes. Controlled processes, on the other hand, being both effortful and conscious, occupy our limited capacity information processing system and therefore can disrupt other cognitive activities. Clark and Isen (1982) attribute the majority of mood effects to automatic processes, which are the subject of the preponderance of her work. In this view, the

hedonic tone associated with the mood-inducing event insidiously causes us to retrieve similarly toned thoughts, thoughts which then influence our judgments, decisions, and behaviors. Note that rather than a precedent-sequacious meaning-extension taking place here, we see the material/efficient cause activation analogy being drawn upon. Another difficulty is that Clark and Isen do not specify the mechanism whereby the cognitive processes associated with a mood switch from the automatic to the controlled variety. Further, this latter notion of an independent ("controlled") contribution of the subject to the task at hand seems a bit out of place in the sort of theoretical framework adopted by Isen, though she apparently does not see any discrepancy here.

How does mood influence the individual in automatic fashion? From a nodal network theory's perspective, the most likely factor would seem to be the absence or lack of a label or appraisal of an affective state. In the case of Isen's account, the typical cause of mood is an event of modest hedonic relevance, sufficient to prime thoughts sharing the same hedonic tone but insufficient to interrupt ongoing behavior and attract focal attention, occurrences Isen associates with emotion. Labeling does not occur because the event initially engages only automatic associative or retrieval processes; conducting an appraisal or "meaning" analysis would require the involvement of higher level cognitive processes which are ordinarily reserved for events of more importance.

On some occasions, mood may affect us in a different way, via so-

called controlled cognitive processes. These are times when the presence of the mood becomes a factor in conscious decision-making or problem solving. The specific instances discussed by Clark and Isen (1982) are self-regulatory in nature; that is, people in good moods make decisions designed to protect their mood from an impending negative event or people in bad moods think or behave in ways designed to "repair" their moods. However, it seems that one could just as easily offer a simple threshold explanation for these phenomenon.

Resource Allocation Models

According to the resource allocation or capacity model explicated by Ellis and Ashbrook (1988), there is a limited amount of attentional capacity within the individual, and this is divided when two or more tasks are engaged in simultaneously. Consequently, information or material which does not require great processing demands (and hence is easily processed) can be expected to result in less consistent mood effects. So, for example, material which has been essentially over-learned (e.g., childhood memories) will not be greatly affected by mood's influence. The same also holds true for highly meaningful or highly organized materials. In those situations, however, in which processing demands are relatively great, the theory predicts that we should observe a more pronounced impact of mood on memory. This prediction is similar to that made by Bower's theory in relation to such over-learned items. The mechanisms, as described, are slightly different, though perhaps not

incompatible. The Ellis and Ashbrook model makes three primary assumptions to account for the effects of emotional states on memory: (1) emotional states produce their effects on cognitive activities by regulating the amount of capacity available to be allocated to a given task; (2) the encoding of information usually requires some allocation of cognitive capacity or effort; and (3) memory performance is frequently correlated with the amount of capacity allocated to the cognitive task (Ellis & Ashbrook, 1989).

The resource allocation approach to mood and memory issues differs from semantic network and schema theories primarily in its focus upon the allocation of attentional capacity. Network and schema theories are generally more concerned with how current memory organization affects the processing of information in memory. What all these theories share in common, however, and a crucial way in which they differ from Logical Learning Theory, is their focus upon energic conceptions as a foundational notion. Both the spreading of "activation" and the appropriation of "attention" eschew the primacy of the Logos in favor of what appear to be Bios conceptions.

Because the resource allocation model will not be discussed further here, we give two brief examples of research from this perspective. Results consistent with this hypothesis were found by Hasher, Rose, Zacks, Sanft, and Doren (1985), who found no evidence for mood congruence effects (an otherwise reliable phenomenon) when they presented subjects with narrative passages during learning and then

tested for recall of these passages. According to this theory, highly organized narrative passages should have been relatively impervious to mood effects. A study carried out by Ellis, Thomas, and Rodriguez (1984) also clearly supported the notion of resource allocation. They employed a sentence-completion task with varying levels of difficulty, such that some of the sentences required a great deal of effort to complete, while others were comparatively easy. They found that depressed subjects had more difficulty recalling the portions of the difficult task, but not so for the easy task. This is as would be predicted by the Ellis and Ashbrook (1988) model, which hypothesizes that depressed states will have their greatest impact on tasks which place a heavy emphasis on encoding.

CHAPTER 5

REVIEW OF THE EMPIRICAL LITERATURE

In most of the recent discussions of mood and memory research, the predominant view has been that the effects of emotion-inducing events are dependent on changes in emotion per se. However, there is now considerable evidence that emotion as a subjective feeling state may often be unrelated to differences in recall. While an emotional state may be particularly salient after exposure to a mood-induction, it does not necessarily follow that the emotion per se has caused the patterning of subsequent recall. While some alternative explanations argue that the immediate effects of the induction may also include the priming of cognitive schemas and conceptual categories (e.g., Bower [1981] or Isen [1982]), this is not the perspective adopted by Logical Learning Theory. In what follows, it will be argued that the LLT conception of affective assessment can adequately account for the familiar, replicable findings in the mood and memory area, as well as for many findings not explained by theories which make some form of emotional "arousal" the mediating variable.

The Effects of Mood on Perception and Judgment

There is a fair amount of literature consisting of studies in which moods are either induced or existing affect is measured and the effect on

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some perception or judgment is assessed. According to Morris (1987), the evidence from these studies tends to confirm popular wisdom that mood does influence how things look to us. He notes that although that influence is most often mood congruent, there is some variability with regard to positive and negative affective states--precisely in accord with the many and varied findings on affective assessment mentioned above. For example, past research has found that while individuals in positive moods show increased helping and attraction toward others, the effects of negative mood are more inconsistent. According to Logical Learning Theory such findings are a result of the precedent-sequacious lines of meaning extension taking place in each particular case. That is, the affective assessment which is rendered sequaciously "colors" the experiences to follow, determining the subjective meaning or quality which they will have for the individual. This evaluation is rendered over and above what is actually taking place in experience, for this is the nature of affective assessment--which is a transcending telosponse. This is a logical--and not a biological--determinism. It is worth noting that the findings of many of the studies to be reported here are similar to those mentioned in the section on LLT, despite the general lack of a mood manipulation in the latter works. This is taken as further support for the notion that both mood and emotion are not "states" of activation, but rather logical extensions of meaning in precedent-sequacious fashion.

<u>Mood and subjective evaluations</u>. In one of the more well-known studies to be done in this area, Alice Isen and her colleagues (Isen, Shalker, Clark, & Karp, 1978, Study 1) induced positive mood in a shopping mall by giving a small promotional gift to individuals who passed by. These persons were stopped a short time later and asked to participate in what was, ostensibly, a consumer satisfaction survey of their televisions and automobiles. In contrast to a control group comprised of individuals from the mall who had not received gifts, the experimental group reported more favorable perceptions of both their televisions and automobiles. Isen (1975) has suggested, in accord with such theories of spreading activation as that proposed by Anderson and Bower (1973), that the effects of positive and negative moods on behavior result from the relative availability of mood congruent thoughts. This is thought to occur through a sort of "priming" of congruent memories, which are theorized as being located near one another within the "semantic network." That is, when a given event is activated by some external occurrence, other nearby nodes are similarly "activated," thereby increasing the likelihood that a given memory will cross the limen of consciousness. This notion is suggestive of a drive conception, and hence is incompatible with Logical Learning Theory.

In a second experiment, Isen et al. (1978) induced positive or negative mood by having subjects win or lose while playing a video game. While subjects in the positive mood condition (those who won while playing the video game) recalled more positive traits from a list of personality trait

words presented previously, those who lost the video game were no more likely to recall negative than positive words. Again, we find individuals in positive moods recalling a greater number of mood congruent items than those in negative moods. While the presence of positive mood may, in both cases, have contributed to a greater availability of mood congruent thoughts, Logical Learning Theory would contend that it is not the increased availability of thoughts per se which determines mood, but rather the broader context of meaning (positive or negative) predicated of the situation in general, and then extended into lived experience.

In order to provide further support to Isen's notion that mood differentially affects the availability of mood-congruent items, Clark and Waddell (1983) tested the hypothesis that mood states would differentially impact on the accessibility of mood congruent thoughts in response to situations involving helping, attraction toward another person, and the acquisition of information. After having experienced either a positive, negative, or no mood induction, subjects were asked to imagine themselves in situations in which (a) helping was possible, (b) they were to meet a blind date, and (c) they had the opportunity to acquire free brochures. Free associations were then given to each situation. Those subjects who were induced to feel good had significantly more positive first affective associations to situations in which helping was possible and to the occasion of meeting a blind date than did subjects in either the control or negative mood conditions.

Subjects induced to feel bad had more negative first affective associations to all three situations than did other subjects, though these differences were not significant. In a similar vein, children with a positive or "happy" outlook have been found to be more helpful to others than children who have a negative or "unhappy" outlook (Strayer, 1980).

In order to assess the possibility that mood might also affect our perceptions of others, Izard et al. (1965) manipulated mood and then examined how this influenced resolutions of binocularly rivalrous stimuli. Relevant affect (positive or negative) was created by having the experimenter be either pleasant or unpleasant. The pleasant experimenter would, for example, praise the subject's performance in an attempt to create a warm and supportive relationship, whereas the unpleasant experimenter was critical of the subject's performance, calling into question the individual's abilities. Izard et al.'s dependent measure consisted of the way in which subjects subsequently resolved the stereoscopic rivalries which were created by displaying pairs of photographs in a stereoscope. These photographic pairs contained either a happy or an angry expression of the same individual, or two pictures of an interpersonal scene involving two people, one scene showing a hostile and the other a friendly interaction. When subjects were asked to report what they saw, there were significant differences for both kinds of stimuli: that is, the subjects exposed to an unpleasant experimenter were apt to see more hostile faces and interactions than subjects who had been exposed to a pleasant experimenter.

Mood and expectancy. Johnson and Tversky (1983) examined the role of mood on expectations of positive and negative future events. After manipulating mood by having subjects read newspaper stories which reported death by either leukemia, homicide, or fire (a control condition which did not involve death was also included), subjects were asked to fill out a questionnaire on which they indicated their level of concern for each of 18 causes of death. As predicted, they found that the stories about the deaths had the effect of creating a more negative mood among the experimental subjects than among those in the control condition. In addition, they reported an increased concern over death by the 18 means as a whole (an increased "global" concern). Surprisingly, they found no increase in the level of concern for the "target" cause, that is, the cause about which they had just read. This finding poses problems for associative and semantic network theories. According to such accounts, exposure to a negative event of some sort (i.e., a death) should lead to the spreading of activation to those nodes closely related to this event, leading to the propensity for a greater negative reaction to this particular type of event: in other words, events that are closely related to the story should be influenced to a greater extent that those which are unrelated. According to LLT, however, the affective assessment rendered (positive or negative) is broader in scope than the event of interest per se. Hence, it is not surprising to find this meaning-extension being predicated of several of the available alternatives.

According to Schwarz and Clore (1983), evaluative decisions which are rendered may be "mistakenly" based upon the affective state or mood which one is in while making such judgments. To test this, they performed two experiments looking at the role of mood-related factors upon judgments of happiness and satisfaction with one's life. They postulated that mood would have a differential impact on the subjects' ratings of well-being depending upon whether or not they were made conscious of the possible influence mood might have. In the first experiment, moods were induced by asking subjects to provide vivid descriptions of happy or sad events which had recently occurred in their lives. In order to isolate the effect of mood, the experiment was run in "an unusual soundproof room" (Schwarz and Clore, 1983, p. 515), with some subjects being told that the room had the general effect of making subjects feel good, while others were told the reverse (i.e., that the room would make them feel bad). The experimenters reasoned that in making subjects aware of the possible causes of their moods, they would become less likely to be influenced by these states; in contrast, when subjects were not made aware of their moods, the usual mood-congruent judgments were expected. As expected, subjects who were not cued as to the possible influence of their mood made life-satisfaction judgments in a mood-congruent direction, while those who were made aware did not display a similar effect.

Here again, we have evidence of precedent-sequacious cognitive processing taking place. In this case, the researchers have capitalized on

the fact that if subjects are given a plausible precedent (i.e., that their moods may "mistakenly" affect their judgments), they will sequaciously extend this meaning into ongoing behavior (Rychlak, 1994, p. 97). This is reminiscent of the research mentioned above involving the notions of "einstellung" and "aufgabe." The aufgabe (the experimenter's predication via task instruction) has once again established an einstellung (predicating bias) for the subject under study, a bias which is then extended into the results of the experiment. This study is "contaminated," therefore, by the fact that the observed results may have less to do with mood per se, than with the willingness of research subjects to comply with the perceived demands (demand characteristics) of the experiment.

Mood Induction Research

The research into the relationship between mood/emotion and memory has expanded greatly in recent years, to the point that there are now journals dealing specifically with such topics. Within this area, however, much of the thinking remains what we have called "mediational," or essentially non-teleological. Intimations of drive theory can be found in, for example, the network theory of Bower (1981, see above), in which discrete brain units are "activated" to some threshold level, causing the effects on memory observed in the experimental context.

In the majority of the research on mood and memory, it has been

found that mood does have some influence on what is learned and/or recalled in subsequent memory tasks. According to Logical Learning Theory (LLT), this is as it should be, for as we have said, it is when someone has affirmed a precedent meaning (e.g., like or dislike) that we see this meaning being sequaciously extended into lived experience. And so we find that positive moods facilitate the recall of positive material, with the reverse generally occurring with material of a negative sort (as rated idiographically by the individual, of course). All findings of this sort are consistent with the precedent-sequacious style of explanation that LLT advocates. A "mood" is clearly a context meaning that is predicated by the person involved. It is worth noting that idiographic differences were not simply overlooked by the Lockean theorists. Though they realized that people had unique idiographic associations to learnable items, the way in which these unique organizations functioned was taken to be identical to the way in which the nomothetic measures functioned: all learning and memory was seen to involve associative strengths based upon the frequency and contiguity of verbal inputs, organized externally and carried along in the mediated process. It did not make sense, from this perspective, to single out such idiographic factors.

In this section we examine more of what has been discovered empirically about the relationship between mood and memory. The predicted effects of mood on memory vary to some degree depending upon the theory being put to test. For example, the resource allocation model

of Ellis and Ashbrook (1989) predicts that the experience of a negative mood will interfere with the performance of any task, including memory tasks, particularly as the demands for "processing" become greater. Yet another possibility is that mood will selectively bias or distort memory in some way. Thus, the mood and memory perspective adopted by Bower (1981) assumes that the way an experience is encoded for storage in long-term memory is largely determined by the encoder's mood state at the time of encoding. According to this view, the mood consists of a number of elements, all of which go together to form a context which can subsequently be "reactivated." Logical Learning Theory, in contradistinction to these theories, holds that it is context qua predication which is most important for the recall of relevant information. Thus, LLT argues that affective assessments will play the greatest role in determining recall in those instances in which this can be observed.

Those studies involving mood manipulations have typically applied variations on a number of common techniques, including (a) the Velten (1968) technique, (b) hypnosis, (c) success/failure experiences, (d) musical mood induction procedures, (e) posturing, and (f) a "memory elicitation" technique (Blaney, 1986, p. 235). One advantage of such mood induction techniques is that they aid in overcoming problems of selection bias; that is, they allow for random assignment of subjects to conditions.

The Velten procedure remains one of the more validated methods for the

induction of mood states, with numerous researchers finding psychomotor speed or activation being positively correlated with moods induced via this procedure. A potential drawback of this and other mood inductions is seen in evidence which suggests that the duration of the effects of mood inductions are usually brief. Specifically, there is evidence that the affective consequences of mood manipulations are normatively quite brief (Frost & Green, 1982; Isen & Gorgoglione, 1983; Ranieri & Ziess, 1984). This may be seen as calling into question the utility of post-test measures of the effectiveness of a given mood induction. Memory elicitation, a related technique which involves the recollection of relevant memories by subjects, also enjoys some popularity among researchers. Though originally developed for work with children, this procedure has also been used successfully with adults (Morris, 1989). Morris has said with regard to such procedures: "Recall, though a different 'medium' than perception, presents the same possibilities...Not only is there little doubt that affect can be generated through recall as well as other thought processes such as imagining but, in addition, there is good reason to suppose that the most likely result would be a mood-like state" (p. 26).

In the following sections, we examine what has been found in the two most prominent areas of the mood and memory literature: mood state dependent memory and mood congruent memory.

Mood state dependent memory. According to the mood state dependent retrieval hypothesis, what an individual is able to retrieve

from memory when in a given mood is dependent to some degree upon what the individual learned when previously in that mood. That is, in network theoretical terms, the more similar the network "activation" (qua drive) entailed by the prevailing context is to the encoding context of the material to be recalled, the more likely will the person be to recall what was learned when previously in the same mood state. Bower, Monteiro, and Gilligan (1978) have spoken of this as "endogenous state-dependent retention" (p. 573). In cases such as these, the affective valence (positive, negative, or neutral) of the material learned is not expected to be of importance. While mood congruence effects are possible both during encoding and retrieval, state dependent memory effects require mood manipulation on two separate occasions, and hence are more concerned with retrieval effects. The evidence for this phenomenon, however, is somewhat equivocal and open to alternative interpretation.

Some support for the mood state dependent retrieval hypothesis was obtained in a non-laboratory setting by Weingartner, Miller, and Murphy (1977), who studied manic-depressive inpatients. Subjects were asked to generate word associations on one occasion, and then to try and recall them four days later. As would be predicted by the mood state dependent hypothesis, recall for the material was related to the degree of mood change exhibited by the subjects, with those subjects undergoing greater levels of mood change recalling less of the relevant material. In this experiment, however, we run into a conceptual problem which is to be

found in much of the research in the area of mood and memory (Blaney, 1986): it is possible that these effects are better explained in terms of a mood congruity hypothesis. That is, from the perspective such as Bower's (1981) semantic network theory, though greater recall was associated with increased similarity of moods across the four day period, it is possible that the material recalled was "activated" by the nature of the material itself, and not the similarity of mood states across occasions. In LLT terms, the affective assessment of the material rendered by the individual was congruent with the material recalled, leading to a sequacious facilitation of recall in the Logos.

Another ostensible example of mood state dependent memory in a non-laboratory setting was reported by Bower (1981), and involved the case of Sirhan Sirhan, the man who, in 1968, assassinated Bobby Kennedy. After he was apprehended, Sirhan initially claimed that he did not remember committing the murder. When placed under hypnosis, however, and made to relive the events of that day, Sirhan became greatly agitated--and only then was able to recall the events. Bower (1981) notes:

> Under hypnosis, as Sirhan became more worked up and excited, he recalled progressively more, the memories tumbling out while his excitement built to a crescendo leading up to the shooting. At that point Sirhan would scream out the death curses, "fire" the shots, and then choke as he reexperienced the Secret Service bodyguard nearly throttling him after he was caught. (p. 129)

As suggested above with regard to the creating of an emotional reaction, it is through the extension of relevant meanings that this process is

facilitated. In the case of Sirhan, this conceptual reframing of a relevant circumstance was aided by the use of hypnosis. In other words, Sirhan was facilitated in bringing to bear currently "unused" or "unrecognized" premises from out of an "unseen" region of mind.

Yet, as suggested above, evidence of mood state dependent retrieval has not always been easy to find. In some of his initial work in this area, Bower (Bower, Monteiro, & Gilligan, 1978) was unable to find support for this effect. College-age subjects were placed in either happy or sad moods and then were asked to memorize a single list of 16 or 20 words. When recall was tested either 10 minutes or 24 hours later, there was no main effect of induced mood, although subjects in the longer retention interval recalled fewer words. This latter finding is as would be expected, since as "time" moves along many and varied predications continue to be made, sometimes altering the initial rendering of an object or event. The failure to find mood state dependent retrieval, however, detracts from the notion of an "activated" context. A similar failure to find state dependent effects when using a single list noninterference paradigm was reported by Nasby and Yando (1982). This study, however, unlike that of Bower et al. (1978) employed children as subjects. Bower and his associates explained this effect as resulting from the distinctiveness of the single list, such that subjects could retrieve the same number of words whether placed in the same or an altered mood. That is, increased activation of retrieval cues did not affect subsequent recall.

Despite this failure to find state dependence using the single-list paradigm, Bower and his colleagues (1978) were able to find supportive evidence in a different portion of their study. This part of their study employed a within-session recall task with elated or depressed mood inductions. They had their experimental subjects learn two lists--one while happy and the other while sad--and then recall in either an elated or depressed mood. Control subjects learned both word lists in either an elated or depressed mood state, then also recalled in a similar state. Compared to the control subjects, those subjects in the experimental condition showed a facilitation of memory for words learned in the same mood, but interference on those words learned in the opposite mood. Again we have here the possibility of a mood congruent learning effect, so that it is unclear just what these results suggest.

More consistent evidence for mood-state-dependent retrieval can be found in those studies which require subjects to recall happy or sad experiences while in either happy or sad moods. In such experiments, retrieval is believed to be state dependent because the material recalled is presumed to have been learned in the same mood as that induced in the experimental context. Once again, however, the LLT advocate is free to argue that it is the sequacious extension of congruent meaning that "accounts for" such effects. Madigan and Bollenbach (1982), for example, used the Velten (1968) procedure to induce elated, depressed, and neutral moods in their subjects, then tested in separate experiments the positivity of personal memories and the positivity of free

associations. They found in their first two experiments that subjects in the elation condition recalled more memories of a pleasant nature than subjects in the depressed condition. In the third experiment of their study, subjects in the elated condition recalled a greater number of pleasant memories than subjects in the depressive condition.

Forgas, Bower, and Krantz (1984) used hypnotic induction to induce elated and depressed moods in subjects, then examined the amount recalled with regard to the stressfulness or comfortableness of previous experiences. They found that their depressively induced subjects recalled more about their stressful experiences, while the elation induced subjects recalled more of their comfortable experiences. Though these studies have been discussed in terms of state dependence, it is again possible that they arise from mood congruence effects. That is, the affective valence of the material recalled is generally congruent with the ongoing mood state, so that the effects of each cannot be adequately separated. However, such findings are in the direction which would be predicted by LLT.

Mood congruence. Mood congruence refers to the finding that people will generally encode more information which is congruent than incongruent with their ongoing mood. Here we find one of the main differences between studies of mood congruent and state dependent memory, at least with regard to methodology. In contrast to studies which are designed to examine mood state dependent retrieval, studies of

mood congruity do not require subjects to experience a given mood on two separate occasions. And, whereas the research findings for mood state dependent retrieval remain open to question, the findings on mood congruence have been more robust (Blaney, 1986). In terms of Bower's (1981) network theory, affective state acts to render more salient those emotional characteristics in the environment which are consistent with an individual's emotional state. However, such findings are also consistent with the Logical Learning Theory contention that mood states are not akin to "drive" states which can be "activated" on the analogy of an electrical circuit. Once again, it is of the nature of "logical" meaning-extension to find such effects--not a biological activation of some sort.

It is assumed by network theories such as Bower's (1981) that mood states can act as cues for selective recall of mood-congruent information (mood-congruent retrieval). Thus, it may for example be expected that pleasant memories will be more easily retrieved than negative or neutral memories when the person is in a positive mood at the time of recall. A similar but conceptually distinct aspect of mood congruent memory involves the selective encoding of new information (mood-congruent encoding). In this case, mood states supposedly influence the salience and selective encoding of new mood-congruent information, resulting in better retention and recall of that information. Although the mood-based conceptualization appears theoretically sound, key predictions have not been upheld. Most of the confirmatory findings involve the selective advantages of encoding or retrieving mood-congruent

information.

Johnson, Petzel, Hartney, and Morgan (1983), for example, performed a study examining the memory of depressed and nondepressed undergraduate subjects. Specifically, they looked at memory for tasks which subjects had been asked to perform, and which they had been either successful or unsuccessful in completing. Subjects were led to believe that whether or not they completed these tasks was under their control. In fact, however, the experimenters had set up the experiment so that all subjects performed equally with regard to success or failure. They found, as they had predicted, that depressed subjects subsequently recalled more of their uncompleted tasks, while nondepressed subjects recalled more of their completed tasks. Similar to these results are the findings of Roth and Rehm (1980) who found that depressed inpatients were more interested in examining instances of their failures than psychiatric controls. In both instances the task at hand was predicated negatively, with negative or disliked meaning being extended sequaciously to the contents under "processing."

A frequently cited work of particular interest for the present work is a study done by Bower, Gilligan, and Monteiro (1981). These researchers hypnotized subjects to feel either happy or sad before having them read a story about two fictional characters. The characters, Jack and Andre, each experienced a number of either unhappy or happy events. After a delay of 24 hours, subjects returned and were asked to recall, now in a neutral mood, as much of the story as possible. They found that those

subjects who had been placed in sad moods recalled a greater number of facts about sad Jack than happy Andre, while those in the elation condition recalled more facts about happy Andre then sad Jack. There was no significant relationship between mood and the total number of facts (both positive and negative) recalled. This study is important in having examined the effect of mood at encoding (mood-congruence), without confounding the issue of state-dependent learning effects by manipulating mood also at recall.

Evidence for mood-congruence has been discovered in paradigms in which subjects are asked to recall a list of positive or negative adjectives or events which they previously read or heard while in an induced mood. Typical induction procedures involve having subjects read lists of either positive or negative statements (Velten, 1968), or undergo hypnotic procedures (Bower, Gilligan, & Monteiro, 1981) in an attempt to induce the desired positive or negative moods. The rationale for such procedures is that by controlling the mood the subject experiences, any differential effects arising within the experimental context will be the result of mood and not other extraneous variables. What is typically found is that subjects in positive moods are more likely to recall (or recognize) positive adjectives, while those persons in negative moods are more likely to recall (or recognize) negative adjectives (Alexander & Guenther, 1986; Natale & Hantas, 1982; Nasby & Yando, 1982).

Another interesting test of the mood-congruity hypothesis was done by Clark and Teasdale (1985), and yielded differential results for males

and females. That is, while there was no evidence for mood-congruity effects among the males participating in the experiment, the females did show the effect in relation to affectively-toned personality trait words and abstract nouns. They discovered in a later portion of their experiment that the females were significantly more likely to have employed the materials of interest at some time in the past. Similar were the results of an experiment carried out by Einstein and Ellis (1987), in which they examined the recall of depressed males and females for either fairy tales or technically-oriented material. They found that the depressed females recalled the technically-oriented passages more poorly than neutral mood controls, but the same did not hold true for the fairy-tales. The depressed males, in contrast, showed a reverse pattern: that is, their recall of the technically-oriented materials was not significantly affected, though they showed poorer recall of the fairy-tales. Einstein and Ellis concluded that differential levels of past experience and "interest values" for the content of the passages was likely responsible for the observed effects. This notion of "interest value" is clearly an example of what LLT would call affective assessment, while the results themselves are akin to results reported by Rychlak, Tasto, Andrews, and Ellis (1973) in a study on the RV-positive effect. They showed in a study of college subjects who showed elevations on a measure of masculinity, that such subjects learned masculine words (but not their feminine words) according to an RV-positive effect in a free-recall task. The reverse was found for female subjects, who showed an

RV-positive effect for the learning of feminine words. Finally, we conclude this section with a study designed specifically to investigate the relationship between mood-state dependent and mood-congruent memory, contrasting the outcomes predicted by each approach with what actually occurred.

In a work designed to replicate the Bower et al. (1978) experiment discussed above, Lewis and Williams (1989) employed essentially the same design, but with some important additions. These authors approached the experiment, not from a nodal network theory perspective, but rather directly from the point of view of LLT. The primary goal of this experiment was to compare in one study both the mood state dependent memory effect and the mood-congruity effect. The former is fundamentally inconsistent with LLT, for as the authors point out, "The concept of state-dependent learning...has always implied a fundamentally physiological explanation; the ability to retrieve memories is presumed to depend on the condition or 'state' of the central nervous system" (Lewis and Williams, 1989, p. 157).

In seeking to further clarify the relationship between mood state-dependent retrieval and mood-congruence effects, Lewis and Williams had subjects rate (affectively assess; see above) words from the Anderson (1968) norms on a scale of likability with values ranging from "like much" and "like slightly," to "dislike slightly" and "dislike much." This provided an idiographic measure of individual subject word-preference, thus allowing them to look for potential mood-congruence effects within

the state-dependent retrieval effect. Lewis and Williams hypothesized that subjects would indeed show a mood-state-dependent retrieval effect, but that this effect would be due to a mood congruity effect not apparent in the earlier Bower et al. (1978) study.

As hypothesized, Lewis and Williams found that when a list was facilitated in recall as indicated by a congruence between mood at learning and mood at recall, the recall advantage was manifest only as mood-congruent recall. In other words, when a word list is favored in recall by a negative mood, the facilitation of recall only occurs for words which the subjects have rated as disliked; similarly, when a word list which has been learned is favored in recall by a positive mood, the increased recall involves words the subjects have rated as liked. This study, while not altogether incompatible with the mood state dependent retrieval effect hypothesized by Bower (1981), does render such an account incomplete by calling into question the true nature of nodal "activation." From the perspective of such a theory, there should not have been differences in the numbers of liked and disliked words recalled in the varying experimental conditions, since each subject had the opportunity to learn and recall an equal number of liked and disliked words. More importantly, it provides increased evidence for the value of the mood congruity hypothesis, and the precedent-sequacious nature of meaning-extension posited by LLT. As Lewis and Williams (1989) state:

> The favorable effect of matching moods during learning and recall appears to depend on the subject's ability to extend meaning to experience in fundamentally different ways, rather than on the

experimenter's ability to induce fundamentally different "states." Put another way, the mood-dependent retrieval effect reflects more of what we commonly refer to as a "state of mind" than it reflects what some people call a "brain state." The "context" upon which memory is dependent is logical and meaningful rather than structural or associationistic." (p. 168)

Mood asymmetry and mood incongruity. Thus far we have examined the research in light of an associative network theory of memory, which predicts that mood will prime those memories with which it is associated, thus leading to mood congruent recall. However, there is some evidence that the mood congruity hypothesis, by itself, is not sufficient to explain all the empirical findings. That is, under some conditions an asymmetrical mood effect or even a mood incongruity effect may occur. For example, though the associative network theories (e.g., Bower, 1981) would predict symmetrical mood-congruent and mood-state-dependent effects, such effects are not always found. That is, the effects of sadness on negative material are not always the same as the effects of happiness or elation on positive material. Though this has, in fact, been the case, the study of this effect does not have the rich empirical framework found with the study of mood congruence or state dependence. As we shall see, most of the substantial efforts to isolate this effect have been of fairly recent origin.

One of the patterns of results of interest here, notably asymmetrical mood effects, was early noted by Clark and Isen (1982). Specifically, they recognized that though good and bad moods were believed to be opposites, their effects on memory processes did not always reflect such a

hypothesized relationship. A number of studies have now made the general point that while positive mood inductions facilitate the recall of positive memories, negative mood induction does not always make the recall of negative memories more likely (Isen, 1985).

Forgas and Moylan (1987), for example, obtained an asymmetrical mood effect; that is, they found a lack of an effect for negative mood, but a rather strong effect for positive mood in a study looking at the effects of mood-inducing movies. The authors state:

> This study was successful in demonstrating that exposure to various motion pictures generates strong and demonstrable mood effects in people, and that these moods in turn have a significant influence on a wide variety of thematically unrelated social judgments. We found positive mood effects to be more general and powerful than negative mood effects. The findings may be regarded as consistent with the predictions of recent mood-cognition theories, such as Bower's (1981) and Clark and Isen's (1982) models, and represent an ecologically valid extension of some earlier laboratory and field experiments demonstrating mood effects on social judgments. (p. 476).

These results, coming from what is taken here to be a competing paradigm, actually fall nicely in line with the results of previous research within the framework of LLT. Earlier we discussed research that demonstrated that adult patients given diagnoses such as schizophrenia, depression, and alcoholism, might collapse the learning superiority for positively assessed items, at times even in the direction of favoring negative items (Mosbacher, 1984; Rychlak, McKee, Schneider, & Abramson, 1971; Slife, Miura, Thompson, & Shapiro, 1984). These findings were, of course, also extended to elementary, high school, and college students with negative self-images (August & Rychlak, 1978;

August, Rychlak, & Felker, 1975; Rychlak, Carlsen, & Dunning, 1974), and high school students who were forced to perform a learning task that they disliked (Rychlak & Marceil, 1986, 1992). Asymmetry of mood, however, is still somewhat different than a mood incongruity effect. The latter involves not only a diminution of the traditional mood congruence effect, but an outright reversal. Such an effect, if shown to exist, poses greater problems for traditional network theories of affect and memory. Has such an effect been shown to exist?

Parrott and Sabini (1990) performed a series of experiments to examine the possibility that mood incongruent recall occurs under some conditions. For example, subjects in bad moods might be expected to attempt "mood repair" by recalling material incongruent with their prevailing mood. They theorized, however, that standard laboratory conditions may not be conducive to finding a mood incongruence effect for two reasons. First, Parrott and Sabini speculated that under normal laboratory conditions, cooperative subjects might be inclined not to attempt mood repair if they suspected that doing so might hinder the purposes of the experimenter. And second, they speculated that laboratory procedures might semantically prime mood congruent memories and concepts, so that any initial tendencies toward mood-congruent recall would be exaggerated. To investigate these and other hypotheses, Parrott and Sabini carried out a series of five experiments. The first two of these were quasi-experimental designs which examined the effect of mood on autobiographical memory in a field setting; the

latter three were carried out in the laboratory.

In the first of their five studies, Parrott and Sabini (1990) employed a quasi-experimental design, and utilized what they called "a reliable elicitor of moods in the ecology of the undergraduate student: the return of the graded midterm exam." They handed back exams at the beginning of class, then proceeded to give a lecture on autobiographical memory. This lecture, not ostensibly related to the return of their midterm exams, included as part of a class demonstration a memory task in which students were asked to recall and record several autobiographical memories. For those students who agreed to participate in the experiment (participation was necessarily voluntary), Parrott and Sabini (1990) found that students who received good grades (and hence were assumed to be in good moods) recalled events that were significantly less positive and more negative than students who received poor grades (and hence were assumed to be in bad moods)--evidence for the mood incongruity effect. Interestingly, this effect, which could have been "mood repair," appeared only for the first of the three memories recalled by each student.

In the second of their two quasi-experiments, Parrot and Sabini utilized another reliable elicitor of moods--the weather--to obtain the desired effects. One advantage of this design was that it afforded greater control over subject selection. Specifically, they interviewed and obtained autobiographical memories from subjects traveling to and from the entrance to a library during either sunny or cloudy days. They found

that subjects who were approached on sunny days (and hence were presumed to be in good moods) recalled memories that were generally more negative than those of subjects approached on cloudy days (and who were presumed to be in relatively worse moods). The effect obtained here was somewhat different from that obtained in the first study. The authors noted:

> This result only partly replicates the findings of the first study in that a mood incongruent bias was evident only with regard to the negative affect of the memory. Nevertheless, because there was once again no significant evidence of mood congruent recall, it seems justified to conclude that mood incongruent events were recalled in both studies. (Parrott & Sabini, 1990, p. 326)

The results obtained by Parrot and Sabini (1990) in the first two of their experiments run counter to those generally found by other researchers (see Blaney, 1986; Singer & Salovey, 1988). The authors speculate that several factors may have facilitated such findings. One major difference between the mood inductions employed by Parrot and Sabini and other researchers was the fact that the latter subjects were not aware that their moods were relevant to the experiments. This is much in contrast to the Velten (1968) and hypnotic procedures, which ask subjects directly to alter their moods. Their finding held up in three subsequent laboratory experiments, which sought to render less plausible the hypotheses that (1) the type of memory might have been responsible for the mood incongruent effect, or that (2) the type of environment (laboratory or natural) was responsible. Ruling out this latter possibility would greatly increase the external validity of the

findings and would be suggestive of the directions which future research might take.

The results of the experiments by Parrott and Sabini (1990) presented something of a challenge to the formulations of LLT. According to the LLT account, all the memories recalled should be congruent with the affirmed mood of the subject. For this reason, Wandrei (1993) undertook to examine more closely relevant aspects of this work. After examining the experimental designs employed in this research, several modifications suggested themselves. For example, rather than obtaining idiographic measures of subject memories, Parrott and Sabini had used two judges to independently rate the memories recalled by subjects. From the LLT perspective, such judgments are better made on an individual basis, so that more accurate (valid) measures of affective quality are obtained. Second, Parrott and Sabini apparently conceptualized positive and negative affect as independent constructs, measured separately on independent scales. This contrasts markedly with the LLT view of affection, from which perspective affection is a single dimension encompassing both positive and negative evaluations. In other words, "more happy" can be seen at once to imply "less sad," and "more sad" to imply "less happy" (Wandrei, 1993).

The study carried out by Wandrei was designed as a partial replication of the Parrott and Sabini (1990) work. However, whereas the former study employed an essentially nomothetic measure of affective assessment, the latter obtained idiographic ratings of affective quality

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from all subjects. Further, as noted above, this affective dimension was conceptualized--not as two separate dimensions--but rather as oppositional in nature, and measured accordingly. Wandrei predicted that mood congruence would be found when using idiographic measures of affective assessment, but that such effects would not be found when independent judges made the evaluations. What follows is a very brief look at some of her results.

An unanticipated effect was found in the Wandrei (1993) study for the memory ratings of judges, such that differences were found in ratings of memories depending on the order in which they were recalled. These differences were significant when one pair of judges made independent ratings of positivity and negativity, while there was a trend toward significance when another pair of judges used a global measure of positivity/negativity. Further examination revealed that the main source of the order effect was, in both cases, a tendency for the first memory recalled to be more positively rated than the second in all groups. Wandrei proposes that LLT could explain the observation as the result of a naturally positive predication that subjects make when approaching a new task or target. This could facilitate the effects of a predication based on positive mood, and might inhibit to some extent the extension of negative meaning that comes from a negative predication or sad mood. It may therefore be that, in recalling memories, subjects continue to use a "positive background framework" that is even more basic than that which they generally take on in their affective mood state. The results of this

research were somewhat mixed, but a clear advantage for the subjects' idiographic ratings was found. In other words, such results were consistent with the LLT notion that conceptualization (predication) is a process by which meaning is extended from a broader realm of meaning to a narrower target.

Literature Review: Conclusions

Work on the interrelationships of mood and memory is changing to an extent that would have been difficult to foresee even a few years ago. New theoretical propositions are being offered, and some of these are a great deal more consistent with the LLT position than others of the theories we have examined. One such example has recently been pointed out by Costanzo and Hasher (1989), who question the more traditional conceptions of mood and memory (e.g., Bower, 1981). We conclude this section with a quote from these authors, who state:

> [A] unidirectional relationship between affective and cognitive systems is typically assumed. As in much of the historical research on affect-cognition relationships, affective processes are viewed as interrupting, interfering with, or directing cognitive processes. This is true whether one employs a schematic, semantic network, or resource allocation perspective as a theoretical base. In all such formulations, cognitive and memorial processes are construed as dependent or outcome variables, while affective processes are typically manipulated or assessed as independent or moderator variables. Although this directional portrayal is...plausible...it is unlikely to provide a complete understanding of affective-cognitive inter-relationships. Indeed, based on clinical observation and theory...there is good reason to think of affect as a secondary manifestation of an underlying cognitive process.

The Present Study

As should now be clear, the results of a great number of the investigations into the relationship of mood and memory have yielded ambiguous results. From the perspective offered by LLT, much of this confusion arises from the manner in which the individual's contribution to knowing is construed by more traditional cognitive models. Mechanistic formulations do not take into consideration the unique meanings affirmed by the subjects under study. As indicated earlier, this is the case because such theories, based on such measures as frequency and contiguity, posit no unique role for individual affective factors. Yet, in failing to take such factors into consideration an important dimension of the individual's learning style is left out. As Lewis and Williams (1989) suggest: "If learning material is not assessed idiographically, then ambivalent, unstable, and eccentric affective valences may wash out the mood-dependent retrieval effect" (p. 168).

The purpose of the present study is therefore to compare directly the relative influences of affective assessment and mood induction on memory performance. In doing so, we are assessing the contribution of the subject's idiographic rating of learnable materials as against the contribution made by an experimentally manipulated mood of the sort that is characteristic of many of the studies in this area (see Blaney, 1986). The present study is similar in some respects to a study carried out by Teasdale and Russell (1983), in which the effect of induced mood on the recall of previously learned personality trait words was examined.

Personality trait words were here arrayed in three groups based on nomothetic averages from the Anderson (1968) norms, in order to control for association value (see above). These words were then presented to subjects for rating either before or after positive, negative, or neutral mood induction. The inclusion of a control group was designed to assess whether, for example, positive mood actually facilitates the retrieval of positive words, and/or whether negative mood disrupts the retrieval of positive words. Evidence cited above indicated that the affective consequences of mood manipulations are usually quite brief. This suggests that effective manipulation checks would be those that occurred immediately or shortly after the conclusion of the induction. However, this would then leave uncertain whether the induction effects would persist into the crucial portions of the experiment, in the present study, the recall and recognition tasks presented to each subject. For this reason, the present study has not included a mood manipulation check. Rather than interrupting subjects as they move from the induction to the rating task or from the induction to the memory tasks and having them rate their moods, we have instead chosen to combine two of the more effective mood induction techniques on the assumption that they will be effective in eliciting the desired moods in the experimental groups.

The design of this experiment places the predictions of LLT directly against those of Bower's (1981) nodal network theory of emotion. From the perspective of the latter, emotion is a node within the associative network which, when activated beyond a certain threshold, triggers

related or associated nodes. From the perspective of Logical Learning Theory, affection is the ability of the individual to transcend ongoing cognition, evaluating the contents under processing as either liked (positive evaluation) or disliked (negative evaluation) in quality. This ability is not learned, and hence is not merely a content within a mediational process. Rather, the meanings precedently framed in such acts of cognition play a very basic role (indeed, *the* most basic role), sequaciously "coloring" what is to follow in thought.

CHAPTER 6

STATEMENT OF THE PROBLEM

<u>Hypotheses</u>

1)   Subjects asked to recall and recognize material that they have pre-rated for affective assessment will be found to rely more on this idiographic measure than they will on the moods that they are induced to perform under in a recall and recognition task.

2)   The presence of a mood induction will interact with affection ratings, so that: (a) Subjects in the positive mood induction condition will show an advantage in the recall and recognition of liked over disliked words. (b) Subjects in the negative mood induction condition will show a diminution of the superiority of liked over disliked words in recall and recognition tasks. This will manifest itself in approximately equal levels of recall and recognition for both liked and disliked words. (c) Subjects in the neutral condition (no mood induction) should display an advantage in the recall and recognition of liked over disliked words.

<u>Rationale</u>:

Hypothesis I follows from the basic tenets of LLT discussed above. In a population of male and female college subjects, we presume that the

majority of such "well-adjusted" individuals will tend to predicate themselves and the task at hand positively, thereby leading to a facilitation in the learning of liked over disliked words. Such a prediction is based on the findings of Rychlak (1988), who has found in numerous studies that "normal subjects reflected the typical RV-positive effect in their learning performance" (p. 378). We therefore predict that the person's "natural" evaluation of the experimental context (i.e., a person's general or "background" mood) will provide a more personally relevant framework for organizing the experimental situation, including the information to be learned and remembered, than will the mood supposedly "activated" by traditional mood induction procedures. Put another way, the mood inductions employed in the present study will not "wash out" the more general or basic effects of affection. This follows from the fact that emotion or mood is not a "node" that can be activated, but rather an aspect of the predicational process per se.

With regard to Hypothesis II, we have seen that predications must be fairly negative (mood negative, self-evaluation negative, etc.) before we diminish or flatten out the positive affective assessment effect (e.g., Slife, Miura, Thompson, & Shapiro, 1984; August & Rychlak, 1978; Rychlak & Marceil, 1986). Above we discussed a study involving high school students in which the factors of high or low self-image were crossed with ratings of "liking" or "disliking," and an enforced paired-associates learning task then performed. While neither of these factors by itself was sufficient to achieve a reversal, when subjects were negative in self-image

and forced to perform a disliked learning task, they did indeed learn significantly more disliked than liked CVC trigrams (Rychlak & Marceil, 1992). It is the organizing heuristic at the outset of learning that ensures solid learning and long-lasting memory rather than sheer repetition of such cognitions. Because the mood induction of interest here is provided externally, LLT would argue that this is not as salient a predicating framework as a "naturally" occurring mood state such as depression or even a hypnotic induction procedure of the sort used by Lewis and Williams (1989). This may be seen clearly in work with depressed individuals, who by definition are prone to see themselves and varying aspects of their world in negative terms. The results of studies such as these tend to be quite consistent, showing diminutions and even occasional outright reversals of the typical positive affection effect.

There are two primary factors to be considered in an experimental task of the sort being examined here: the word ratings per se, and the mood context. Our goal is to challenge those Lockean or mediational forms of thinking which hold that people are manipulated by externals that direct them to learn one way or another (to recall and recognize one way or another) based on such manipulations. From this Lockean perspective, any role for their unique (idiographic) influences are considered, at best, secondary mediating factors. Affection, however, works at what has traditionally been called the point of "encoding." This is therefore not a question of "input," which might suggest that an already organized item is being "taken in" from an unpredicated external

source. From the LLT perspective, encoding is active organization, including affective assessments rendered by an evaluating intellect and brought to bear on what can and will then be "known." We thus want to see if mood induction has an effect over and above the idiographic ratings. In other words, does mood induction really counter the role of affective assessment? We predict it does not.

CHAPTER 7

METHOD

Overview

Student subjects were placed into one of three mood conditions, (a) an elated mood state, (b) a depressed mood state, or (c) a neutral mood state. The two mood induction conditions involved the use of a variation of the Velten (1968) mood induction procedure and the recall of a relevant personal experience to induce the desired mood. Control subjects remained in a neutral mood, performing a filler task that required them to solve anagram problems for a specified period of time. All subjects rated for likability a list of 60 words, and subsequently were given tests of recall and recognition to assess memory performance.

Subjects

Subjects came from the introductory psychology classes offered at Loyola University of Chicago's Lakeshore Campus during the Fall semester of 1992. Of 141 subjects initially brought into the experiment, 137 provided useful data. Four subjects were eliminated from the Anagram conditions because of a failure to correctly follow the instructions.

Materials

The word list which all subjects rated contained a total of 60 words randomly selected from the Anderson (1968) norms. The list was

constructed in the following fashion: 20 words were randomly selected from the 100 most-liked words (e.g., happy, considerate), 20 from the 100 least-liked (e.g., cold, lazy), and 20 from the neutral words ranked between 227 and 327 (e.g., scientific, conservative) on the list of 555 personality trait words [see Appendix A for a listing of all relevant words]. This last group of words was assumed to represent an "ambivalent" sampling in terms of association value. The order of presentation of the words in the rating procedure was determined by assigning words using a random numbers table. The same order of presentation was subsequently used for all subjects.

For the recognition portion of the experiment, an equal number of words was taken from the Anderson (1968) norms to act as distractor items. These words were chosen in the same manner as those above: 20 words were randomly selected from the 100 most-liked words, 20 from the 100 least-liked, and 20 from the neutral words ranked between 227 and 327 on the list of 555 personality trait words. The order of presentation of the 120 words in the recognition condition was again determined by assigning words using a random numbers table. The same order of presentation was used for all subjects. None of the words appearing in the rating or recognition conditions appeared on the mood induction statements.

Mood Induction

The mood induction procedure was a modified version of that described by Velten (1968), as employed by Teasdale and Russell (1983)

[see Appendix B].

Anagram Task

Subjects in the anagram conditions were given forty anagrams on two pages, each anagram consisting of five scrambled letters (e.g., A T W R E = WATER). The time allotted for this portion of the experiment was equal to the amount of time subjects in the positive and negative mood induction conditions had to read the Velten statements and record a relevant memory (seven minutes). A complete list of the selected anagrams may be found in Appendix C.

Ratings of Affective Assessment

Subjects were presented with the 60 words selected from the Anderson (1968) norms (see above). Twenty words were taken from each of the upper, middle, and lower third of these ratings. Subjects idiographically rated these words using a four-point scale consisting of the following choices: 1. Dislike Much, 2. Dislike Slightly, 3. Like Slightly, and 4. Like Much. Subjects were asked to select the item that corresponded most closely with his or her assessment of the word. The instructions asked subjects not to skip any items, making whatever choice seemed most appropriate. The relevant materials are presented in Appendix A.

Experimental Design

The present experiment required each subject to appear on one occasion only. The experimental design crossed three levels of encoding mood (Positive, Negative, and Neutral) with two levels of idiographic rating (Before or After mood induction) [see Table 1]. The anagram

Table 1. <u>Experimental Design</u>

	<u>Part 1</u>	<u>Part 2</u>	<u>Part 3</u>	<u>Part 4</u>
Group 1	Anagram	RV Rating	Recall	Recognition
Group 2	Pos. Mood	RV Rating	Recall	Recognition
Group 3	Neg. Mood	RV Rating	Recall	Recognition
Group 4	RV Rating	Anagram	Recall	Recognition
Group 5	RV Rating	Pos. Mood	Recall	Recognition
Group 6	RV Rating	Neg. Mood	Recall	Recognition

groups represented a control condition in the present study. The list of words which subjects were asked to remember consisted of highly positive, negative, or neutral words according to the Anderson (1968) norms.

Procedure

Subjects were selected on a voluntary basis from the introductory psychology classes offered at Loyola University. The experiment was conducted in a single classroom with between three and seven subjects per trial. Moreover, all subjects in any given trial were placed in the same condition (one of three), (a) an elated mood state, (b) a depressed mood state, or (c) a neutral mood state. The two mood induction conditions involved using a variation of the Velten (1968) mood induction procedure, along with the recall of a relevant personal experience to induce the desired mood (see Appendix B). During each mood induction, subjects were asked to read through a set of twelve sheets of paper, each bearing one typed self-referent statement (e.g., positive mood induction: "I feel pretty good right now," "Right now, I feel like smiling"; negative mood induction: "I feel unhappy," "I feel downhearted and miserable"). Subjects were instructed to read through the cards and to attempt to experience the mood suggested by the statements. Following along the lines of the study by Teasdale and Russell (1983), subjects were instructed to proceed through the cards at a rate which would help them feel the mood suggested. The duration of this portion of the mood induction was seven minutes, allowing roughly

20 seconds per card. Subjects were then given three minutes to record a relevant memory on an accompanying sheet of paper. Control subjects remained in a neutral mood, performing a filler task requiring them to solve anagrams for a specified period of time (seven minutes). All subjects rated a list of words on a four-point likability scale: half in each condition (positive, negative, or anagram) before and the other half after the relevant induction/anagram procedure. Following this portion of the experiment, all subjects were given sheets of paper containing instructions, which were also read aloud (see Appendix D), and given two minutes to recall as many words as possible from the first portion of the experiment (i.e., the words which had been rated for likability). At the end of this time recall sheets were collected, following which the recognition forms were distributed and the accompanying instructions read aloud (see Appendix E). Subjects were allowed to work on these for four minutes before being told that when finished they could turn in their sheets and receive credit for the experiment. Upon completing the task, subjects were debriefed and dismissed.

Formulation of Scores for Data Analysis

To examine the relative contributions of affective assessment and mood induction, there were four dependent measures in the present study: (a) the percentage of positively and negatively evaluated words recalled by each subject, and (b) the percentage of positively and negatively evaluated words recognized by each subject. These values were adjusted to reflect the percentage of such recalled and recognized words

that fell in the liked versus disliked designations (based on the idiographic ratings made of the words by each subject). No distinction was drawn between those words rated "Like Much" and "Like Slightly" or between those rated "Dislike Slightly" and "Dislike Much." This follows from previous research on affective assessment (see Rychlak, 1988, Chap. 9).

The actual methods used to tabulate the relevant data are discussed below. In Part I, the derivation of the recall percentage scores for both positive and negative words is examined. In Part II, a similar format is followed in the examination of the recognition scores. It should be noted that the percent recall and recognition scores were subjected to an arcsine transformation--in order to equate for distance between data points--before undergoing analyses of statistical significance. The means and standard deviations presented in the tables, however, reflect the original untransformed percentage scores. Individual raw scores as well as transformed raw scores are presented in Appendix F.

Recall Score Derivation. In order to examine the levels of recall for positive and negative words in the six conditions of the experiment, the following procedure was employed: As a first step, the total number of words--from the initial list of 60--rated liked and disliked was calculated for each subject. This involved collapsing together those words rated as "Like Slightly" and "Like Much" to form one category of "Liked" words, and collapsing together those words rated as "Dislike Slightly" and "Dislike Much" to form a similar "Disliked" category. So, for example, a

subject might rate 40 of the 60 words as liked, and 20 as disliked. Next, those words actually recalled by each subject in the Recall portion of the experiment were sorted in similar fashion into categories of "Liked" and "Disliked" words. Our hypothetical subject might then recall 15 of the words which were rated, 10 of them liked and 5 of them disliked.

The scores to be used in the omnibus analysis of variance test were then derived in a third step. For each subject, the number of words rated positively or negatively (calculated above) was employed as the denominator of a fraction, with the actual number of words recalled serving as the numerator. This procedure formed a ratio score which took into consideration the relative percentages of words rated positively and negatively across subjects. These scores could theoretically range from 0%-100%, with greater numbers indicating better recall of the relevant words. Thus, for example, the percent positive recall for our particular subject would be calculated as follows: recall that he rated 40 of the 60 words presented as either "Like Much" or "Like Slightly"; the relevant fraction would therefore have as the denominator the number 40; since the subject then recalled 10 of these 40 words rated positively, the relevant fraction would be 10/40 or .25 x100=25% (numbers were multiplied by 100 to eliminate the decimal). In other words, the subject would have successfully recalled 25 percent of the words he or she had rated positively in the affection rating portion of the experiment. A similar procedure was followed for the computation of percent negative recall. To continue our example, the percent negative recall for our

particular subject would be calculated as follows: since he rated 20 of the 60 words presented as either "Dislike Much" or "Dislike Slightly", the relevant fraction would have as the denominator the number 20; since the subject then recalled 5 of these 20 words rated negatively, the relevant fraction would be 5/20 or .25 x100=25%. Our subject would have successfully recalled 25 percent of the words he rated negatively in the affection rating portion of the experiment. This procedure, carried out across subjects, provided the relevant scores for analysis of recall memory.

Recognition Score Derivation. In the recognition condition we again sought to take into consideration the overall percentage of words rated positively and negatively by each subject. A relevant fraction was computed using a method similar to that described in the recall condition, but with one significant modification: in order to provide a more stringent test of the hypothesis that subjects would evidence a facilitation in recognition memory for words affectively assessed positively, it was decided to remove from consideration those words which had been successfully recalled (including those evaluated both positively and negatively). In doing this, it was presumed that subjects would be likely to recognize those words which they had recently recalled successfully, since recall presents a more difficult test of memory than recognition. In general, then, given the facilitation in recall memory of positively-rated over negatively-rated words, we would see more positively evaluated than negatively evaluated words being removed from

consideration across subjects--thereby making an effect of positive affection more difficult to find.

To calculate the percent recognition for our hypothetical subject, any positively or negatively evaluated words that had been correctly recalled were first removed from the list of recognizable items. Since our subject correctly recalled 10 positive and 5 negative words, this would leave 40-10=30 positive words and 20-5=15 negative words that could be correctly recognized in this portion of the experiment; thus, 30 and 15 became the denominators for the percent positive and negative recognition, respectively. To calculate percent recognition, the remaining correctly recognized items were separated into those that had been initially rated positively and those rated negatively, and divided by the appropriate denominator. If our hypothetical subject correctly recognized 20 of the remaining words that he had initially rated positively, he would achieve a score of 20/30=.67 or 67%. Similarly, if he correctly recognized 10 of the remaining words that he had initially rated negatively, he would achieve a score of 10/15=.67 or 67%. This procedure, carried out across subjects, provided the relevant scores for analysis of recognition memory.

CHAPTER 8

RESULTS

There were four dependent measures in the present study: (a) the percentage of _positively_ and _negatively_ evaluated words _recalled_ by each subject, and (b) the percentage of _positively_ and _negatively_ evaluated words _recognized_ by each subject. In order to test the relevant experimental hypotheses, the data were subjected to a 2 (Order) x 3 (Induction) x 2 (Affection) repeated-measure analysis of variance (ANOVA), with the first two variables between and the third within subjects. Separate omnibus analyses were then carried out for both the recall and recognition data.

Mood and Recall Learning

Hypothesis I predicted that subjects asked to recall words that they had pre-rated for affective assessment would be found to rely more on this idiographic measure than they would on the moods that they were induced to perform under. A test for a main effect of Affection (within-subjects) was significant, with subjects in all groups recalling more of their positively assessed than their negatively assessed items, as follows: Positive Affection M=17.12, SD=7.77; Negative Affection M=14.14, SD=7.29 (F=16.403, df=1, 129, p<.001).

Hypothesis II predicted that the presence of a mood induction would

interact with affection ratings. Relevant scores were entered into a factorial analysis of variance having the characteristics of a 3 (Induction) x 2 (Affection), with the first variable between and the second within subjects. Was the expected effect found? The hypothesis, which can be examined by looking at the Affection x Induction interaction, was not significant, with the data arraying as follows: a) Positive Induction: Positive Affection $\underline{M}$=16.07, $\underline{SD}$=7.18; Negative Affection $\underline{M}$=14.36, $\underline{SD}$=7.15 b) Negative Induction: Positive Affection $\underline{M}$=16.03, $\underline{SD}$=8.54; Negative Affection $\underline{M}$=13.29, $\underline{SD}$=8.02; c) Anagram: Positive Affection $\underline{M}$=19.26, $\underline{SD}$=7.58; Negative Affection $\underline{M}$=14.76, $\underline{SD}$=6.71 ($\underline{F}$=.352, $\underline{df}$=2, 129, $\underline{p}$=.704).

An unanticipated effect was found for the Order variable. Tests of statistical significance indicated that subjects asked to rate words before undergoing a mood induction recalled a significantly lower percentage of learnable items than subjects undergoing a mood induction first, suggesting that there was systematic variation produced by this variable, as follows: rating first $\underline{M}$=13.46, $\underline{SD}$=7.52; induction first $\underline{M}$=17.79, $\underline{SD}$=7.07 ($\underline{F}$=15.809, $\underline{df}$=1, 129, $\underline{p}$<.001).

Table 2

Mean and Standard Deviation (in parentheses) of Recall Scores for the Experimental Groups, Arrayed by Condition and Percent Positive/Negative Recall

Mood Induction/Rating

Group	% Positive Recall	% Negative Recall
#1) Anagram (N=21):	20.81 (7.18)	16.76 (7.04)
#2) Positive (N=20):	18.00 (6.49)	17.15 (6.71)
#3) Negative (N=24):	19.54 (8.21)	14.50 (6.60)

Rating/Mood Induction

	% Positive Recall	% Negative Recall
#4) Anagram (N=24):	17.71 (7.77)	12.75 (5.93)
#5) Positive (N=23):	14.13 (7.39)	11.57 (6.58)
#6) Negative (N=23):	12.52 (7.46)	12.09 (9.27)

<u>Mood and Recognition Learning</u>

For the recognition conditions, Hypothesis I again predicted that subjects would be found to rely more on affective assessment than they would on the moods that they were induced to perform under. A test for a main effect of Affection (within-subjects) was significant, with subjects in all groups recognizing more of their positively assessed than their negatively assessed words, as follows: Positive Affection $\underline{M}$=86.27, $\underline{SD}$=9.30; Negative Affection $\underline{M}$=79.86, $\underline{SD}$=12.92 ($\underline{F}$=28.840, $\underline{df}$=1, 129, $\underline{p}$<.001).

Hypothesis II also predicted that the presence of a mood induction would interact with affection ratings. Relevant scores were entered into a factorial analysis of variance having the characteristics of a 3 (Induction) x 2 (Affection), with the first variable between and the second within subjects. The hypothesis, which can be examined by looking at the Affection x Induction interaction, was not significant, with the data arraying as follows: a) Positive Induction: Positive Affection $\underline{M}$=86.65, $\underline{SD}$=8.99; Negative Affection $\underline{M}$=80.73, $\underline{SD}$=13.99; b) Negative Induction: Positive Affection $\underline{M}$=86.33, $\underline{SD}$=10.47; c) Anagram: Positive Affection $\underline{M}$=85.84, $\underline{SD}$=8.43; Negative Affection $\underline{M}$=78.42, $\underline{SD}$=12.68 ($\underline{F}$=0.900, $\underline{df}$=2, 129, $\underline{p}$=.409).

Table 3

Mean and Standard Deviation (in parentheses) of Recognition Scores for the Experimental Groups, Arrayed by Condition and Percent Positive/Negative Recognition

Mood Induction/Rating		
Group	% Positive Recog.	% Negative Recog.
#1 Anagram (N=21):	85.43 (8.11)	75.71 (14.22)
#2 Positive (N=20):	86.30 (9.11)	79.80 (17.44)
#3 Negative (N=24):	86.83 (11.10)	82.75 (11.12)

Rating/Mood Induction		
Group	% Positive Recog.	% Negative Recog.
#4) Anagram (N=24):	86.25 (8.86)	81.13 (10.85)
#5) Positive (N=23):	87.00 (9.08)	81.65 (10.46)
#6) Negative (N=23):	85.83 (10.00)	78.13 (12.83)

CHAPTER 9

DISCUSSION

The results of the present experiment fall nicely in line with the predictions of LLT--and particularly the notion that an individual's affective assessment is of greater consequence to memory than an external mood induction. Indeed, the rationale of Hypothesis I was confirmed in both the recall and recognition portions of the experiment. In LLT, we have two factors to consider in an experimental task of the sort being discussed here--the word rating per se, and the mood context. Prior research, and now the present experiment as well, suggest that predications have to be pretty generally negative, the mood negative, the self-evaluation negative, etc., before we will flatten out the positive affective assessment effect. It is the organizing heuristic at the outset of learning that ensures solid learning and long-lasting memory rather than sheer repetition of such cognitions. Affection undoubtedly serves as a major cognitive organizer of this nature:

> Framed in traditional computer lingo, this means that affection works at the point of "encoding." But LLT would not have this be a question of "input," which suggests that there is already an organized item being "taken in" from an unpredicated external source. From the LLT perspective, encoding is active organization, including affective assessments rendered by an evaluating intellect and brought to bear on what can and will then be "known." (Rychlak, 1994)

As just noted, the results of the recognition portion of this

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experiment were also in the direction predicted by LLT. That is, even when those words that had previously been remembered in the recall portion of the experiment were removed (thereby, on average, removing a greater number of positive than negative words from consideration), a significant advantage was found for liked versus disliked words. This rather robust finding lends further support to the notion that it is the individual's predication of the task at hand that plays the greatest role in determining memory performance. Or, put another way, we have seen that such an effect depends upon "the subject's ability to extend meaning to experience in fundamentally different ways, rather than on the experimenter's ability to induce fundamentally different 'states.'" (Lewis & Williams, 1989, p. 168). Thus, subjects who predicate themselves, the task at hand, and the world around them in generally positive terms are seen to extend positive meanings more readily than negative meanings to the people and events around them. And as the research discussed above has demonstrated, it is only when individuals affectively assess some aspect of the world and/or themselves in a truly negative fashion that we are likely to observe a diminution or reversal of this typical predicational style.

Hypothesis II, which predicted an interaction between mood induction and affection ratings, was not supported. Instead, the general positive affection effect predicted in Hypothesis I appeared also in the negative mood induction conditions of the experiment. That is, in the negative recall conditions we did not find the expected diminution of the

positive affection effect. While at first such results may seem puzzling, a glance back at our literature review may provide some clues as to what may have occurred. In Group #3 of the experiment, subjects underwent a negative mood induction, followed by the affection ratings of learnable personality trait descriptors. This negative mood induction, by definition, is a negative experience. The termination of this induction might therefore be viewed as being a slightly positive experience, at least in contrast to what has just gone before. This is reminiscent of the work on nonspecific transfer cited above, in which subjects moving from a disliked to a liked task manifest greater improvement than when moving in the opposite affective direction (positive nonspecific transfer). When provided with the opportunity to affectively predicate the new task, the evaluation of learnable materials, subjects may have sought to bolster their feelings by, in a sense, re-predicating the task before them. Hence, in predicating the rating task positively, and then carrying this generally positive affective preference over to the recall task, words with a positive affective quality would be favored, as happened in this group.

In Group #6, in contrast, subjects were given no opportunity to essentially re-predicate their circumstances. Why then do we not see an advantage of disliked over liked words? Wandrei (1993; see above) proposed that LLT could explain various of her observations as the result of a naturally positive predication that subjects make when approaching a new task or target, as of the sort seen here. This could facilitate the effects of a predication based on positive mood, and might inhibit to

some extent the extension of negative meaning that comes from a negative predication or sad mood. It may therefore be that, in recalling memories, subjects continue to use a "positive background framework" that is even more basic than that which they generally take on in their affective mood state. This fact is further suggested by some of the work cited above with depressed individuals, who by definition are prone to see themselves and the varying aspects of the world in negative terms. The results of such studies tend to be more consistent with notions of mood congruence, showing diminutions and even occasional outright reversals of the typical positive affection effect. Particularly noteworthy in this regard is the study by Slife et al. (1984), which showed that as depressed individuals were successfully treated with psychotherapy, their affective preferences shifted from being predominantly negative back toward the usual advantage for positively evaluated materials.

One unanticipated result of the present experiment involved the finding that subjects undergoing a mood induction first (regardless of the type of induction), followed by the rating task, recalled a greater percentage of learnable words (both positive and negative) than subjects receiving the reverse task-order. This pattern of results would seem to be an artifact of the experimental design. In the case of those subjects performing the affective rating task after the induction, a shorter period of time elapsed between their having seen the words and their trying to recall them. For subjects completing the rating task first, the presence of an intervening task may have adversely affected their ability to recall

the relevant materials. Such results again follow from the nature of the process of predication. Memory is always a matter of reconceptualizing prior experience, not just of calling to mind or activating a template or engram from the past into the present. As time passes, memories do not "wear down" and disappear, but rather alternative predications occur, thereby decreasing to some extent the likelihood of recall. Increasingly meaningful items of information are less likely to be forgotten, though memory is still never a matter of recalling anything free of the expectations and biases of the present.

As we have seen from our examination of the empirical research done in both the Kantian spirit of LLT and the more Lockean framework of nodal network theory, these formulations, by virtue of their precedent frameworks, frame fundamentally different creatures. It is quite true that both paradigms have been empirically rigorous in their research; however, the differing viewpoints on how knowledge is to be accrued lead each side to approach research very differently:

> When knowledge is seen as dependent on the assumptions or predications of the observer/participant, empirical research becomes a way of validating the claims made by a theory with observation. This is the "top down" approach taken by LLT: explicit predictions made by the theory are tested in order to see if the constructs we use to explain the world fit with the observed world. When knowledge is seen as being derived directly from the observations themselves, as in the view of a realist, theory is less prominent in guiding the actual research, instead being put together piece by piece from the observed "facts." The "bottom-up" approach of the dustbowl empiricist attempts to rule out bias in the observation of events by keeping theories small and directly tied to observation. This seems to be more the case with NNTA [Nodal Network Theory of Affect], which is referred to in many studies of mood and memory not as a guiding formulation of the

research, but as an explanation of the observed phenomena. (Wandrei, 1993, p. 31)

Another point which may again be emphasized is that the affective assessment is an active event, whereas the so-called "activations" of network theories are passive events (much as is any other such activation). But this simply raises the question--what differentiates the activation of an ordinary passive sentence such as "It is raining" from an introspectively conceived evaluation such as "I dislike rain"? The LLT notion of a transcending telosponse is suited to rendering an account of this phenomenon, whereas more traditional conceptions of the person seem incapable of doing so. What would "trigger" such an evaluation? And what would lead this evaluation to fall one direction rather than another? According to LLT, what mechanistic theories take to be "activations" or "reactivations" are, in fact, simply the manifestations of ongoing cognition, which by its nature involves the reformulation of experience. Hence, such activations are simply the unfolding of the introspective organization of the individual under consideration. It is not drive-reduction that shapes individual behavior, but rather the sense of affective satisfaction experienced as his or her precedent assumptions bring rewards in the form of expected/predicted outcomes (positive and negative reinforcers).

Reflections on the Present Study

The present study suffered from several methodological limitations,

each of which has contributed in some way to concerns about the internal and external validity of the present findings. One limitation of this study was its inability to separate subjects on the basis of gender. For this reason, the experiment was incapable of detecting any differences in recall and recognition that may have been produced by underlying differences in gender. For example, it is possible, if not likely, that a more pronounced finding in one gender grouping (e.g., males) may have "boosted" the lower scores of the other (i.e., females), thereby masking a more limited effect. The obvious answer to this problem will be to retain appropriate records in future studies.

A second design limitation, again of considerable interest, concerns the relative effectiveness of the mood inductions employed. While previous research cited above suggests that both the Velten (1968) procedure and the recalling of a relevant personal memory can be effective at eliciting a desired mood, this is ideally confirmed within the experimental context itself. In the present experiment, we cannot be absolutely certain that the effects of the affection ratings actually "overcame" the salience of mood induction. If the inductions were not truly effective, this pose difficulties for such an interpretation. We have here assumed that with normal subjects of the sort found within a university setting it will be somewhat difficult to achieve a diminution, and particularly an outright reversal, of the positive affection effect typically found--even if the mood inductions are effective. Once again, though the argument is plausible on the basis of procedural evidence,

the true test of such a notion lies with the validating evidence provided within the methodological realm.

Perhaps a more minor point (though this is, of course, an empirical question) concerns the nature of the distractor task performed by subjects in the anagram conditions. Because the dependent measures of the present experiment were essentially based on verbal factors, it may be important to provide control subjects with a non-verbal task when seeking to balance time considerations across groups. The only subjects excluded from providing useful data were in fact subjects from the anagram condition who confused the verbal materials of the anagram and recall tasks.

Finally, there is the matter of the reliability of the affection ratings of personality trait words obtained from subjects. In prior research in this area, Rychlak (1988) has typically advised the use of only those words which have been reliably rated, meaning that subjects rate words on two separate occasions. Researchers then use only those words that have been rated "Like Much" and "Dislike Much" on these two occasions as learnable items. Time constraints and limitations imposed by subject allocation requirements precluded adding this desirable feature to the experimental design.

In order to add support to and extend the present findings, future research may well take into consideration the points just made. Particularly important will be efforts to validate the effectiveness of mood inductions in studies of this sort. This may yet prove to be a formidable

task, as there is not complete agreement on just what constitutes a "mood." However, it certainly seems that the framework of Logical Learning Theory provides one feasible definition--a definition which has held up in over twenty years of varied empirical research.

Concluding Comment

What one may hopefully see in the context of the present experiment and discussion is that the individual human being does contribute meaningfully to what he or she can and will know. Through the telosponsive process the individual aligns precedent meanings right from birth, framing the contents of experience in logical (if not always rational) fashion. Given that we must "know" in order "to know," the value of a precedent affective dimension should also be readily apparent. As a most basic aspect of the telosponsive process, affection allows the knowledge-acquisition propensity (memory) of the human being to "get underway." The present study is here seen as tending to confirm the tenets of the theoretical framework from within which it arose. The individual does contribute meaningfully to what comes his or her way, and unless this fact is taken into consideration, the result is likely to be a theoretical muddle of the sort which currently exists in the field. To emphasize the point, we close with a quote from Bower (Bower & Mayer, 1989), a quote which may be very telling of the current "state" of research in this area:

> As noted, the failure to find a mood-context effect in these "standard context" experiments impacts negatively upon many theories which expect it. The failure contradicts not only the first

author's earlier theory of mood as a retrieval cue (Bower, 1981). The failure impacts more generally upon any learning theory which supposes that internal states act as contexts which by their presence can become associated automatically by contiguity to memories of coincident events, thus to later cue their retrieval. The disconfirmed theories include not only the drive stimulus theories noted above but also the arousal-as-cue theory of Clark, Milberg, and Ross (1983). Moreover, to the extent that mood influences the encoding of verbal material, the failure of MDR [mood-dependent retrieval] on measures of recall and recognition impacts negatively upon the principle of encoding specificity (Tulving and Thomson, 1973). Clearly many theorists have been wrong in expecting or explaining MDR. (p. 153)

APPENDIX A

SAMPLE IDIOGRAPHIC RATING SHEETS

FOR AFFECTIVE ASSESSMENT

On the following page you will see a list of words. Please read each word and decide which statement most accurately describes your attitude toward that word. Though you may find it difficult to decide for some words, please make whatever choice seems most appropriate. ***Please do not leave any words unrated.***

	Dislike Much	Dislike Slightly	Like Slightly	Like Much
01. productive	1	2	3	4
02. grouchy	1	2	3	4
03. thoughtless	1	2	3	4
04. informal	1	2	3	4
05. careless	1	2	3	4
06. uncongenial	1	2	3	4
07. friendly	1	2	3	4
08. understanding	1	2	3	4
09. conservative	1	2	3	4
10. cheerful	1	2	3	4

	Dislike Much	Dislike Slightly	Like Slightly	Like Much
11. honest	1	2	3	4
12. perfectionistic	1	2	3	4
13. radical	1	2	3	4
14. changeable	1	2	3	4
15. headstrong	1	2	3	4
16. ill-mannered	1	2	3	4
17. hostile	1	2	3	4
18. sincere	1	2	3	4
19. phony	1	2	3	4
20. responsible	1	2	3	4

	Dislike Much	Dislike Slightly	Like Slightly	Like Much
21. warm	1	2	3	4
22. mathematical	1	2	3	4
23. foolish	1	2	3	4
24. enthusiastic	1	2	3	4
25. skillful	1	2	3	4
26. boring	1	2	3	4
27. selfish	1	2	3	4
28. courteous	1	2	3	4
29. deceitful	1	2	3	4
30. crafty	1	2	3	4

	Dislike Much	Dislike Slightly	Like Slightly	Like Much
31. scientific	1	2	3	4
32. unsympathetic	1	2	3	4
33. unethical	1	2	3	4
34. generous	1	2	3	4
35. philosophical	1	2	3	4
36. considerate	1	2	3	4
37. lifeless	1	2	3	4
38. blunt	1	2	3	4
39. kind-hearted	1	2	3	4
40. meticulous	1	2	3	4

	Dislike Much	Dislike Slightly	Like Slightly	Like Much
41. wise	1	2	3	4
42. nonchalant	1	2	3	4
43. cautious	1	2	3	4
44. optimistic	1	2	3	4
45. lazy	1	2	3	4
46. tough	1	2	3	4
47. cold	1	2	3	4
48. incompetent	1	2	3	4
49. pessimistic	1	2	3	4
50. interesting	1	2	3	4

	Dislike Much	Dislike Slightly	Like Slightly	Like Much
51. modest	1	2	3	4
52. happy	1	2	3	4
53. cruel	1	2	3	4
54. forward	1	2	3	4
55. honorable	1	2	3	4
56. normal	1	2	3	4
57. amiable	1	2	3	4
58. depressed	1	2	3	4
59. emotional	1	2	3	4
60. shrewd	1	2	3	4

APPENDIX B

SAMPLE: NEGATIVE MOOD INDUCTION STATEMENTS

Please Read and Follow the Instructions. If you have any questions,
please feel free to ask the experimenter.

On the following pages you will see a number of statements. Please read each statement, and while reading through each of the statements, try to experience the state suggested; that is, try to feel the mood described. Spend roughly 20 seconds per statement, but more on those which you find particularly effective in inducing this mood. The experimenter will notify you when you should proceed to the next section. Please go on to the next page now.

The following statements were employed in the depression induction:
1. I feel unhappy.
2. I feel sad and blue.
3. I feel fed up.
4. I just feel drained of energy, worn out.
5. I feel pretty low.
6. Things seem futile, pointless.
7. I feel hopeless.
8. I feel downhearted and miserable.
9. I feel so tired and gloomy that I would rather just sit than do anything.
10. I feel heavy and sluggish.
11. It seems such an effort to do much.
12. I'm fed up with it all.

Part II. Recall of a relevant personal memory:

In the space provided, please record a NEGATIVE memory from your past which stands out in your mind. Who was present? What makes this event stand out as NEGATIVE? Please record any details you recall which are relevant to the event. Your response will remain anonymous and confidential.

APPENDIX C

SAMPLE: POSITIVE MOOD INDUCTION STATEMENTS

Please Read and Follow the Instructions. If you have any questions,
please feel free to ask the experimenter.

On the following pages you will see a number of statements. Please read
each statement, and while reading through each of the statements, try to
experience the state suggested; that is, try to feel the mood described. Spend
roughly 20 seconds per statement, but more on those which you find
particularly effective in inducing this mood. The experimenter will notify you
when you should proceed to the next section. Please go on to the next page
now.

The following statements were employed in the elation induction:
1. I feel pretty good right now.
2. I feel happy.
3. I feel cheerful, confident.
4. I can think quickly and clearly right now.
5. Right now, I feel very contented.
6. Right now, I feel like smiling.
7. I feel alert, happy, and full of energy.
8. I have a feeling of lightness and joy.
9. I really like this light-hearted feeling.
10. I can feel a smile on my face.
11. I feel so good I almost feel like laughing.
12. It feels great to be alive!

Part II. Recall of a relevant personal memory:

In the space provided, please record a POSITIVE memory from your past which stands out in your mind. Who was present? What makes this event stand out as POSITIVE? Please record any details you recall which are relevant to the event. Your response will remain anonymous and confidential.

APPENDIX D

SAMPLE: INSTRUCTIONS TO SUBJECTS

IN THE ANAGRAM CONDITION

The following groups of letters are ordinary words which have been scrambled. Please rearrange these letters to form their respective words until the experimenter asks you to stop.

Examples:

a) A R C = C A R

b) L C W N O = C L O W N

1. D I O R A = _ _ _ _ _
2. R W A E T = _ _ _ _ _
3. K E R O J = _ _ _ _ _
4. E H N O P = _ _ _ _ _
5. K T I H N = _ _ _ _ _
6. W E H E L = _ _ _ _ _
7. N Y M O E = _ _ _ _ _
8. D B I E R = _ _ _ _ _
9. C T A R O = _ _ _ _ _
10. O E R S H = _ _ _ _ _
11. G U D E J = _ _ _ _ _
12. O W L E B = _ _ _ _ _
13. S L A C P = _ _ _ _ _
14. P E O K R = _ _ _ _ _
15. W S I T N = _ _ _ _ _
16. K P R A S = _ _ _ _ _
17. H I T G L = _ _ _ _ _
18. N H T G I = _ _ _ _ _
19. O E M V I = _ _ _ _ _
20. K I R N D = _ _ _ _ _
21. S E R A P = _ _ _ _ _
22. A L I C M = _ _ _ _ _
23. K S A N E = _ _ _ _ _
24. N H A Y D = _ _ _ _ _
25. R W T E I = _ _ _ _ _
26. S P R A G = _ _ _ _ _
27. D N R B A = _ _ _ _ _
28. U P H N C = _ _ _ _ _
29. K R I B C = _ _ _ _ _
30. O L N V E = _ _ _ _ _
31. U K T C R = _ _ _ _ _
32. I P O N A = _ _ _ _ _
33. C H L O T = _ _ _ _ _
34. H T O T O = _ _ _ _ _
35. Z A B E L = _ _ _ _ _
36. S M E G R = _ _ _ _ _
37. O C T U R = _ _ _ _ _
38. P R E A P = _ _ _ _ _
39. T S L E Y = _ _ _ _ _
40. D A G E R = _ _ _ _ _

APPENDIX E

SAMPLE: INSTRUCTIONS FOR RECALL SECTION OF EXPERIMENT

Below are a number of blank spaces. In these spaces please write as many words as you can recall from the list of words which you rated in the first portion of this experiment.

_____   _____
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APPENDIX F

SAMPLE: INSTRUCTIONS FOR RECOGNITION

PORTION OF EXPERIMENT

Look at each of the following words and decide whether "Yes," you saw it previously in this experimental context, or "No," you did not. Circle the appropriate response. *Do not skip any.*

001. bold	Yes	No
002. conceited	Yes	No
003. excited	Yes	No
004. thoughtful	Yes	No
005. thoughtless	Yes	No
006. understanding	Yes	No
007. meticulous	Yes	No
008. sincere	Yes	No
009. bossy	Yes	No
010. loyal	Yes	No
011. informal	Yes	No
012. changeable	Yes	No
013. warm	Yes	No
014. respectful	Yes	No
015. bashful	Yes	No
016. modest	Yes	No
017. radical	Yes	No
018. generous	Yes	No
019. lively	Yes	No
020. silent	Yes	No
021. incompetent	Yes	No
022. vulgar	Yes	No
023. aimless	Yes	No
024. mature	Yes	No
025. grateful	Yes	No

026. forgiving	Yes	No
027. cowardly	Yes	No
028. selfish	Yes	No
029. jealous	Yes	No
030. humorous	Yes	No
031. happy	Yes	No
032. depressed	Yes	No
033. interesting	Yes	No
034. quiet	Yes	No
035. nonchalant	Yes	No
036. strict	Yes	No
037. emotional	Yes	No
038. cheerful	Yes	No
039. educated	Yes	No
040. honest	Yes	No
041. forward	Yes	No
042. reliable	Yes	No
043. ill-mannered	Yes	No
044. pessimistic	Yes	No
045. shrewd	Yes	No
046. courteous	Yes	No
047. naive	Yes	No
048. snobbish	Yes	No
049. kind-hearted	Yes	No
050. blunt	Yes	No
051. wasteful	Yes	No
052. amiable	Yes	No

053. tactless	Yes	No
054. tolerant	Yes	No
055. daredevil	Yes	No
056. truthful	Yes	No
057. cautious	Yes	No
058. unsympathetic	Yes	No
059. witty	Yes	No
060. self-conscious	Yes	No
061. aggressive	Yes	No
062. friendly	Yes	No
063. tough	Yes	No
064. conventional	Yes	No
065. crafty	Yes	No
066. obnoxious	Yes	No
067. skillful	Yes	No
068. mathematical	Yes	No
069. wordy	Yes	No
070. imaginative	Yes	No
071. responsible	Yes	No
072. cold	Yes	No
073. clownish	Yes	No
074. deliberate	Yes	No
075. phony	Yes	No
076. normal	Yes	No
077. considerate	Yes	No
078. intolerant	Yes	No
079. capable	Yes	No
080. conservative	Yes	No

081. lazy	Yes	No
082. productive	Yes	No
083. antisocial	Yes	No
084. trusting	Yes	No
085. unfair	Yes	No
086. scientific	Yes	No
087. skeptical	Yes	No
088. hostile	Yes	No
089. careless	Yes	No
090. enthusiastic	Yes	No
091. authoritative	Yes	No
092. shallow	Yes	No
093. insecure	Yes	No
094. deceitful	Yes	No
095. foolish	Yes	No
096. childish	Yes	No
097. ordinary	Yes	No
098. optimistic	Yes	No
099. boring	Yes	No
100. lonely	Yes	No
101. unselfish	Yes	No
102. perfectionistic	Yes	No
103. spiteful	Yes	No
104. philosophical	Yes	No
105. unpredictable	Yes	No
106. honorable	Yes	No
107. lifeless	Yes	No

108. methodical	Yes	No
109. wise	Yes	No
110. weak	Yes	No
111. angry	Yes	No
112. headstrong	Yes	No
113. uncongenial	Yes	No
114. unethical	Yes	No
115. energetic	Yes	No
116. cruel	Yes	No
117. creative	Yes	No
118. spirited	Yes	No
119. grouchy	Yes	No
120. unkind	Yes	No

APPENDIX G

UNTRANSFORMED RAW SCORES

The following data represent the untransformed ratio (percentage) scores for each subject. Columns one and two represent the percentage of positive and negative words recalled, respectively. Columns three and four represent the percentage of positive and negative words recognized, respectively.

Subject	Group	One	Two	Three	Four
1	1	7	25	93	69
2	1	22	18	72	33
3	1	25	18	91	81
4	1	32	7	83	91
5	1	5	15	84	67
6	1	17	10	85	68
7	1	23	30	86	55
8	1	16	8	78	81
9	1	18	18	95	90
10	1	18	19	81	94
11	1	20	12	89	89
12	1	16	3	84	82
13	1	37	16	96	88
14	1	27	22	96	71
15	1	22	21	76	70
16	1	24	6	84	75
17	1	17	19	75	71
18	1	21	22	70	83
19	1	24	15	96	86
20	1	26	23	91	82
21	1	20	25	90	64
22	2	16	22	77	94
23	2	26	18	80	85
24	2	14	8	77	61
25	2	26	29	82	81
26	2	32	17	90	78

27	2	19	18	100	100
28	2	6	0	85	76
29	2	16	25	78	83
30	2	17	17	83	71
31	2	26	21	96	100
32	2	16	18	67	36
33	2	16	21	88	71
34	2	19	11	75	80
35	2	23	13	100	95
36	2	15	0	97	75
37	2	12	16	100	92
38	2	13	14	84	45
39	2	7	19	88	77
40	2	19	22	90	100
41	2	22	25	92	100
42	3	15	4	96	79
43	3	6	8	100	95
44	3	0	7	88	82
45	3	25	8	93	94
46	3	27	11	83	63
47	3	29	8	96	83
48	3	16	14	81	92
49	3	18	19	91	92
50	3	27	15	79	87
51	3	16	21	93	82
52	3	17	13	67	70
53	3	23	27	71	85
54	3	29	20	74	77
55	3	19	21	82	75
56	3	26	19	56	50
57	3	13	20	100	85

58	3	18	5	94	86
59	3	7	7	97	92
60	3	24	13	88	82
61	3	30	19	83	88
62	3	31	15	90	100
63	3	11	9	98	93
64	3	24	26	93	71
65	3	18	19	93	84
66	4	31	13	58	86
67	4	21	10	91	79
68	4	12	4	93	88
69	4	13	20	96	100
70	4	14	17	88	89
71	4	19	21	84	91
72	4	26	8	79	74
73	4	29	23	87	65
74	4	11	13	88	89
75	4	29	11	80	69
76	4	8	14	74	68
77	4	15	4	76	64
78	4	9	13	88	69
79	4	20	17	92	80
80	4	25	25	96	90
81	4	16	15	82	83
82	4	13	7	92	89
83	4	29	3	100	89
84	4	25	11	92	100
85	4	6	12	87	64
86	4	18	12	82	74
87	4	13	17	95	93
88	4	18	10	88	84

89	4	5	6	83	75
90	5	11	16	76	87
91	5	15	15	76	60
92	5	12	15	86	96
93	5	20	7	100	96
94	5	9	11	100	92
95	5	14	13	76	76
96	5	12	18	100	77
97	5	11	0	86	74
98	5	5	0	85	63
99	5	18	8	77	85
100	5	8	13	89	77
101	5	26	24	100	84
102	5	9	7	86	72
103	5	31	7	95	83
104	5	9	11	84	71
105	5	15	15	100	90
106	5	6	21	83	74
107	5	16	7	83	93
108	5	24	13	71	75
109	5	10	10	97	86
110	5	29	24	87	79
111	5	6	3	76	89
112	5	9	8	93	100
113	6	10	16	78	78
114	6	19	21	100	88
115	6	11	0	86	71
116	6	23	13	76	73
117	6	14	12	90	70
118	6	14	4	91	65
119	6	13	40	96	63

120	6	3	8	64	65
121	6	28	14	76	74
122	6	6	7	94	83
123	6	2	0	67	92
124	6	8	4	83	82
125	6	11	8	97	82
126	6	0	15	83	100
127	6	11	17	94	78
128	6	18	11	100	100
129	6	16	18	97	100
130	6	14	21	87	55
131	6	9	15	87	91
132	6	6	0	83	78
133	6	19	21	76	58
134	6	27	13	93	85
135	6	6	0	69	69

APPENDIX H

TRANSFORMED RAW SCORES

The following data represent the transformed ratio (percentage) scores for each subject. As above, columns one and two represent the percentage of positive and negative words recalled, respectively. Columns three and four represent the percentage of positive and negative words recognized, respectively. The following scores have been transformed according to Winer (1965) [Appendix B.5]

Subject	Group	One	Two	Three	Four
1	1	0.5355	1.0472	2.6062	1.9606
2	1	0.9764	0.8763	2.0264	1.2239
3	1	1.0472	0.8763	2.5322	2.2395
4	1	1.2025	0.5355	2.2916	2.5322
5	1	0.4510	0.7954	2.3186	1.9177
6	1	0.8500	0.6435	2.3462	1.9391
7	1	1.0004	1.1593	2.3746	1.6710
8	1	0.8230	0.5735	2.1652	2.2395
9	1	0.8763	0.8763	2.7093	2.4981
10	1	0.8763	0.9021	2.2395	2.6467
11	1	0.9273	0.7075	2.4655	2.4655
12	1	0.8230	0.3482	2.3186	2.2653
13	1	1.3078	0.8230	2.7189	2.4341
14	1	1.0928	0.9764	2.7389	2.0042
15	1	0.9764	0.9521	2.1177	1.9823
16	1	1.0239	0.4949	2.3186	2.0944
17	1	0.8500	0.9021	2.0944	2.0042
18	1	0.9521	0.9764	1.9823	2.2916
19	1	1.0239	0.7954	2.7389	2.3746
20	1	1.0701	1.0004	2.5322	2.2653
21	1	0.9273	1.0472	2.4981	1.8546
22	2	0.8230	0.9764	2.1412	2.6467
23	2	1.0701	0.8763	2.2143	2.3462
24	2	0.7670	0.5735	2.1412	1.7926
25	2	1.0701	1.1374	2.2653	2.2395

26	2	1.2025 0.8500 2.4981 2.1652
27	2	0.9021 0.8763 3.0783 3.0783
28	2	0.4949 0.0633 2.3462 2.1177
29	2	0.8230 1.0472 2.1652 2.2916
30	2	0.8500 0.8500 2.2916 2.0042
31	2	1.0701 0.9521 2.7288 3.0783
32	2	0.8230 0.8763 1.9177 1.2870
33	2	0.8230 0.9521 2.4341 2.0042
34	2	0.9021 0.6761 2.0944 2.2143
35	2	1.0004 0.7377 3.0783 2.6906
36	2	0.7954 0.0633 2.7652 2.0944
37	2	0.7075 0.8230 3.0783 2.5681
38	2	0.7377 0.7670 2.3186 1.4706
39	2	0.5355 0.9021 2.4341 2.1412
40	2	0.9021 0.9764 2.4981 3.0783
41	2	0.9764 1.0472 2.5681 3.0783
42	3	0.7954 0.4027 2.7189 2.1895
43	3	0.4949 0.5735 3.0783 2.6906
44	3	0.0633 0.5355 2.4341 2.2653
45	3	1.0472 0.5735 2.6062 2.6467
46	3	1.0928 0.6761 2.2916 1.8338
47	3	1.1374 0.5735 2.7389 2.2916
48	3	0.8230 0.7670 2.2395 2.5681
49	3	0.8763 0.9021 2.5322 2.5681
50	3	1.0928 0.7954 2.1895 2.4039
51	3	0.8230 0.9521 2.6062 2.2653
52	3	0.8500 0.7377 1.9177 1.9823
53	3	1.0004 1.0928 2.0042 2.3462
54	3	1.1374 0.9273 2.0715 2.1412
55	3	0.9021 0.9521 2.2653 2.0944
56	3	1.0701 0.9021 1.6911 1.5708

57	3	0.7377 0.9273 3.0783 2.3462
58	3	0.8763 0.4510 2.6467 2.3746
59	3	0.5355 0.5355 2.7819 2.5681
60	3	1.0239 0.7377 2.4341 2.2653
61	3	1.1593 0.9021 2.2916 2.4341
62	3	1.1810 0.7954 2.4981 3.0783
63	3	0.6761 0.6094 2.8240 2.6062
64	3	1.0239 1.0701 2.6062 2.0042
65	3	0.8763 0.9021 2.6062 2.3186
66	4	1.1810 0.7377 1.7315 2.3746
67	4	0.9521 0.6435 2.5322 2.1895
68	4	0.7075 0.4027 2.6062 2.4341
69	4	0.7377 0.9273 2.7440 3.0783
70	4	0.7670 0.8500 2.4341 2.4655
71	4	0.9021 0.9521 2.3186 2.5322
72	4	1.0701 0.5735 2.1895 2.0715
73	4	1.1374 1.0004 2.4039 1.8755
74	4	0.6761 0.7377 2.4341 2.4655
75	4	1.1374 0.6761 2.2143 1.9606
76	4	0.5735 0.7670 2.0715 1.9391
77	4	0.7954 0.4027 2.1177 1.8546
78	4	0.6094 0.7377 2.4341 1.9606
79	4	0.9273 0.8500 2.5681 2.2143
80	4	1.0472 1.0472 2.7288 2.4981
81	4	0.8230 0.7954 2.2653 2.2916
82	4	0.7377 0.5355 2.5681 2.4655
83	4	1.1374 0.3482 3.0783 2.4655
84	4	1.0472 0.6761 2.5681 3.0783
85	4	0.4949 0.7075 2.4039 1.8546
86	4	0.8763 0.7075 2.2653 2.0715
87	4	0.7377 0.8500 2.6906 2.6062

88	4	0.8763	0.6435	2.4341	2.3186
89	4	0.4510	0.4949	2.2916	2.0944
90	5	0.6761	0.8230	2.1177	2.4039
91	5	0.7954	0.7954	2.1177	1.7722
92	5	0.7075	0.7954	2.3746	2.7189
93	5	0.9273	0.5355	3.0783	2.7189
94	5	0.6094	0.6761	3.0783	2.5681
95	5	0.7670	0.7377	2.1177	2.1177
96	5	0.7075	0.8763	3.0783	2.1412
97	5	0.6761	0.0633	2.3746	2.0715
98	5	0.4510	0.0633	2.3462	1.8338
99	5	0.8763	0.5735	2.1412	2.3462
100	5	0.5735	0.7377	2.4655	2.1412
101	5	1.0701	1.0239	3.0783	2.3186
102	5	0.6094	0.5355	2.3746	2.0264
103	5	1.1810	0.5355	2.7045	2.2916
104	5	0.6094	0.6761	2.3186	2.0042
105	5	0.7954	0.7954	3.0783	2.4981
106	5	0.4949	0.9521	2.2916	2.0715
107	5	0.8230	0.5355	2.2916	2.6062
108	5	1.0239	0.7377	2.0042	2.0944
109	5	0.6435	0.6435	2.7876	2.3746
110	5	1.1374	1.0239	2.4039	2.1895
111	5	0.4949	0.3482	2.1177	2.4655
112	5	0.6094	0.5735	2.6062	3.0783
113	6	0.6435	0.8230	2.1652	2.1652
114	6	0.9021	0.9521	3.0783	2.4341
115	6	0.6761	0.0633	2.3746	2.0042
116	6	1.0004	0.7377	2.1177	2.0488
117	6	0.7670	0.7075	2.4981	1.9823
118	6	0.7670	0.4027	2.5322	1.8755

119	6	0.7377 1.3694 2.7189 1.8338
120	6	0.3482 0.5735 1.8546 1.8755
121	6	1.1152 0.7670 2.1177 2.0715
122	6	0.4949 0.5355 2.6467 2.2916
123	6	0.2838 0.0633 1.9177 2.5681
124	6	0.5735 0.4027 2.2916 2.2653
125	6	0.6761 0.5735 2.7762 2.2653
126	6	0.0633 0.7954 2.2916 3.0783
127	6	0.6761 0.8500 2.6467 2.1652
128	6	0.8763 0.6761 3.0783 3.0783
129	6	0.8230 0.8763 2.7707 3.0783
130	6	0.7670 0.9521 2.4039 1.6710
131	6	0.6094 0.7954 2.4039 2.5322
132	6	0.4949 0.0633 2.2916 2.1652
133	6	0.9021 0.9521 2.1177 1.7315
134	6	1.0928 0.7377 2.6062 2.3462
135	6	0.4949 0.0633 1.9606 1.9606

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