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The Effects of Oppositional Meaning in Learning Personality Styles and Difficult Words

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**THE EFFECTS OF OPPOSITIONAL MEANING IN LEARNING
PERSONALITY STYLES AND DIFFICULT WORDS**

by
Jonathan Daniel Thomas

**A Thesis Presented to the Faculty of the Graduate School
of Loyola University of Chicago in Partial Fulfillment
of the Requirements for the Degree of
of Master of Arts
January
1992**

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CHAPTER I

INTRODUCTION

Theories of learning have been the backbone of psychological research and theory construction since psychology's scientific beginnings. An understanding of how human beings learn is fundamental to understanding human beings at all. From the 1930s through the 1950s, perhaps the heyday of learning theory development and research, psychologists endeavored to create "global" or "grand" theories that could explain all aspects of the learning process. Skeptical that any one theory could explain completely the nature of the learning process, psychologists since the 1960s have tended to focus on specific aspects of the learning process. Behavioristic theories such as classical conditioning or reinforcement theories, as well as the numerous cognitive theories, have each at one time or another enjoyed a considerable amount of empirical attention. Currently, even while various cognitive theories continue to develop, the more traditional behavioristic theories are enjoying a comeback in psychological research (Klein and Mowrer, 1989).

A careful reading of both past and present theories of learning reveals that most of them assume a mediation model of cognition in which various cognitive mechanisms mediate between environmental stimuli and behavioral responses. In

this thesis, however, we would like to put forth a theory of learning, perhaps in the spirit of grand theories, that derives from a predicational (after Rychlak, 1988b) model of cognition rather than a mediational model. A predicational model of learning is an alternative theoretical explanation based on the assumption that people as agents actively endow their world with meaning. The predicational process of learning is neither mechanistic nor mediated; it is a process that requires an active (as opposed to passive) contribution on the part of an individual in order for learning to take place. The fundamental nature of the predicational process is dialectical. That is, learning is process by which meanings are grasped in terms of, at the very least, their opposites. Opposites provide clarity and a delimitating context within which the contents of the predicational process can be framed. This is by no means the only way in which dialectics has been understood. The term "dialectical" has a long philosophical history, with many different meanings. For the purposes of this thesis we will refer to the dialectical aspect of the predicational process as oppositionality.

To be sure, there is a growing body of research that suggests that there is a dialectical or oppositional feature to cognition. In Chapter I of this thesis, we will provide a theoretical backdrop from which to understand the current research on oppositionality--itself a form of the

predicational process. Chapter II will include a review of past research that shows oppositionality to be an important aspect of the learning process. The primary purpose of this thesis is to add to that body of research by reporting on three experiments that were designed to demonstrate the importance of oppositionality during learning.

Specifically, the experiments conducted for this thesis were designed to investigate directly a) the extent to which oppositional meanings are salient in learning and memory tasks, and b) whether oppositional meanings (as opposed to non-oppositional meanings) can actually enhance learning and memory abilities.

CHAPTER II

THEORETICAL FOUNDATIONS OF OPPOSITIONALITY

In this chapter the theoretical foundations for the research reported in this thesis are laid down. A brief discussion of importance of theory in research is followed by an discussion of Logical Learning Theory (LLT), the theory of interest. The final pages of this chapter define and explicate--via dialectical meaning--the particular theoretical construct of interest within this theory: *oppositonality*.

Theory

For the past forty years or so, historians and philosophers of science have reminded us of the preeminent role that theory plays in scientific inquiry (e.g., Kuhn, 1970; Popper, 1959; Marx, 1951). Theories, whether formal or informal, give expression to any given fact pattern. The positivistic notion that the "facts speak for themselves," that they are somehow independent of theory, has given way to a more modest notion that for any given fact pattern there are, in principle, an infinite number of explanations. Even more fundamental than simply recognizing that the same fact pattern may have multiple interpretations is the realization that in order for facts to be facts at all--that is, facts for a community of scientists--they need a

language of description, and any given language necessarily carries with it implicit (if not explicit) assumptive categories. Since assumptions are inextricably joined to theory, at one level or another, it follows that articulated facts are theory-laden. Moreover, contemporary criticism of scientism¹ reminds us that observations, from which facts are derived, are themselves theory-laden, dependent upon the pre-understanding (or assumptions or framework) of the observer. This becomes a critical point as scientists construct a body of *scientific* knowledge. Understanding the pre-understanding or assumptive framework of the observer (or scientist) becomes a crucial factor in understanding a body of empirical research that is being offered up by an observer or a community of observers.

Given these assertions about the importance of theory, those who hold to such assertions would see theory construction, explication and criticism as perhaps the most crucial tasks of the scientist.² On this account the

¹-According to Bleicher (1982, p.14) the term "scientism" refers to a particular brand of science that includes the following tenets:

- a) science deals with "facts" given independently of the researcher
- b) the empirical-analytical method is the only valid mode of knowledge-acquisition:
- c) that this method should be extended to all spheres of cognitive activity
- d) that its results are the only true form of knowledge

²-Recently there is has been call for psychologists to take the task of theory construction and criticism in a rigorous way (see Kukla, 1989).

ubiquitous aphorism usually attributed to Kurt Lewin that "there is nothing so practical as a good theory" might be better stated as "there is nothing so essential as good theory." Nevertheless, while these epistemological considerations are crucially fundamental³, theory qua theory continues to play an important practical role in scientific inquiry.

Rychlak (1981, Chapter III), for example, has considered the role of theory in psychology and has outlined four general functions: First, theory serves a descriptive function in that it gives an accounting of the nature of human phenomena (p.45). This function brings together statements, categories, or propositional relationships that describe, at one level of abstraction or another, the sum total of a given phenomenon or phenomena. Theoretical descriptions make explicit the pre-understanding or assumptive categories of theorists. Theory also functions to delimit or set bounds on the scope of constructs or propositions (p.49). Delimiting theoretical constructs or propositions allows for theories to be cogent, meaningful and explanatorily powerful. Without this delimiting

³-Obviously, epistemological considerations of science, knowledge and observation are the stuff whole theses and books are made of. It is not my intention to go into any further detail concerning this important area. For detailed analysis of these issues see Bleicher (1982), Faulconer and Williams (1985), Feyerabend (1975), Kuhn (1970), Lakatos and Musgrave (1970), Manicus and Secord (1983) Polkinghorne (1983), Rychlak (1985), Shames (1990) and Suppe (1977).

function theoretical constructs or propositions can address many different phenomena but the relationship between them will be conflated or unclear. Theories that delimit are able to escape the philosophical truism that "that which explains everything explains nothing." Theory also serves a generative function in providing the germ from which further thought and research can be nourished (p.54). Theory should be used as a heuristic that generates insights, speculation or explanation about the nature of a given phenomenon. Finally, as implied in the other functions, theory serves an integrative function (p.65); it brings together theoretical constructs into a consistent unified whole. At the very least, formal theories should reflect this integrative quality.

It might be maintained that a good theory should reflect all four of these functions. Even while it can be argued that theories which may be lacking in one or more of these functions are still good theories, the four functions do serve as a useful framework from which to examine the merits of a given theory. Moreover, it seems reasonable to suggest that the staying power of a theory may depend on its ability to carry out these fundamental functions.

The present research for this thesis is directly tied to a theory. Given the preceding discussion about the importance and function of theory, what follows will include a brief explication of the theory of interest--via this

chapter and a literature review--as well as a presentation of empirical findings designed to investigate important constructs contained within the theory.

Logical Learning Theory

Rychlak's (1988) "Logical Learning Theory" (LLT) serves as the rationale for the research reported on in this thesis. It is a teleological, humanistic approach to human phenomena. According to this theory, individuals as agents are capable of making a contribution to their own cognitions and behaviors. That is, human beings are able to act "for the sake of which," instead of merely being acted upon by external or internal (biological) forces. Human freedom or agency is a fundamental concern of LLT (Rychlak, 1988, 1981).

Since there are many definitions of and perspectives about freedom or agency which are in constant state of flux, and since any discussion of freedom can become easily conflated, it is important to be explicit about the kind of freedom LLT seeks to address. Logical learning theory is not concerned with physical or political freedom. Often questions of political liberty and rights or physical confinement in one form or another are confused with what has been called freedom of the will or agency. It is the latter concept that LLT concerns itself with. Logical learning theory is strictly a psychological theory,

concerning itself with such psychological processes as wishes, decisions, intentions, desires, motivations and individual responsibility for such cognitive processes.⁴

At first glance, theories that concern themselves with human agency seem neither original nor productive given the long-standing, notoriously complicated debates that span the philosophical history of Western civilization. Moreover, because of the reductio-mechanistic tendencies of modern psychological inquiry, the notion of agency is usually ignored, lost, or denied.⁵ By and large, most theories of human behavior are deterministic in the same sense that Newtonian physics is deterministic. Indeed, most models of human behavior are, by now in an "unconscious" way, patterned after the model of a superseded physics (Leahey, 1987, pp.3-33; Polkinghorne, 1983, Chapter 2; Robinson, 1981, Chapters 10 & 11; Rychlak, 1979, Chapter 2, 1981, Chapter V). Since efficient-cause forces rather than freedom are the central concern of psychology, the question of human beings qua agents is either assumed, ignored or

⁴-See Thorp (1980, pp.3-16) for a brief but informative explication of the varieties of psychological freedom. For a more detailed analysis and critique of psychological freedom as defined here, see Strawson (1986).

⁵-For example, Skinner (1971) suggests that "man's struggle for freedom is not due to a will to be free, but to certain behavioral processes characteristic of the human organism, the chief effect of which is the avoidance of or escape from so-called aversive features of the environment (p.42)." Our "feeling" free is an illusion because, ultimately, "freedom is a matter of contingencies of reinforcement . . ." (p. 37).

thought to be too theoretically and methodologically messy. But as some psychologists have argued (e.g., Gauld and Shotter, 1979; Rychlak, 1988, 1979; Taylor, 1985; Williams, 1987), unless psychology can account for human activity in terms of agency, in terms of genuine (not simply apparent) possibility and responsibility, human activity in all of its variety will necessarily lose any semblance of meaningfulness. As Williams (1987, p.211) has argued, the meaningfulness of human action resides "in its possibilities and its alternatives, its meaningful network of ends and distinctions." To borrow an example from Williams, an act of love is meaningful if it is distinguished from acts of hate, envy or mistrust and if it is understood that it need not happen.

Meaningful acts are meaningful because an actor could have acted differently or not acted at all. If acts of love or hate or a variety of other human activities were to be understood fundamentally as efficiently caused necessity, those acts could only be understood as unintelligible and therefore absurd; and any semblance of meaningfulness attached to such acts must be viewed as illusory. Since as psychologists and human beings we take our actions and the actions of others to be meaningful, it is incumbent upon us to explain and understand human behavior as essentially meaningful. But while human freedom may be theoretically and methodologically difficult, scientific method and

inquiry should and can contribute to ongoing dialogue about human freedom. This has been precisely Rychlak's point: Human agency need not and should not evade empirical rigor.

To account for human agency LLT utilizes Aristotle's well known notion of the four causes: material, efficient, formal and final. The material cause refers to the substance from which something is made. If we are trying to demonstrate the causes of chair, to use the classic example, the wood used to build a chair would be the material cause. The efficient cause refers to the forces or "energy" by which something is made. In the case of our chair, it would be the physical effort expended in putting the chair together. The formal cause refers to the "form" or "blueprint" belonging to the item being brought about. In order for the chair to be made, some idea about what a chair looks like--its "chairness"--must be known. The final cause refers to the intention or "that for the sake of which" something is brought about. The chair was made with the intention of being used to sit on (among other things). As might be noticed, Aristotle's notion of cause is much broader than current notions of cause--established by the Newtonian world--which generally limit (reduce) themselves to either material or efficient causes (Rychlak, 1988, 1985)--i.e., the external or internal forces mentioned above.

Logical Learning Theory offers a distinctive set of

concepts that challenge traditional notions about the process of cognition and meaningful human activity. While these concepts, in themselves, are not unique, when taken together they provide a unique and provocative agentive theory of human activity. For purposes of this thesis some key concepts need to be defined: The mediational process explanation, the predicational process explanation, dialectical meaning, oppositionality and telosponse.

When addressing the issue of learning processes, Rychlak (1988b) makes a distinction between two kinds of theoretical explanation: mediational theorizing and predicational theorizing. The mediational theoretical model always assumes that "something formed outside [the learning] process is taken in and comes to play a role in that process that is not intrinsic to it" (p.118). That is, the process mediates for the stimulus, or "input", which is extrinsic to the process and is the prompting signal for getting the process "up and running." The mediational process conveys rather than creates meaning. The meaning derived from the process is contingent and necessary; the process itself never articulates or forms the meaning, it only plays an instrumental role in making the proper connection for the meaning to occur. This is essentially a description of the behavioristic stimulus-response model which sees frequency and contiguity as the sole force (efficient cause) behind learning. Many cognitive theories base their explanation of

human learning on the same mediational process, only they are interested in describing the mechanisms that occur between stimulus and response, but they are necessary mechanisms nonetheless.

In contrast, the predicational process explanation, upon which LLT is based, describes a process of learning and meaning that involves "the act of affirming, denying, or qualifying broader patterns of meaning in relation to narrower or targeted patterns of meaning" (ibid., 1988a, p.119). It is a top-down process. For example, when we say "all men are mortal," mortality is the larger meaning and man is the narrower or "target" meaning. The act of predicating also establishes a context, as in the major premise of a syllogism, which extends meaning to the minor premises and conclusion.

This is not to say that predication is tied exclusively to syntax and grammar; predication is essentially a semantic process, with meaning being fundamental. Meaning is patterned organization, symbolizing intention. The predicational process places the predicator at center stage, allowing for the meaning to be created by the process not something extrinsic to it. Since in a mediational process the process itself never articulates or forms meaning, something like predication could only be secondary and essentially mechanistic, as in some cognitive theories. Thus, after taking in "men" and "mortality" and a few other

connecting words like "all" and "are," the mediational process can combine--through frequency and contiguity--word units into the sentence "all men are mortal." The main point is that the predication process sees the agent as the creator of meaning and the mediational process sees stimuli or inputs as the source for the illusion of meaning. The person is active in the predicational process and passive in the mediational.

It is here that our above discussion of theory and assumptions is pertinent. Since scientific knowledge grows only as fast as theories are able to generate and nurture that knowledge, whether the fruits of such knowledge are bitter or sweet depend, ultimately, on the bitter or sweet potential of its theoretical-assumptive roots. For the mediational theorist, the person is a conveyer rather a creator of meaning. Conversely, the predicational theorist takes the person to be the active contributor of meaning. These two mutually exclusive assumptions about human beings form the roots of two very different trees of scientific knowledge. Logical learning theory maintains that the predicational model of human learning is worth nurturing through empirical cultivation because it can potentially yield a rich body of knowledge that affirms human agency. In the remainder of this chapter and the following chapter, we will attempt to further elucidate those aspects of the predicational process of learning that are of particular

relevance to research conducted for this thesis.

Dialectical Oppositionality

The seminal idea of predication came from Aristotle's work, employing his notion of formal and final causation. Logical Learning Theory employs dialectical reasoning to account for both the formal and final cause contribution of the person to his or her behavior. For human action to be meaningful in any real sense the action must be "that, as opposed to this, for the sake of which"; human activity must have purpose rather than merely being a "response" to stimuli. Since dialectics has a long philosophical history, as well as a long list of different meanings (see Georgoudi, 1983; Reese, 1982; Rychlak, 1976), it is important to clarify what aspects of the dialectical tradition LLT employs.

Originally dialectics, derived from the Greek adjective *dialektikos*, meant conversation or discussion (see the Oxford English Dictionary). This particular meaning is still retained in at least one contemporary sense which refers to idea of debate or argumentation. Throughout the history of Western philosophy, dialectics has taken on many forms. For some preSocrates (e.g., Anaximander, Parmenides, Zeno and Heraclitus), Plato's Socrates, dialectics meant a method for ascertaining truth through the analysis or reconciliation of apparent oppositions or contradictions of

reality (Reese, 1982, p. 424) . Later, Aristotle distinguished between demonstrative and dialectical inquiry or reasoning; the former referring to the kind of syllogistic reasoning that begins with "primitive" or primary and true premises and the latter referring to syllogistic reasoning that uses as its starting point generally accepted opinions. Aristotle held that dialectical inquiry or reasoning is "a process of criticism wherein lies the path to the principles of all inquiries" (Runes, 1983, pp. 94-95).

Both Medieval (e.g., Augustine and Aquinas) and Modern philosophers such as Kant, Hegel and Marx all include, to varying degrees, the idea of dialectics, though each philosopher tends to use the term in very different ways. Kant uses the term to describe that part of his philosophy which critically analyzes the difficult attempt to apply the categories of understanding beyond the objectified realm of time and space to transcendental realm of antinomies, paralogisms and ideas. For Hegel, of course, dialectical idealism refers to ongoing thesis-antithesis-synthesis transformations which are teleological in nature. Marx's dialectical materialism, while still interested in opposition or negation (thesis-antithesis), locates this process in materialism or historical materialism eschewing Hegel's ontological idealism and, in most senses, his teleology.

While we have only touched briefly on the variety of meanings associated with dialectics in Western thought [the dialectic is ever present in most Eastern philosophies as well; see Nakamura (1964) and Kuo (1976)], there are some common themes, as well as some elaborations, that run through the history of dialectical meaning. Georgoudi (1983), in his review of dialectics, suggests following commonalities and elaborations: dialectic orientation is opposed to all metaphysical conceptions that claim psychological processes, social structures or material conditions as the primary cause of human activity; it is usually viewed as a process of relating between elements as subject and object or consciousness and being; dialectical relations are founded on negation or contradiction; negation is dynamic, always in play; it is concerned not with states of being but the process of becoming; dialectics is teleological; and finally, dialectical relationships are grounded on concrete lived experiences and not on reified abstractions.

Dialectical meaning is the *sine qua non* of LLT, which embraces some but not all of the preceding descriptions. Its interests lie in the human capacity to think and reason in terms of opposition. Rychlak (1988a, p.511) describes dialectical meaning as "meaning in which relations are said to bear the characteristics of oppositionality, duality, relationality, contradiction, and arbitrariness." Logical

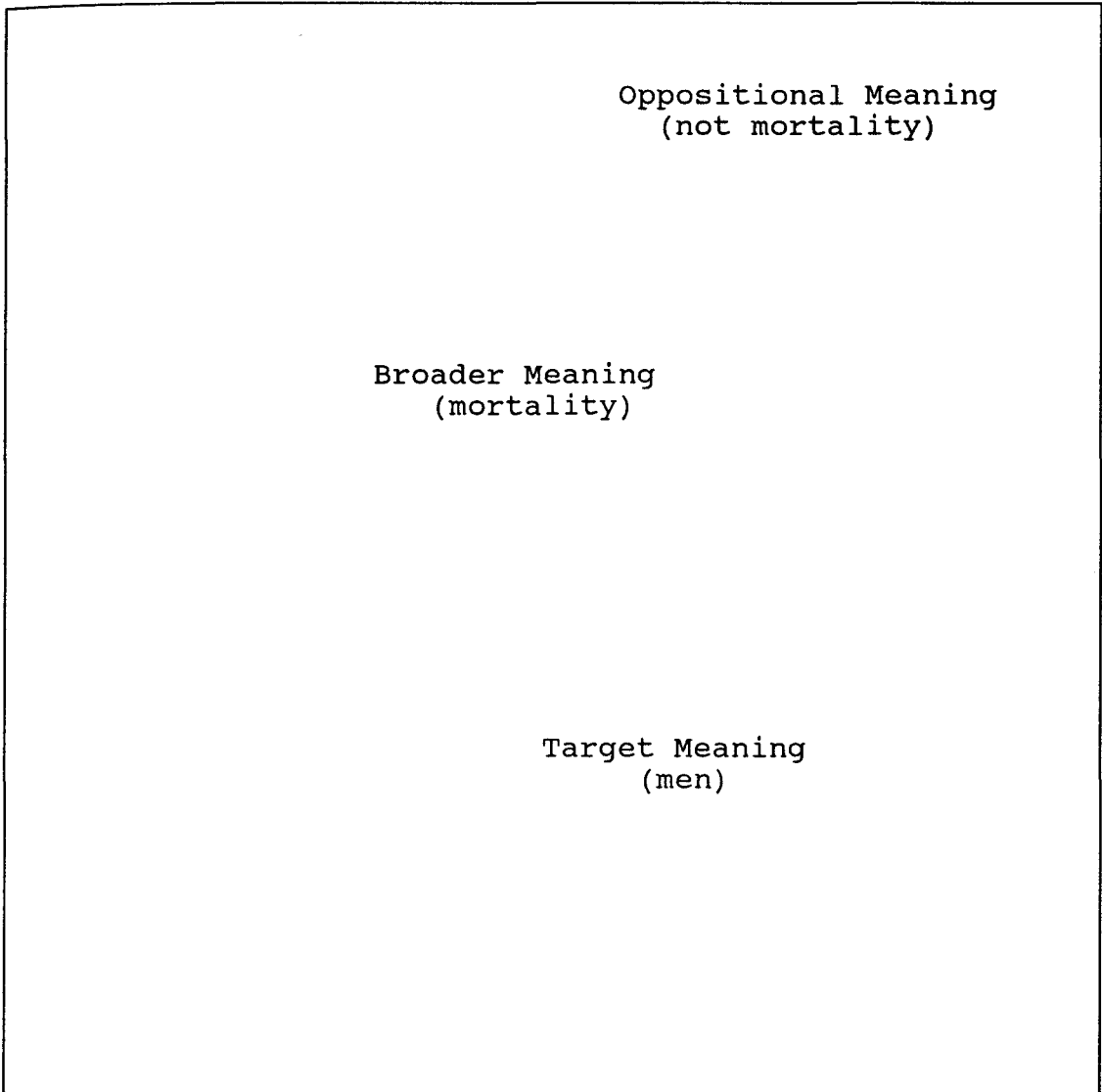
learning theory maintains that many--perhaps all--meanings are bipolar, and they can be apprehended only in terms of their opposites. Note, however, that LLT employs dialectical meaning to describe the relationship of meanings within the predication process and is thus part and parcel of the process (contra other dialectical explanations). Furthermore, human beings are by nature capable of dealing with this oppositionality by creating dialectical alternatives. Because of this there is never only a single cognitive or behavioral alternative available to a person at any one time. Agency--or affirming one line of reasoning or behavioral activity over another--is required within this theoretical perspective.

The oppositional nature of the dialectic implies that meaning is, at the very least, bipolar. For example, if one is confronted with a list of twenty traffic rules, immediately one has at the very least forty alternatives, not to mention a myriad of other alternatives, combinations and degrees. Inherent in any meaning is its opposite. In fact, meaning is delimited by its opposite. And thus LLT uses the term "oppositionality"⁶ which encompasses contrariety (all is X, none is X), contradiction (all is X, at least one is not X), negation (All is X, That is an

⁶-Since there are a large variety of meanings associated with the idea of dialectics, in recent years Rychlak has essentially replaced the term "dialectical meaning" with "oppositionality" to avoid misunderstanding and confusion about what he means by dialectics.

untrue premise) and contrast ("this" versus "that"). Contrariety is the most basic concept here, from which the other three spring. Oppositionality refers specifically to the bipolar, or dichotomous, aspects of a continuum of alternatives in any given situation or context. It is in oppositionality that any other alternative is possible.

To better understand how meaning is defined and delimited by its opposite and how this relates to the predicational process, it is sometimes helpful to think of meaning in terms of Euler circles (see Fig. 1). For example, if we say that "all men are mortal," we could represent "mortality" as the larger circle (or broader pattern of meaning) and "all men" (the targeted or narrower meaning) as the smaller circle inside the larger circle. What is often forgotten is that there in meaning outside the larger circle ("not morality" or "immortality") that delimits and thus adds to the meaning of mortality. We don't often think of meaning this way because the opposite or the negation of a particular meaning is usually not articulated or explicitly understood. Nevertheless, in any act of predication the opposite of any meaning is necessarily implied. This places oppositionality at center stage in the predicational process.

MeaningFig. 1

It is tempting as psychologists, inclined to look for universal categories and their operationalizations, to see oppositionality as merely content categories of opposing meanings. This is essentially how mediational theorist would view opposites. A mediational model of learning would

not include oppositional meanings at the simple, initial level of stimulus inputs. As explained earlier, in a mediational model oppositional meaning could only be present in learning later when higher order meaning can be formed-- that is, after a series of oppositional stimuli can be paired or encoded or attached together through frequency and contiguity. This learning would require, then, that there be static, universal opposites that form strong associations through frequency and contiguity. The key to understanding oppositionality under this model would essentially involve constructing a taxonomy of specific meanings and their opposites. This, in turn, would require one to ask odd questions such as, for example, "what thing is the opposite of red?" This would be an important question since the mediational model sees external contents as producing opposite meanings in a bottom-up fashion.

Conversely, a predicational process of learning put forth by LLT does not see the accumulation of oppositional content categories as forming oppositional meaning. In a top-down fashion, as stated earlier, the process of framing or predicating meaning includes oppositional meaning at the outset. Oppositionality is immediate, not sequential. When a particular meaning is grasped, so is its opposite. Oppositionality is inherent to the process of creating meaning and not the contents, which are the products of such a process. Opposites are not static because the process

creates opposites given particular contexts with particular contents.

To further illustrate this point, we could say the opposite of "red" is "not red," or, by contrast, is "green." If one is watching a basketball game between a team dressed in red and a team dressed in green, it is easy to see how one might understand green to be the opposite of red. Moreover, green might be considered the opposite of red if one is sitting at a stop light. Again, however, we might be tempted to see a particular content within a context as determining the oppositional meaning. But this would be misleading because for any given content within a context there is, in principle, an infinite number of opposites. The opposite of a particular content within a context is produced by the process and not that particular content. Therefore, LLT would explain green as the opposite of red within the context of watching a basketball game only because oppositionality, as part of the predicational process, always suggests "this" as opposed to "that," and not because we have somehow associated red with green enough times within this context to see them as opposites. This distinction between process and content is essential to understanding how the predicational process of learning differs from the mediational process.

In order to explain the process of how an individual may affirm or embrace one or the other ends of bipolar

meanings, LLT uses a technical term called the "telosponse." Telosponse--as opposed to "response"--refers to "taking on a meaningful item (e.g., image, word judgmental comparison) relating to a referent acting as a purpose for the sake of which behavior is then intended" (Rychlak, 1988b, p.283). This is to say that humans have an innate mental ability to choose among alternatives (at the very least oppositions) in a meaningful way that makes their choosing uniquely theirs and not merely a product of incoming stimuli. In everyday language we would probably refer to this process as acting intentionally; and intentional acts, according to LLT, is what make human agency possible. For purposes of the empirical research included in this thesis, however, we have concerned ourselves strictly with the concept of oppositionality and not with telosponse per se.

The foregoing is necessarily an abbreviated discussion of Logical Learning Theory. For a complete explication the reader is referred to Rychlak's (1988a) treatment of the topic. The purpose of this thesis is to empirically investigate practical applications of LLT dealing with the central construct of oppositionality. Chapter III will review pervious research that has looked at oppositionality in learning. Further definitions, explanations, distinctions and operationalizations will be made in that chapter and in other chapters of the thesis.

In summary, LLT involves a predicational process in

which a wider framework of meaning is used to endow a targeted item (or narrower meaning) with additional meaning, thus establishing a context within which targeted items are made more meaningful. Since oppositionality is an inherent part of that process and provides a bipolar framework within which meaning is apprehended, it stands to reason that if an oppositional context is used in learning and memory tasks, it will have a greater facilitatory effect on learning than a non-oppositional context. The experiments described in chapters IV, V, VI are designed to test the validity of this assertion.

CHAPTER III

Literature Review

Because what's *present* doesn't last,
The opposite of it is *past*.
Or if you look ahead,
Future's the opposite instead.
Or look around to see what's here,
and *absent* things will not appear.
There's one more opposite of *present*
That's really almost too unpleasant:
It is when *someone* takes away
Something with which you like to play.

--Richard Wilbur

"The concept of opposition," writes Rodney Needham (1987, p.xi-xii),

is one of the most antique in the history of disciplined thought, and it is to be discerned in the most disparate and far-separated forms of civilization. . . . Opposition would thus seem to be a fundamental notion and thereby qualified to serve as a basic predicate in the interpretation of human experience and its most general modes of representation.

And, indeed, it does appear that almost from the beginning of our Western philosophical tradition, philosophers have concerned themselves with opposition in terms of metaphysics, epistemology and ontology. As Ogden (1967, p. 21-33) points out, "Heraclitus had described his flux and Becoming as a union of the opposites, Being and Notbeing; Xenophanes had represented the amalgamation of One and All in God as immanent unity of opposites; Parmenides had found in the reciprocal relation of a series of pairs of opposites the constitution of the world of Appearance, and Plato made

the contradiction between this world and that of the Eternal, the Unchangeable and the Perfect a basis for his entire Theory of Ideas." Of course this early Greek concern with opposites culminated with Aristotle in what Ogden (ibid.) calls "Aristotle's obsession with the problem opposition" or what is generally identified as Aristotle's theory of contrariety (See Anton, 1957; Babin 1940; Ogden, 1967), which was briefly outlined in chapter II.

In chapter II we also mentioned in our discussion of dialectics later philosophical approaches that embody an oppositional nature at the most fundamental level. To be sure, the great dualisms generated by Western thought, e.g., subject/object, absolute/relative, spiritual/physical, one/many, reason/faith, mind/body, individual/community, free will/determinism, nature/nurture, are all oppositional in nature. Logical Learning Theory would predict such fundamental dualism or oppositions in our philosophical tradition because it claims that thought, mentation or cognition itself is based on oppositionality from the outset--the "inside" versus "outside" of categorical reasoning (see Chapter II, Figure 1). The purpose of this literature review, however, is not to catalogue the examples and instances of oppositional thinking from our Western tradition. In this chapter, we are interested in reviewing empirical research that has specifically advanced our understanding of how oppositionality plays a role in the

cognitive process itself. While this genre of research is relatively new, the reader may find that there is now enough empirical research dealing with oppositionality to warrant further empirical verification and exploration in this area.

Linguists have long recognized the importance that opposition plays in language. I. A. Richards, for example, in his introduction to Ogden's (1967) treatise (referred to above) tells us that the chief principle by which language works is opposition. Lyons (1977) explains that "opposition is one of the most important principles governing the structure of language" (p. 271). And Atkinson, Kilby and Roca (1982) have pointed out that "Pairs of words which are opposite in meaning are a pervasive feature of the semantic structure of any language" (p. 181).

Empirical evidence supporting the claim that opposition plays a fundamental and "pervasive" role in "any" language has only in recent years found its way into the social science literature. For example, Raybeck and Herrmann (1990), in an ambitious study that looked at eight different cultures found that when comparing contradictory/directional, contradictory/ reverse and reverse/directional semantic relationships (all of which fall under our definition of opposition) with other forms of synonymic or associative relationships, the "opposites are the semantic relations upon which the members of different cultures most strongly agree" (p.470). This kind of study substantiates

Osgood's (1952) procedure of using bipolar or oppositional meanings to study how widely different cultures make connotative judgments (see Osgood, Suci & Tannenbaum, 1957).

Oppositionality and Cognitive Development

Not only is there evidence that oppositionality is culturally universal, there is now concrete evidence suggesting that the capacity for creating oppositional meanings or categories begins at a very early age. Kagan (1984) informs us that "As the child creates categories, she is disposed to invent their complement. Soon after learning the meaning of *up*, the child learns the meaning of *down*; after learning the meaning of *high*, she learns the meaning of *low*; after *good*, she develops the meaning of *bad*. The appreciation of opposites is comprehended too early and too easily to be the product of painstaking instruction" (p. 189).

An example of this kind oppositional comprehension is Carey's (1978) research from which she has shown that children, as young as two years old, have the ability to contrast the meanings of "big" and "little," meanings that "seem to be acquired at the same time and are mapped onto the core comparative structure (including polarity) immediately" (p. 279). Carey's research clarifies Kagan's observations by suggesting that children learn the meaning of "big" and "little" simultaneously and not just "soon

after" as Kagan suggests. Her research also echoes earlier research conducted by Brewer and Stone (1975) who argued that at least for spatial meanings, children learn "the polarity of a dimension before they learn the dimension itself" (p.306). This clarification is consistent with LLT's predicational process which suggests that meaning itself is constructed oppositionally.

In another study involving semantic relationships, Kreutzer, Leonard & Flavell (1975) interviewed elementary school children (K, 1, 3, 5) to see how much the children themselves knew about various memory-related phenomena. When they were asked about the kinds of semantic relationships they thought would be easiest to learn, their responses revealed that with an increase in age came the tendency to assert that the oppositional meanings are easier to learn. Later research conducted by Landis, Herrmann, and Chaffin (1987) confirmed those assertions when they found that when comparing the performances of second and eight grade students who were asked to make judgments about semantic relations, both the second and eight grader's judgments about opposites were much more accurate than their judgments about other semantic relationships. That oppositionality or what is sometimes called antonymic structure is fundamental to the learning process is underscored by the fact that educators are now advocating "teaching vocabulary through opposition" (Powell, 1986).

The child's natural ability to frame and understand oppositional meaning is perhaps best illustrated by the poems found in Richard Wilbur's book entitled *Opposites* (1973), one of which introduced this chapter. Wilbur explains that the material for the dialectical poems contained in this book came from a game he and his children would play in which one member of the family would suggest a word, and then everyone would join in a lively quarrel about its proper opposite.

The ability to utilize oppositional meaning has been found to be associated with creativity, mental health and maturity. Rothenberg (1973) conducted an experiment which demonstrated that subjects who score high on creativity scales have a stronger tendency to engage in "Janusian thinking," a "capacity to conceive and utilize two or more opposite or contradictory concepts, images or ideas simultaneously." Hogben and Jacobs (1972) found that schizophrenic subjects tend to "appraise words with similar sound but dissimilar meaning and words of antithetical meaning as similar in meaning more frequently than normal subjects" (p. 296). And Basseches (1980) reported that a content analysis of interviews about the nature of education conducted with freshman, seniors and faculty members of a university revealed the faculty members had a significantly broader range of dialectical schemata than seniors or freshman, and seniors had a significantly broader

dialectical schemata than freshman.

Oppositionality and Word Association Tasks

As early as 1948, Karwoski and Schachter, through a series of free association experiments, found that contrasting words (or words opposite in meaning) were readily produced, usually faster and more frequently than words similar in meaning to the stimulus words. Similar results were found by Siipola, Walker, and Kolb (1955) when subjects were asked to produce words in either high pressure or relaxed conditions. Kjeldergaard (1962) found, in another word association task, that subjects', when asked to do so, could produce equal if not greater numbers of oppositional words than when asked to give the first response that came to them. Carol, Kjeldergaard, and Carton (1962) also found that oppositional responses are consistent, independent tendencies in word association tasks. This is an important finding since many opposite responses on standard word-association norms are also primary responses.

It stands to reason that if oppositionality plays a prominent role in free association tasks, it is likely that oppositionality will also play a role in transfer effects or generalization in learning. This is indeed the case. As early as 1960, Ryan found that when subjects were given different types of transfer lists--associated

(oppositional), similar and control--the associated list produced significantly greater transfer effects than either similar or control lists, suggesting that oppositional meaning is fundamental to semantic organizational patterns. This finding has been repeatedly confirmed by later research, utilizing a variety of transfer tasks (Bastian, 1961; Mink, 1963; Weiss-shedd, 1973; Wickens & Chermak, 1967).

A considerable amount of research dealing with the associative structure of common english adjectives in particular also points to the prominent role that antonymic meaning or oppositionality plays in semantic cognitive patterns. Reese (1964, 1965) was one of the first to look at the associative strength and structure of adjectives. When using a stimulus list that included nearly all common adjectives in the English language, Reese (1964) found that "a very considerable portion of the associative meaning of common English adjectives can be directly described by the contrast of a polar-opposite scheme" (p.349). Contemporary research in semantic memory has also noted the prominent role bipolar or "marked" antonymic adjectives play in the organization of meaning (Zagrodzki, 1986; Gross, Fischer, & Miller, 1989). After reviewing the relevant literature and conducting their own experiments that look at the organization of adjectival meaning, Gross, Fischer, and Miller (1989) conclude that "predicative adjectives are

organized in semantic memory in clusters of synonymous (or nearly synonymous) terms, and that pairs of clusters are held together conceptually by bipolar attributes whose opposite ends are labeled by direct antonyms that provide foci for the clusters" (p. 96). Moreover, Brewer and Lichtenstein (1974) have conducted research that calls into question findings which contend that "unmarked" antonymic features do not function in the same way that marked antonymic features do in semantic organizations (see also Grossmann and Eagle, 1970), suggesting that oppositionality is truly a semantic rather than simply a syntactic or lexical feature. The oppositional nature of adjectival meaning is of particular interest to us since the experiments for this thesis require the use of adjectives.

By now it should be obvious that oppositional meaning is important to the learning and memory process. It should be noted, however, that underlying assumptions about *how* oppositional or antonymic meaning comes to play an important role in cognition is fundamentally different for LLT than for most language and learning theories. Furthermore, the theoretical explanation for the findings for many of the preceding studies does not include oppositionality, nor does it include the nomenclature we have used to describe LLT and oppositionality in particular. For example, Deese (1965) prefers to treat oppositional findings as manifestations of similarity or contiguity. As outlined in chapter II most

learning theories embrace a mediational model of learning in which incoming stimuli form the building blocks of semantic organization or structure in a bottom-up fashion through frequency and contiguity. In other words, the *contents* (stimuli) determine the semantic relationships established in learning and memory. Conversely, a Logical Learning Theorist would want to argue that the predicational *process* forms (requires) oppositional meaning and not the contents of the process. Consequently, the theoretical interpretation and language attached to much of the preceding evidence for oppositionality would be fundamentally and substantially different for one subscribing to the tenets of LLT. We would argue that the pervasive evidence for oppositionality is due not solely to incoming stimuli, but more fundamentally to the predication process, a process requiring that meaning be framed oppositionally.

It appears that there is some research which suggests that the processing of semantic relationships into oppositional dimensions enhances and perhaps forms the meaning of any specific semantic relationship. We have already called attention to Brewer and Stone's (1975) finding that little children use the polarity of a dimension before they learned the particular labels of a dimension. The work of linguists such Chaffin and Herrmann (1985, 1981) has shown that in a variety of verbal tasks the semantic

relationship *between* words is more crucial to processing semantic information than the meaning of individual words themselves (see also Chaffin, Russo, and Hermann, 1981; Herrmann, Chaffin, Conti, Peters, & Robbins, 1979; Herrmann, Chaffin, Daniel, & Wool, 1986). That is to say, the relationship between antonymic pairs appears to be more salient than the meaning of the words that form the antonymic pair. This is consistent with logical learning theory's claim that the predicational process is fundamental to learning specific meanings.

The Utilization of Oppositionality

Several studies have been published in recent years that directly employ and test the theoretical constructs of LLT. A bulk of the research has investigated the oppositional nature of affective assessment, a special case of oppositionality. It is beyond the scope of this literature review to describe the findings of this burgeoning area of research. For a review of this line of investigation, the reader is referred to Rychlak's (1988a, Chapter 9) analysis of this important research. The remainder of this chapter will describe in some detail three recent research projects that have tested directly the utilization of oppositionality in learning tasks without the added variable of affective assessment.

Hyde and Jenkins (1969) investigated the effects of

intentional and two types incidental learning tasks on the recall of highly associated words. The intentional task group was presented with a list of words and asked to remember them for future recall; a semantic task group was asked to rate the same list of words as to their pleasantness or unpleasantness (incidental learning); and a non-semantic task group was asked to look at each word in the same list for a particular letter (incidental learning).

Those who learned the list either intentionally or semantically performed equally well in both recalling and organizing of the stimulus list, and superior to the non-semantic task group. Even though Hyde and Jenkins used both synonym and antonym pairs in this study they did not test the possibility of effects due to oppositionality.

This is precisely what Williams and Lilly (1985) set out to do in their investigation of incidental learning. They conducted two experiments, one of which is of interest to us. The relevant experiment was designed to test whether subjects could recall more antonym pairs than non-antonym pairs in an intentional and three incidental learning tasks. After generating a list of 24 words, half of which were antonym pairs and the other half non-antonym pairs, they gave the same list to four groups. Similar to Hyde and Jenkins, the intentional learning group was instructed to learn the list for future recall. Another group of subjects was instructed to decide whether they liked or disliked each

word in the list (semantic task). A third group was asked to decide whether they thought each word was abstract or concrete (semantic task). And a fourth group was instructed to estimate the number of letters in each word (nonsemantic task). Williams and Lilly predicted that subjects would recall more antonym pairs than non-antonym pairs across groups. And in fact, among other results, they did find that oppositional pairs were recalled significantly better than nonoppositional pairs for all groups.

In another study Rychlak, Williams and Bugaj (1986) tested the facilitory effect of oppositionality in learning male and female names framed from oppositional or nonoppositional descriptor pairs. The four oppositional and nonoppositional pairs were: quiet-outspoken (oppositional), cautious-bold (oppositional), outspoken-bold (nonoppositional), and cautious-quiet (nonoppositional). Rychlak, Williams and Bugaj predicted that subjects would more readily learn the male and female names that were framed from an oppositional context than those that were framed from a nonoppositional context. As predicted, the statistical analysis yielded a main effect for oppositionality, demonstrating that the oppositional condition facilitated learning better than nonoppositional condition.

Rychlak, Williams and Bugaj (ibid.) designed a second experiment that removed word meaning from consideration by

using consonant-vowel-consonant (CVC) trigrams. They essentially turned a paired-associates format into a triassociation format. For this experiment two groups of subjects (one high school students, the other college freshmen) were asked to learn a series of trigrams by means of different types predication relationships. To illustrate, some subjects were asked to learn four types of predications for the trigram HIB: HIB is always VIC (identity), HIB is never QIN (negation), Hib is sometimes YAT (qualification), and HIB is the opposite of JOQ (opposition). This study is a significant test of predicational process since the trigrams had no inherent semantic or syntactic relationship among themselves. Rychlak, Williams and Bugaj predicted that an oppositional predication will facilitate learning CVC trigrams equally as well as an identity predication and that opposition will be superior to negation or qualification predications. As expected, they found that oppositional predications did as well or better than identity, negation or qualification predications, suggesting that oppositionality is in play even when the word meanings are absent.

Finally, Rychlak, Barnard, Williams and Wollman (1989) have conducted a series of experiments designed to demonstrate that subjects can recognize oppositional patterns in word meanings and sentences, that they can come to problem solutions by reasoning oppositionally, that

through practice they can transform sentence meanings oppositionally, and that they can process oppositional meanings rapidly and accurately when distinguishing between opposition and nonoppositional meaning.

In the first experiment, subjects were given 3X5 cards which had written on them eight words such as: tally, reject, order, endorse, state approve, help, decline. Of the eight words in this example, two (endorse and approve) are opposites of "reject" and one (decline) is a synonym. Subjects played a "two-touch" game with the experimenter which allowed subject to identify either antonyms and control words or synonyms and control words. Subjects were placed in either an antonym vs. control or a synonym vs. control condition. Rychlak *et al.* found that subjects were just as sensitive to the antonymic patterns as they were to the synonymic patterns.

In experiment two, the experimenters devised a clever scenario in which subjects, in order prevent a catastrophe, had to choose between several different patterns marked by A's and B's (e.g., AABBAAB), some of which were oppositional, others reflected a recency or primacy pattern in relation to the original pattern, and still others had no recognizable pattern as a control. It was found that subjects recognized and utilized the oppositional patterns as readily as the recency/primacy patterns when compared to the control patterns.

In a third experiment, Rychlak *et al.* wanted see if oppositionality would occur in recognizing meaningful statements and actually increase in facility as a result of practice. Subjects were asked to memorize 24 brief statements (e.g., "the elephant climbed the ladder") and were assigned to three different conditions that reflected different ways in which to understand the original statements. The three conditions were as follows: *identical* ("the elephant climbed the ladder"), *paraphrase* ("the elephant went up"), and *opposite* ("the elephant went down"). The statistical analysis revealed the *identical* condition was too easy, but in both the *paraphrase* and *opposite* conditions subjects improved their cognition steadily with every trial, thus supporting the hypothesis the oppositional meaning can be recognized in otherwise meaningful statements and can improve with practice to facilitate learning.

In the fourth and final study, Rychlak *et al.* compared the accuracy and speed with which subjects could recognize oppositional or nonoppositional meaning in a meaningful statement. To do this, they modified the procedures of the third experiment by giving subjects a prime sentence (e.g., "The ant crushed the rock") followed by either simple or complex paraphrase statements ("the ant was strong," "the ant was not weak"), or by simple or complex opposite statements ("the ant did not crush the rock," "the ant was

weak"). The findings for this experiment revealed that subjects could, in fact, recognize and respond to oppositional meanings with accuracy and speed that equalled or exceeded their recognition of and response to the paraphrase statements.

In the foregoing, we have tried to build an empirical case for the presence of oppositionality, as defined by LLT, in learning tasks. There is ample evidence to suggest that oppositionality figures prominently in cognitive processes. In this last section of the chapter, we described a small number experiments that have begun to look directly at how oppositional meaning might not only be present in learning but how it might actually facilitate learning. The experiments conducted for this thesis were designed to test and extend in application the facilitory effects of oppositional meaning to learning tasks that have not yet been investigated. Specifically, we wanted to see if subjects could more readily learn such things as personality styles and difficult words if given an oppositional predicational context.

CHAPTER IV

EXPERIMENT I

In order to test our predictions concerning the relationship between learning and oppositionality we designed three studies. All three are variations on the same theme. Two of the studies were designed to ascertain whether subjects could more readily recall personality descriptors given a semantically oppositional rather than nonoppositional context. The third study was designed to ascertain whether subjects could more readily recall the definitions of difficult words when those definitions are learned using an oppositional context verses a nonoppositional context. This chapter will describe and report the results of the first of the two studies involving personality descriptors.

METHOD

Hypothesis:

Subjects who are asked to learn adjectives describing the personality styles of faces will require fewer trials to learn these adjectives when they are presented in an oppositional rather than a nonoppositional context.

Rationale: According to LLT, learning involves predication, in which a wider framework of meaning is

extended to a targeted item, or narrower meaning (see Chapter II). Predications always establish a context within which other items are situated. The clearer this context is and the richer it is with meaning, the more readily learning will take place. Oppositionality--encompassing contrariety, contradiction, negation and contrast--provides a wide-ranging and rich (with meaning) context within which an item can be situated and hence learned. Thus, if a subject is required to associate a face with two personality descriptors such as "dominant or submissive," he or she will have a wide-range predication, a broadly framed yet intrinsically related and meaningful context within which to situate the face. The figure depicting Euler circles on p. 20 in Chapter II illustrates this intrinsic relationship. The direct oppositional relationship of "dominant or submissive" lends a clearly comparable meaning context to the targeted face. Consequently, it should be easier to recall a particular meaning that is an extension of an oppositional predication.

In contrast, when a subject has to associate a face with "dominant or impulsive," the meaning of "impulsive" in relation to "dominant" lacks a clear relational meaning context in which to target the face, because the relationship of "dominant" to "impulsive" adds relative confusion to the context. "Dominant" does not delimit "impulsive" and vice versa. Consequently, recognizing a

meaning that is an extension of a nonoppositional context should prove to be more difficult.

Subjects:

Subjects were male and female college students who participated in the experiment in partial fulfillment of a course requirement for their introductory psychology class at Loyola University of Chicago. A total of forty (N=40) undergraduate students (18 males, 22 females) participated in this experiment.

Procedure

Before beginning the experiment, subjects were given a statement of informed consent to be read and signed (see appendix A). This statement emphasized that their participation was voluntary, that they could withdraw from the experiment at any time without incurring a penalty, and that their performance would be kept confidential. Subjects were then given specific instructions on how the learning experiment would proceed. They were encouraged to ask questions about the procedure. Subjects were tested individually in the same or similar room with comparable conditions to help avoid random irrelevances in the setting.

To test our hypothesis we arranged for a single subject to be shown, using a carousel projector, a series of eight pictures of individual faces flashed on a screen. Following

each face, a pair of adjectives that could describe the this person was shown on the screen (e.g., dominant- submissive or dominant-impulsive). There were four oppositional and four nonoppositional adjective pairs in each list of eight faces. Following each pair of either oppositional or nonoppositional adjectives, the "correct" adjective would appear (e.g., either submissive or impulsive). Each picture was followed by a pair of personality descriptors and then by a single "correct" descriptor. Each slide (face, descriptor pair or single "correct" descriptor) appeared in five-second intervals.

Each subject was told that "In this study we are trying to find out how easy it is to learn a person's personality style or reputation." The subjects were asked to remember the "correct" personality style for the appropriate face. All subjects were given a practice trial, using three faces and descriptors not included in the experiment proper, to familiarize themselves with the procedure. After the practice trial, and after subjects had viewed each face and its accompanying descriptors to be used in the experiment once (one trial), the subjects were instructed to call out, from the second trial and thereafter, the "correct" descriptor before the pair of oppositional or nonoppositional descriptors appeared on the screen. Correctly calling out the proper descriptor constituted a "hit"; and an incorrect response or no response at all

constituted a "miss." Subjects were informed of their hits and misses, and each hit and miss was simultaneously recorded on a trial grid sheet for each of the eight faces across trials. Subjects completed the experiment by correctly calling out all eight descriptors for each face twice in a row in two consecutive trials. If a subject accurately anticipated the "correct" descriptor for all the pictures in a particular trial but then missed correctly anticipating at least one descriptor in the following trial, the subject would then have to correctly anticipate the descriptors for every picture in the next two trials in order for the experiment to stop.

After subjects had completed the experiment, they were given a written debriefing (see appendix B) concerning the purpose of the experiment. When the subjects had finished reading the debriefing, the experimenter took time to explain any unanswered questions. The experimenter then signed the subjects' verification form and they were dismissed. Ten subjects were used to pretest experimental material and procedures.

Materials

The pictures used for this experiment were taken from a 1960s Purdue University yearbook. All eight slides consisted of black and white photographs of Caucasian males. To avoid position effects (e.g., primacy/recency), the faces

and their accompanying descriptors were arranged in three different random orders across trials. The three orders were repeatedly rotated until the subjects completed the experiment.

The sixteen descriptors used in this experiment (see appendix C) were selected from Anderson's (1968) "likableness ratings of 555 personality words" norms. Anderson's norms allowed us to control for positive and negative affective association and the level of ambiguity in meaning. The selection process involved choosing equal numbers of liked and disliked words that had a minimum of ambiguity. Eight of the descriptors chosen were among the top 102 most liked words. None of these eight words had a score less than 4.66 on a scale that ranged from 0-6, a score of 6 being "the most favorable or desirable." The other eight descriptors (opposite in meaning to the first eight) were chosen from among the bottom 121 most disliked words. None of these eight words had a likableness rating higher than 1.53 on a scale that ranged from 0-6, a score of 0 being "the least favorable or desirable." There were equal numbers (four each) of liked and disliked words selected for the "correct" descriptors that followed each pair of semantically oppositional or nonoppositional descriptors. For example, a subject would see a face, then two adjectives such as "polite (or) rude," followed by "rude" signifying the "correct" descriptor for that

particular face. The subject then might see the next face followed by two adjectives such as "liar (or) neat," which, in turn, would be followed by "neat," the "correct" descriptor for that particular face.

From the sixteen descriptors (eight adjectives and their opposites), two different sets of descriptor pairs and their correct descriptor were created using all sixteen words in both oppositional and nonoppositional contexts. For example, half of the subjects were given "polite (or) rude" as one pair of descriptors, while the other half were given "cold (or) polite" and "honest (or) rude" as descriptor pairs (see appendix D for both sets of descriptor pairs). The same descriptors were used in both oppositional and nonoppositional contexts to ensure that the words themselves were not affecting the outcome. The two lists were randomly administered to subjects.

To determine the oppositionality (antonymic) and nonoppositionality of the descriptor pairs, the adjectives were tested against a thesaurus and ratings from three judges who were college students participating in the experiment in partial fulfillment of a course requirement for their introductory psychology class at Loyola University of Chicago. The three judges were given a list of oppositional and nonoppositional adjective pairs, including the experimental pairs, and asked to rate each pair of adjectives and indicate whether they thought that each pair

was opposite in meaning. Interrater reliability was determined taking the number of times the three judges agreed as to the oppositional or nonoppositional nature of each adjective pair and dividing that number by the number of opportunities to agree. This figure was then multiplied by 100 (see Shaughnessy and Zechmeister [1985, p. 60]). The interrater reliability for experimental oppositional and nonoppositional adjective pairs was 100 percent.

Scoring and Statistical Analysis

This experiment is a 2 (sex) X 2 (predicational context) mixed model design, with the first variable being between subjects and the second variable being within-subjects. A significant effect for sex was not expected. The dependent variables of interest were the trials to criterion scores for oppositionality and nonoppositionality. The separate scores for oppositionality and nonoppositionality were calculated by counting the number of trials it took each subject to learn all four of these descriptors in a sublist. The criterion we use for determining whether a subject had learned the personality style for both oppositionally and nonoppositionally framed descriptors was two consecutive trials of accurately anticipating the "correct" descriptor. The number of trials it took each subject to learn all four of oppositionally and nonoppositionally framed descriptors constituted the within-

lists score for these dependent variables. Thus, subjects could have learned the four oppositionally framed descriptors in fewer trials than the four nonoppositionally framed descriptors or vice versa; or they could have tied, learning all eight descriptors in the same number of trials. The difference between the oppositional and nonoppositional scores constituted the test of our hypothesis for this experiment.

To clarify this scoring procedure, if, for example, a subject correctly anticipated all four oppositionally framed descriptors in the 5th and 9th trials, reaching criterion on the 10th, that subject's oppositional score would be 10. This same subject may have correctly anticipated all nonoppositionally framed descriptors in the 5th, 9th, 11th trials, reaching criterion on the 12th, that subject's nonoppositional score would be 12.

The experimenter was present during the experiment in order to record hits and misses for each trial, using a trials to criterion grid sheet. To ensure the accuracy of recording hits and misses, the learning session for one out of every four subjects was audiotaped. There was a total of ten audiotaped sessions. Each taped session was then compared with its trials to criterion grid sheet for recording errors. Of the ten sessions audiotaped, two errors were found, both inconsequential to the score of the particular subject. (The recording errors were made in early

trials in which neither oppositionally or nonoppositionally framed descriptors were learned.) Also, the audio recording for one session helped clarify a recording mark which had no bearing on the score of the subject. Since the audiotaped sessions revealed so few recording errors, we can assume that the overall recording error rate was minimal and was inconsequential to the outcome of the experiment.

The analysis of the data for this experiment was a factorial analysis of variance using the BMDP2V statistical program.

RESULTS

The hypothesis for this experiment predicted subjects will require fewer trials to learn the oppositionally framed descriptors than the nonoppositionally framed descriptors. In order to test this hypothesis, a two-way analysis of variance (sex by predicational context) was performed, comparing the number of trials it took each subject to learn oppositionally and nonoppositionally framed descriptors. The analysis produced a marginally significant main effect for oppositionality, $F(1, 38) = 3.81, p = .0583$. There was not a main effect for sex. There was no interaction between sex and semantic context. Table 1 contains the means and standard deviations for this analysis. Table 2 contains the ANOVA source table for this analysis. The complete set of raw data for this experiment can be found in appendix E.

Table 1
Means and Standard Deviations for Sex and Trials to
Criterion Scores

	Male	Female	Total
oppositional (SD)	8.00 (2.03)	9.50 (3.02)	8.83 (2.53)
nonoppositional (SD)	8.83 (2.04)	9.60 (3.23)	9.25 (2.64)
total (SD)	8.42 (2.04)	9.55 (3.13)	

Table 2
Analysis of Variance for Sex and Trials to Criterion Scores

Source of Variance	Sum of Squares	df	Mean Square	F	p
SEX	25.23	1	25.23	1.88	.1781
ERROR	509.16	38	13.40		
OPPOSITION	4.23	1	4.23	3.81	.0583
SEX/OPPOSITION	2.73	1	2.73	2.46	.1251
ERROR	42.154	38	1.11		

Conclusion

Since the extant literature on oppositionality, summarized in chapter III, establishes a precedent for oppositional effects in learning, we can, with some confidence (our hypothesis could have employed a one-tailed prediction), reject the null hypothesis of "no differences" between oppositionality and nonoppositonality.

A marginally significant effect for oppositionality was found in this trials-to-criterion learning task. Chapter V will describe and report the results of a similar experiment, only this time we will see if oppositionality facilitates learning in a one-shot recall learning task.

CHAPTER V

EXPERIMENT 2

Experiment 1 was designed to test our hypothesis that oppositionality facilitates learning in a trials to criterion recall task. Experiment 2 is designed to test the hypothesis that oppositionality facilitates learning in a one-shot recall task which, again, involved learning personality styles. This chapter will describe and report the results of that experiment.

METHOD

Hypothesis:

Subjects who are asked to select adjectives describing the personality styles of faces will recall more of the adjectives when they are initially presented in an oppositional rather than a nonoppositional context.

Rationale: The rationale is essentially the same as in experiment 1. If a subject is required to associate a face with two personality descriptors such as "dominant or submissive," he or she will have a wide-range predication, a broadly framed yet intrinsically related and meaningful context within which to situate the face. The direct oppositional relationship of "dominant or submissive" lends a clearly comparable meaning context to the targeted face.

Consequently, it should be easier to recall a particular meaning that is an extension of an oppositional predication.

In contrast, when a subject has to associate a face with "dominant or impulsive," the meaning of "impulsive" in relation to "dominant" will more often than not lack a clear relational meaning context to the face because the relationship of "dominant" to "impulsive" adds relative confusion to the context because these meanings do not enrich each other. Consequently recalling a meaning that is an extension of a nonoppositional context should prove to be more difficult.

Subjects:

Subjects were male and female college students who participated in the experiment in partial fulfillment of a course requirement for their introductory psychology class at Loyola University of Chicago. A total of sixty (N=60) undergraduate students (23 males, 37 females) participated in this experiment.

Procedures

The same informed consent procedures were followed as in experiment 1 (see Appendix A). Subjects were then given specific instruction on how the learning experiment would proceed. They were encouraged to ask questions about the procedure. Subjects were tested in the same or similar room

with comparable conditions to help avoid random irrelevances in the setting.

To test our hypothesis we arranged for small groups of subjects (3-4 per group) to be shown a series of twelve pictures of individual faces flashed on a screen by a carousel projector. Following each face, a pair of adjectives--six oppositional and six nonoppositional in relation to each other--that could describe the personality style of the preceding person was shown on the screen (e.g., dominant-submissive or dominant-impulsive). Each picture was followed by one of these pairs of personality descriptors. Each slide (both face and descriptor pair) appeared in ten-second intervals.

A subject was told that in this study we were trying to find out how easy it was to learn a person's personality style or reputation. The subjects were asked to choose one of the two adjectives they thought would best fit the personality style of the preceding picture and then write that adjective down on a sheet of paper provided for them. They were then told that later in the experiment they would be asked to remember the adjectives they chose. All subjects were given a practice trial, using three faces and descriptors not included in the experiment proper, to familiarize themselves with the procedure. Following the practice trial, the subjects were given twelve faces each accompanied by either two oppositional or nonoppositional

personality descriptors. This was a one-shot learning task.

After the subjects had completed the trial and had written down the twelve descriptors of their choosing, the sheets with their chosen descriptors were gathered. The subjects were then given another sheet and instructed that the same twelve pictures, without the pair of descriptors, would be shown to them again in a different order. The subjects were asked to write in the blanks provided on the sheet the personality styles that they chose for each of the faces they were about to be shown. Subjects were instructed to fill in as many blanks as they could, and to put an X on those blanks in which they could not remember the descriptor in order to avoid confusion about where to put which descriptor. (This procedure also helped avoid confusion later when attempting to score the sheets.)

After subjects had completed the second trial and had filled in the second sheet as completely as possible, the sheets were then gathered and paired with the initial sheet that the subjects had been given. After the second sheet was gathered, each subject was given a written debriefing (see Appendix B) concerning the purpose of the experiment. When the subjects had finished reading the debriefing, the experimenter took time to explain any unanswered questions. The experimenter then signed the subjects' verification form and they were dismissed. Four subjects were used to pretest experimental material and procedures.

Materials

As in experiment 1, the pictures used for this experiment were taken from a 1960s Purdue University yearbook. All twelve slides consisted of black and white photographs of Caucasian males.

The twenty-four descriptors used in this experiment (see appendix F) were selected from Anderson's (1968) "likableness ratings of 555 personality words" norms. Again, Anderson's norms allowed us to control for positive and negative affective association and the level of ambiguity in word meaning. The selection process involved choosing equal numbers of liked and disliked words that had a minimum of ambiguity. Eight of the descriptors chosen were among the top 149 most liked words. None of these eight words had a score less than 4.29 on a scale that ranged from 0-6, a score of 6 being "the most favorable or desirable." The other eight descriptors (opposite in meaning to the first eight) were chosen from among the bottom 233 most disliked words. None of these eight words had a likableness rating higher than 2.24 on a scale that ranged from 0-6, a score of 0 being "the least favorable or desirable."

Using the twenty-four descriptors (twelve adjectives and their opposites), two different sets of descriptor pairs were created using all twenty-four words in both oppositional and nonoppositional contexts. For example,

half of the subjects were given "polite (or) rude" as one pair of descriptors, while the other half were given "polite (or) boring" and "sincere (or) rude" as descriptor pairs (see appendix G for both sets of descriptor pairs). The same descriptors were used in both oppositional and nonoppositional contexts to ensure that the words themselves were not affecting the outcome. The two lists were randomly administered to subjects.

To determine the oppositionality and nonoppositionality of the descriptor pairs, the adjectives were tested against a thesaurus and ratings from three judges who were college students participating in the experiment in partial fulfillment of a course requirement for their introductory psychology class at Loyola University of Chicago. The three judges were given a list of oppositional and nonoppositional adjective pairs, including the experimental pairs, and asked to rate each pair of adjectives and indicate whether or not they thought that each pair was opposite in meaning. Interrater reliability was determined taking the number of times the three judges agreed as to the oppositional or nonoppositional nature of each adjective pair and dividing that number by the number of opportunities to agree. This figure was then multiplied by 100 (see Shaughnessy and Zechmeister [1985, p. 60]). The interrater reliability for experimental oppositional and nonoppositional adjective pairs was 100 percent.

Scoring and Statistical Analysis

As with experiment 1, this experiment is a 2 (sex) X 2 (predicational context) mixed model design, with the first variable being between subjects and the second variable being within-subjects. A significant effect for sex was not expected. The dependent variables of interest were the scores for oppositionality and nonoppositionality. The score for oppositionality was calculated by counting the number of correctly recalled descriptors that had been originally framed from an oppositional context for each subject. The same scoring procedure was used for nonoppositionally framed descriptors. For each subject, the number of recalled descriptors that had been originally framed from a nonoppositional context constituted the score for nonoppositionality. Thus, subjects could have recalled more oppositionally framed descriptors than nonoppositionally framed descriptors, or vice versa; or they could have tied, recalling equal numbers of oppositionally and nonoppositionally framed descriptors. The mean difference between the oppositional and nonoppositional scores constituted the test of our hypothesis for this experiment. The analysis of the data for this experiment was a factorial analysis of variance using the BMDP2V statistical program.

RESULTS

The hypothesis for this experiment predicted that subjects will recall more of the oppositionally framed descriptors than the nonoppositionally framed descriptors. The two-way factorial analysis of variance produced a significant main effect for predicational context, $F(1, 58) = 5.03, p = .0288$. There was no main effect for sex. There was no interaction between sex and predicational context. Table 3 contains the means and standard deviations for this analysis. Table 4 contains the ANOVA source table for this analysis. The complete set of raw data for this experiment can be found in appendix H.

Table 3
Means and Standard Deviations for Sex and Trials to
Criterion Scores

	Male	Female	Total
oppositional (SD)	2.21 (1.35)	2.27 (1.76)	2.25 (1.56)
nonoppositional (SD)	1.61 (1.23)	1.81 (1.17)	1.73 (1.20)
total (SD)	1.91 (1.29)	2.04 (1.46)	

Table 4
Analysis of Variance for Sex and Recall Scores

Source of Variance	Sum of Squares	df	Mean Square	F	p
SEX	0.46	1	0.46	.19	.6648
ERROR	141.03	58	2.43		
OPPOSITION	8.09	1	8.09	5.03	.0288
SEX/OPPOSITION	0.16	1	0.16	.10	.7552
ERROR	93.33	58	1.61		

Conclusion

Since a significant effect for oppositionality was found we can reject the null hypothesis suggesting "no differences" between our experimental conditions.

Since a marginally significant effect for oppositionality was found in the trials to criterion recall task (Experiment 1) and an unqualified significant effect was found in this one-shot recall task, it seemed plausible to us that oppositionality may facilitate learning in yet other types of learning tasks which heretofore had not been studied. Chapter VI will describe and report the results of another experiment designed to extend and test our hypothesis that oppositionality facilitates learning.

CHAPTER VI

EXPERIMENT 3

Experiment 1 and 2 were designed to test our hypothesis that oppositionality facilitates learning in trials to criterion and one-shot recall tasks. Experiment 3 is designed to test, again, the hypothesis that oppositionality facilitates learning in a trials to criterion learning task which involves learning the definitions of difficult words. This chapter will describe and report the results of that experiment.

METHOD

Hypothesis:

Subjects who are asked to learn the definitions of difficult words will require fewer trials to learn these definitions when they are presented in an oppositional rather than a nonoppositional context.

Rationale: The rationale is essentially the same as in experiments 1 and 2. If a subject is required to associate a difficult word with two possible definitions that are antonymically related, such as "fancy or plain," he or she will have a wide-range predication, a broadly framed yet intrinsically related and meaningful context within which to situate the word. The direct oppositional relationship of

"fancy or plain" lends a clearly comparable meaning context to the targeted difficult word. Consequently, it should be easier to recall a particular meaning that is an extension of an oppositional predication.

In contrast, when a subject has to associate a word with "genial or fancy," the meaning of "genial" in relation to "fancy" will more often than not lack a clear relational meaning context to the difficult word because the relationship of "fancy" to "genial" adds relative confusion to the context because these meanings do not delimit each other. Consequently recalling a meaning that is an extension of a nonoppositional context should prove to be more difficult.

Subjects:

Subjects were male and female college students who participated in the experiment in partial fulfillment of a course requirement for their introductory psychology class at Loyola University of Chicago. A total of sixty (N=60) undergraduate students (17 males, 43 females) participated in this experiment.

Procedures

The same informed consent procedures were followed as in experiment 1 (see Appendix A). After consent forms were signed, subjects were then given specific instructions on

how the learning experiment would proceed. They were encouraged to ask questions about the procedure. Subjects were tested individually in the same or similar room with comparable conditions to help avoid random irrelevances in the setting.

To test our hypothesis we arranged for each subject to be shown, using a standard memory drum, a series of eight difficult words. Following each difficult word, a pair of one-word definitions appeared in the memory drum window. One of the words was a synonym for the difficult word. The other word in the pair was either an antonym (opposite in meaning) or another word that was neither a synonym or antonym. For example, if the difficult word "recherche" appeared in the window, a pair of words, either "fancy-plain" (oppositional) or "genial-fancy" (nonoppositional), would next appear in the window. There were four oppositional and four nonoppositional definitional pairs in each list of eight difficult words. Following each pair of either oppositional or nonoppositional definitional pairs, the correct definition would appear in the window. In this particular example, the word "fancy" would appear in the window after "fancy-plain" or "genial-fancy." Each difficult word was followed by a pair of definitions and then by the correct definition of the two. The words (difficult word, single-word definition pairs and the correct definition) appeared in the memory drum window at

four-second intervals.

Each subject was told that "In this study we are trying to find out how easy it is to learn the meanings of difficult words." The subjects were asked to remember the correct definitions that accompanied the difficult word. All subjects were given a practice trial, using three difficult words and their definitional pairs not included in the experiment proper, to familiarize themselves with the procedure. After the practice trial, and after subjects had viewed each difficult word and its accompanying definitions to be used in the experiment once (one trial), the subjects were instructed to call out, from the second trial and thereafter, the correct definition before the pair of oppositional or nonoppositional definitions appeared in the window. Correctly calling out the proper meaning constituted a "hit"; and an incorrect response or no response at all constituted a "miss."

Subjects were informed of their hits and misses, and each hit and miss was simultaneously recorded on a trial grid sheet for each of the eight faces across trials. Subjects completed the experiment by correctly calling out all eight definitions twice in a row in two consecutive trials. If a subject accurately anticipated the correct definition for all the difficult words in a particular trial but then missed correctly anticipating at least one definition in the following trial, the subject would then

have to correctly anticipate the definitions for every difficult word in the next two trials in order for the experiment to stop.

After subjects had completed the experiment, they were given a written debriefing (see appendix I) concerning the purpose of the experiment. When the subjects had finished reading the debriefing, the experimenter took time to explain any unanswered questions. The experimenter then signed the subjects' verification form and they were dismissed. Ten subjects were used to pretest experimental material and procedures.

Materials

The eight difficult words used in this experiment (see appendix J) were selected from a dictionary. The one-word definitions for each of the eight difficult words were also derived from a dictionary. A total of twenty-two words (8 definitions and their opposites and 8 other words) were generated to provide the oppositional and nonoppositional meaning context for the difficult words.

From the twenty-two definitions, two different sets of definitional pairs were created. For example, as illustrated in the procedure section, for half of the subjects the difficult word "recherche," was followed by the definitional pair "fancy (or) plain," while for the other half "genial (or) fancy," followed "recherche" (see appendix

K for both sets of definitional pairs). The two lists were randomly administered to subjects.

To determine the oppositionality (antonymical) and nonoppositionality of the definitional pairs, the meanings were tested against a standard thesaurus and ratings from three judges who were college students participating in the experiment in partial fulfillment of a course requirement for their introductory psychology class at Loyola University of Chicago. The three judges were given a list of oppositional and nonoppositional one-word definition pairs, including the experimental pairs, and asked to rate each pair of meanings and indicate whether or not they thought that each pair was opposite in meaning. Interrater reliability was determined taking the number of times the three judges agreed as to the oppositional or nonoppositional nature of each definitional pair and dividing that number by the number of opportunities to agree. This figure was then multiplied by 100 (see Shaughnessy and Zechmeister [1985, p. 60]). The interrater reliability for experimental oppositional and nonoppositional definitional pairs was .75.

Scoring and Statistical Analysis

Like experiments 1 and 2, this is a 2 (sex) X 2 (predicational context) mixed model design, with the first variable being between subjects and the second variable

being within-subjects. A significant effect for sex was not expected. The dependent variables of interest were the trials to criterion scores for oppositionality and nonoppositionality.

The score for oppositionality was calculated by counting the number of trials it took each subject to learn all four oppositionally framed definitions. The criterion we use for determining whether a subject had learned the definition of each difficult word for both oppositionally and nonoppositionally framed definitions was two consecutive trials of accurately anticipating the correct definition. The same scoring procedure was used for nonoppositionality framed definitions. The number of trials it took each subject to learn all four nonoppositionally framed definitions constituted the score for nonoppositionality. Thus, subjects could have learned the four oppositionally framed meanings in fewer trials than the four nonoppositionally framed meanings, or vice versa; or they could have tied, learning all eight definitions in the same number of trials. The difference between the oppositional and nonoppositional scores constituted the test of our hypothesis for this experiment.

To clarify this scoring procedure, if, for example, a subject correctly anticipated all four oppositionally framed definitions in the 5th and 9th trials, reaching criterion on the 10th, that subject's oppositional score would be 10.

This same subject may have correctly anticipated all nonoppositionally framed definitions in the 5th, 9th, 11th trials, reaching criterion on the 12th, that subject's nonoppositional score would be 12.

The experimenter recorded the hits and misses for each trial, using a trials to criterion grid sheet. Since the audiotaped recordings for experiment 1 revealed that the hits and misses recording procedure was virtually errorless, we did not tape any of the learning sessions for this experiment. The analysis of the data for this experiment was a factorial analysis of variance using the BMDP2V statistical program.

RESULTS

The hypothesis for this experiment predicted subjects will require fewer trials to learn the oppositionally framed definitions than the nonoppositionally framed definitions. The two-way factorial analysis of variance did not produce a significant effect for predicational context, $F(1, 58)=1.86$, $p=.1783$. There was no main effect for sex. Table 5 contains the means and standard deviations for this analysis. Table 6 contains the ANOVA source table for this analysis. The complete set of raw data for this experiment can be found in appendix L.

Table 5
Means and Standard Deviations for Sex and Trials to
Criterion Scores

	Male	Female	Total
opposition (SD)	8.06 (2.49)	8.12 (2.94)	8.10 (2.72)
nonoppositional (SD)	8.59 (2.72)	8.42 (3.58)	8.47 (3.15)
total (SD)	8.32 (2.61)	8.27 (3.26)	

Table 6
Analysis of Variance for Sex and Recall Scores

Source of Variance	Sum of Squares	df	Mean Square	F	p
SEX	0.08	1	0.08	.00	.9467
ERROR	986.29	58	17.01		
OPPOSITION	4.21	1	4.21	1.86	.1783
SEX/OPPOSITION	0.31	1	0.31	.14	.7112
ERROR	131.65	58	2.27		

While the mean difference of scores for this experiment did favor oppositionality (albeit nonsignificantly), the above results were somewhat surprising since, at face-value, the raw data scores revealed that considerably more subjects learned the oppositionally framed words faster than subjects who learned nonoppositionally framed words faster. Of the 60 subjects, 31 (52%) learned the oppositionally framed words faster; 14 (23%) learned the nonoppositionally framed words faster; and, 15 (25%) tied, learning both oppositionally and nonoppositionally framed words in the same number of trials.

Because there was a mean difference in performance and it appears that an inordinate number of subjects learned the oppositionally framed words faster, we have grounds for conducting a post hoc chi-square statistical analysis to determine if the inordinate number of subjects learning the oppositionally framed words faster is significantly different from the number of subjects who either learned the nonoppositionally framed words faster or tied.

For the analysis, we simply grouped subjects according to whether they learned 1) the oppositionally framed words faster (OPP), 2) the nonoppositionally framed words faster (NON), or 3) the oppositionally and nonoppositionally framed words in the same number of trials (TIE). Since there were three possible outcomes, the expected number of subjects for each group was 20 (see table 7). The chi-square analysis

revealed that a significant number ($X = 9.10$, $df=2$, $p < .025$) of subjects learned the oppositionally framed words faster than those who learned the nonoppositionally framed words faster or tied.

Table 7
Chi-square Analysis Expected and Observed Outcomes Diagram
for Experiment 3

	OPP	NON	TIE
Expected	20	20	20
Observed	31 (52%)	14 (23%)	15 (25%)

Conclusion

Since the factorial analysis of variance did not yield a significant effect for predicational context, we are unable to reject the null hypothesis of "no differences" between experimental conditions. However, the post hoc chi-square analysis does suggest that oppositionality is affecting learning for a significant number of subjects. In Chapter VII we will discuss the results and implications of those results for all three experiments.

CHAPTER VII

DISCUSSION AND CONCLUSION

The present research has sought to empirically test and extend the application of oppositionality, an important construct of LLT, to learning tasks heretofore not studied. We sought to test whether or not oppositionality can facilitate learning as it applies to learning personality styles of faces and difficult words. In doing so we have taken seriously the notion that meaning is oppositional. While the majority of learning theories rely on a mediational model of learning, our interest was to demonstrate that human beings, in actuality, learn by means of predicational process in which meaning is framed oppositionally. Since oppositionality is fundamental to the predicational process, it stands to reason that if people are given a learning task in which they are able to learn target items from both an oppositional or nonoppositional context, a targeted item framed from an oppositional context should prove to be easier to learn than an item framed from a nonoppositional context.

In Experiment 1 we hypothesized that subjects will take fewer trials to learn personality descriptors they have framed oppositionally than those descriptors they framed nonoppositionally. We found a marginally significant main effect in favor of oppositionality. The fact that an effect for oppositionality was only marginally significant may be

due to our procedure for this experiment. After having subjects view the faces, the pairs of descriptors (either oppositional or nonoppositional) in the second flash, and then the "correct" adjectives in the third flash in the first trial, we asked subjects to call out the "correct" descriptor before the second flash in each subsequent trial. There is the possibility that subjects did not attend to or consider the pair of descriptors in the second flash because they knew that the "correct" descriptor would immediately follow in the third flash. So essentially after the first trial, some subjects may have only attended to the faces and the correct descriptor for each face, effectively preventing them from framing the faces in either an oppositionally or nonoppositional predicational context. If this was indeed the case then we have no theoretical grounds upon which to predict that subjects would learn the personality style of some faces rather than others, and even a marginally significant effect for oppositionality would be surprising. It is likely that some subjects did consider the oppositional and nonoppositional context of the second flash at least in a number of trials and other subjects rarely considered the context of the second flash; hence, the watered down effect for oppositionality.

Our insistence that oppositionality did facilitate learning in Experiment 1, albeit in a less than ideal fashion, is justified since Experiment 2 clearly

demonstrates that oppositionality does facilitate learning personality styles. We modified the design of experiment 2 so that subjects would have to consider carefully the predicational context by only giving them the faces in the first flash and the oppositional or nonoppositional descriptors in second flash and then asking them to select one of the two descriptors they thought fit the preceding face. This procedure required subjects to utilize the predicational context and allowed us to test, unambiguously and without reservation, whether or not subjects could recall more self-selected descriptors that were framed oppositionally. The results using this procedure yielded a significant effect for oppositionality. It is clear that when subjects are required to carefully consider and perhaps actively and personally contribute to the predicational process by selecting from either oppositional or nonoppositional descriptors, they recall significantly more descriptors that are framed oppositionally than those that are framed nonoppositionaly.

Since LLT claims that oppositionality is fundamental to all forms of learning (see Rychlak, 1988a, Rychlak and Slife, 1984), the results of experiment 3, in which we asked subjects to learn the definition of difficult words, should have shown that oppositionality facilitates learning. Even though the mean variance between oppositionally and nonoppositionaly framed definitions favored

oppositionality, the analysis of variance for this experiment did not yield a main effect for predicational context. In light of the procedural problems associated with experiment 1 discussed above, we should not be surprised to find no effect for oppositionality since the procedure for experiment 3 was identical to experiment 1, only in experiment 3 subjects were asked to learn the definitions of difficult words rather personality styles of faces. Again, subjects could have easily ignored the predicational context (oppositional or nonoppositional) provided in the second flash and simply concentrated on the difficult word and its correct definition which followed the predicational context for each difficult words in every trial.

There is, however, evidence that oppositionality did, in fact, facilitate learning in this experiment as suggested by the post hoc chi-square analysis. That analysis found that a significant number of subjects (51%) actually learned more readily oppositionally framed definitions than subjects who tied (25%) or learned nonoppositionally framed definitions more readily (24%). Since for a significant proportion of the subjects the oppositional context facilitated learning, it can be argue that this nonparametric discrepancy is due to the fact that some subjects, more than others, were actually taking into consideration the predicational context.

In addition, there appears to be a list difference for subjects receiving lists 1 and 2. While 13 of the 30 subjects who received list 1 learned the nonoppositionally framed definitions more readily, only 1 out of the 30 subjects who received list 2 learned the nonoppositionally framed definitions more readily (See appendices K and L). It is possible that some difficult words were, regardless of the predicational context, simply easier to learn, or some other unforeseen (and, hence, uncontrolled) variable influenced the difference in outcomes for the two lists. At any rate, had all subjects taken seriously the predicational context, the parametric results should have shown a significant result for oppositionality as was the case in experiment 2.

Since logical learning theory maintains that it is the individual person who frames meaning oppositionally and not some universally law exogenous to the person, the nonparametric analysis which took into consideration the outcome of each individual subject should be considered a legitimate way to test the effect of oppositionality.

Nevertheless, one could revise the procedures for both experiment 1 and 3 in such way that subjects would have to more earnestly consider the oppositional and nonoppositional context. For example, one could change the procedure so that both experiments become recognition tasks. Instead of asking subjects to call out the correct descriptor or

definition before the oppositional or nonoppositional context appears (in the second flash), we could ask subjects to decide, after the second flash, which one of the two descriptors or definitions is the correct one. The third flash would then signify to the subject whether or not he or she recognized the correct descriptor or definition. Since following this procedure would require subject be attentive to the predicational context, we would, again, hypothesize that subjects will learn the oppositionally framed descriptors and definition more readily than the nonoppositionally framed descriptors and definitions.

Be that as it may, the three experiments described in this thesis, when taken together, do support LLT's claim that oppositionality or dialectical thinking is important to the learning process. In and of themselves, of course, they do not demonstrate the breath and depth of oppositionality as outlined by LLT, but they do provide an useful operationalization of oppositionality that can be empirically validated. Judging by the outcomes of these three experiments, we strongly recommend that future research dealing with oppositionality include experimental designs that require subjects to attend to and actively contribute to the learning process.

In conclusion, we argued in chapter II that a learning theory must take into account the agentive nature of human activity since, in some sense, we generally take our

thoughts and actions and the thoughts and actions of others to be meaningful and not simply effected by efficiently caused necessity; it should be abundantly clear that a mediational model of learning fails to render human activity meaningful. We have also argued that the oppositional or dialectical nature of human cognition and behavior has a long and thoroughly demonstrable tradition in philosophy and history. We have also described a sizable amount of research in learning that illustrates the oppositional or dialectical nature of the learning process, even though it is not always identified by its researchers as such.

Rychlak's LLT has set forth a theory of learning that takes into account both the oppositional nature of mentation and the agentive quality of human activity. The research for this thesis has offered empirical support for tenets of that theory. Since LLT represents an alternative to the many mechanistic theories which either explicitly or implicitly adhere to a mediational model of learning, continuing to gather empirical support for it may prove to be one of the most fruitful lines of research for psychologists as they attempt to understand human beings.

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APPENDIX A

Consent Form

Date: _____

Dear Friend:

Thank you for volunteering to participate in this research project.

Please know that all of the information that we collect today is confidential. This means that it will be seen only by myself and other qualified researchers and will be used for research purposes alone.

You need not use your own name on the experimental sheets. You can substitute a number (in certain cases we will do this for you). Rest assured that any data we gather here today is entirely anonymous. No one will ever know what you specifically achieved or conveyed here today.

Finally, should you decide at any point to discontinue your participation in this project, for whatever reason, please feel free to do so. Though we do not expect that this will happen, we want you to know that you are free to leave the study at any point without incurring any kind of penalty.

Please feel free to ask any questions. Once again, thank you for participating in this research.

Sincerely,

I have read the above and understand it completely.

Signature
Date

Today's

APPENDIX B

DEBRIEFING: Learning Personality Styles

In this study we are investigating whether you can learn more readily the personality style of a person (picture of a person) if given two opposing adjectives to choose from rather than two nonopposing adjectives. Since previous research has shown that when people are presented with opposite meanings they are better able to remember those meanings, we wanted to see if the same was true when one is learning personality styles of someone else. To see if you are, in fact, better able recall opposite meanings than nonopposite meanings, we simply compared your ability to call out the correct descriptor associated with a particular face and whether that descriptor had initially included opposite or nonopposite meanings.

This research is based on the work of Professor Joseph F. Rychlak of our psychology department. If you would like to discuss any of this with him or the person conducting this study, they would be happy to arrange an appointment with you.

Thank you very much for being a participant in the study.

PLEASE LEAVE THIS SHEET ON YOUR DESK

APPENDIX C

Sixteen descriptors for Experiment 1

01. warm
02. cold
03. sincere
04. phony
05. sloppy
06. neat
07. kind
08. cruel
09. honest
10. liar
11. boring
12. interesting
13. polite
14. rude
15. unreliable
16. dependable

APPENDIX D

Lists of Descriptor Sets for Experiment 1List 1

1. polite/rude=rude
2. interesting/cruel=cruel
3. unreliable/kind=kind
4. liar/honest=honest
5. sincere/boring=sincere
6. sloppy/neat=sloppy
7. cold/warm=warm
8. phony/dependable=phony

List 2

1. cold/polite=polite
2. interesting/boring=boring
3. kind/cruel=kind
4. liar/neat=liar
5. phony/sincere=sincere
6. warm/sloppy=sloppy
7. honest/rude=honest
8. unreliable/dependable=
unreliable

APPENDIX E

Raw Data Scores for Experiment 1

<u>Subject</u>	<u>O</u>	<u>N</u>	<u>M/F</u>	<u>Subject</u>	<u>O</u>	<u>N</u>	<u>M/F</u>
1.	07	09	F	21.	11	11	F
2.	11	11	F	22.	09	08	F
3.	09	10	F	23.	11	10	M
4.	07	08	M	24.	11	08	F
5.	07	08	F	25.	09	13	F
6.	06	05	F	26.	10	09	M
7.	06	06	M	27.	10	09	M
8.	06	08	M	28.	09	07	F
9.	18	20	F	29.	10	10	F
10.	10	11	F	30.	08	08	F
11.	06	06	M	31.	05	06	M
12.	13	11	F	32.	09	09	M
13.	06	08	M	33.	12	12	F
14.	06	09	F	34.	10	12	M
15.	11	13	M	35.	13	11	F
16.	09	11	M	36.	10	09	F
17.	09	10	M	37.	05	04	F
18.	05	06	M	38.	07	09	M
19.	08	10	M	39.	10	10	F
20.	05	06	F	20.	09	09	M

O=Oppositional Score

N=Nonoppositional Score

M\F=Male or Female

APPENDIX F

Twenty-four descriptors for Experiment 2

01. selfish
02. generous
03. sincere
04. phony
05. sloppy
06. neat
07. pleasant
08. obnoxious
09. honest
10. liar
11. boring
12. interesting
13. polite
14. rude
15. unreliable
16. dependable
17. friendly
18. hostile
19. sad
20. happy
21. unfaithful
22. loyal
23. sociable
24. shy

APPENDIX G

Lists of Descriptor Sets for Experiment 2List 1

01. interesting/boring
02. happy/unfaithful
03. selfish/sociable
04. loyal/sad
05. unreliable/dependable
06. liar/honest
07. shy/pleasant
08. hostile/thoughtful
09. generous/obnoxious
10. polite/rude
11. phony/sincere
12. sloppy/neat

List 2

01. interesting/phony
02. happy/sad
03. selfish/generous
04. loyal/unfaithful
05. unreliable/honest
06. liar/neat
07. shy/sociable
08. hostile/friendly
09. pleasant/obnoxious
10. polite/boring
11. sincere/rude
12. sloppy/dependable

APPENDIX H

Raw Data Scores for Experiment 2

<u>Subject</u>	<u>O</u>	<u>N</u>	<u>M/F</u>	<u>Subject</u>	<u>O</u>	<u>N</u>	<u>M/F</u>
1.	3	3	M	31.	2	1	M
2.	4	2	F	32.	1	1	F
3.	3	0	M	33.	0	1	F
4.	5	2	F	34.	2	4	M
5.	2	2	F	35.	2	3	M
6.	3	4	F	36.	2	1	F
7.	2	1	F	37.	0	1	F
8.	3	2	M	38.	4	2	F
9.	1	2	F	39.	4	3	F
10.	0	0	M	40.	1	0	M
11.	5	1	F	41.	0	3	F
12.	3	1	F	42.	4	5	F
13.	2	0	F	43.	3	1	M
14.	2	1	F	44.	2	2	F
15.	5	3	M	45.	0	1	F
16.	4	4	M	46.	0	1	F
17.	2	0	M	47.	1	2	F
18.	4	4	F	48.	1	2	M
19.	3	1	M	49.	1	2	F
20.	2	1	M	50.	0	2	M
21.	5	2	M	51.	0	0	F
22.	4	1	F	52.	1	0	M
23.	5	1	F	53.	2	2	F
24.	2	1	M	54.	0	5	F
25.	4	1	F	55.	0	1	F
26.	5	2	F	56.	2	2	F
27.	4	2	F	57.	1	2	M
28.	2	2	F	58.	0	2	M
29.	4	1	F	59.	2	1	M
30.	3	2	M	60.	1	2	M

O=Oppositional Score
N=Nonoppositional Score
M\F=Male or Female

APPENDIX I

DEBRIEFING: Learning Difficult Words

In this study we were testing whether oppositionality is more likely to facilitate learning than nonoppositionality. Some of the words you had to learn were defined for you in an oppositional context during the second presentation of words. Others were defined in a nonoppositional context.

It is our hypothesis that when you learn something in an oppositional context, since both ends of the opposition are important to the meaning of the word you are learning, you have more information to work with than when you are trying to learn something in a nonoppositional context.

This is not a simple idea. For example, we might argue that if you are given opposite words (on the second presentation) defining the word you are targeted to learn, you could become confused by these overlapping meanings and actually do worse than if you had nonoppositional words to work with.

This research is based on the work of Professor Joseph F. Rychlak of our psychology department. If you would like to discuss any of this with him or the experimenter, they would be happy to arrange an appointment with you.

Thank you very much for being a participant in this study. If you care to write any comments on this study, as it applied to you, please use the reverse side of this sheet.

PLEASE LEAVE THIS SHEET ON YOUR DESK WHEN YOU LEAVE

APPENDIX J

Eight Difficult Words for Experiment 3

1. prolix
2. recherche
3. nugatory
4. apodictic
5. amphibolous
6. protean
7. jejune
8. anodyne

APPENDIX K

Lists of Definitional Pairs for Experiment 3List 1

- Anodyne
1. soothing/helpful=soothing
- Jejune
2. interesting/dull=dull
- Protean
3. elderly/changing=changing
- Prolix
4. wordy/brief=wordy
- Amphibolous
5. doubtful/merciless=doubtful
- Nugatory
6. worthless/distressful=
worthless
- Apodictic
7. questionable/certain=
certain
- Recherche
8. plain/fancy=fancy

List 2

- Anodyne
1. tension/soothing=soothing
- Jejune
2. dull/merciless=dull
- Protean
3. changing/rigid=changing
- Prolix
4. weak/wordy=wordy
- Amphibolous
5. confident/doubtful=doubtful
- Nugatory
6. valuable/worthless=
worthless
- Apodictic
7. certain/helpful=certain
- Recherche
8. plain/fancy=fancy

APPENDIX L

Raw Data Scores for Experiment 3

<u>Subject</u>	<u>O</u>	<u>N</u>	<u>M/F</u>	<u>Subject</u>	<u>O</u>	<u>N</u>	<u>M/F</u>
1.	12	11	M	31.	09	10	M
2.	11	09	F	32.	07	07	F
3.	09	09	F	33.	10	10	M
4.	11	09	F	34.	07	09	F
5.	10	07	F	35.	08	15	F
6.	09	10	F	36.	07	07	F
7.	06	08	M	37.	05	07	F
8.	10	10	F	38.	05	06	F
9.	11	12	F	39.	10	10	M
10.	06	02	F	40.	08	08	M
11.	09	06	M	41.	09	09	F
12.	07	08	M	42.	14	16	F
13.	06	07	M	43.	14	14	F
14.	12	08	F	44.	08	12	M
15.	09	07	M	45.	09	05	M
16.	08	05	F	46.	07	09	F
17.	11	12	F	47.	13	15	M
18.	08	04	F	48.	07	08	F
19.	05	06	F	49.	04	04	F
20.	08	06	F	50.	04	05	F
21.	04	04	F	51.	06	10	M
22.	10	10	F	52.	09	11	F
23.	03	04	F	53.	04	05	M
24.	07	07	F	54.	07	07	F
25.	11	12	F	55.	09	10	F
26.	07	09	M	56.	03	04	F
27.	07	04	F	57.	08	08	F
28.	06	07	F	58.	08	10	F
29.	04	05	M	59.	04	07	F
30.	10	06	F	60.	14	18	F

O=Oppositional Score
N=Nonoppositional Score
M\F=Male or Female

The thesis submitted by Jonathan Daniel Thomas has been read and approved by the following committee:

Dr. Joseph F. Rychlak, Director
Professor, Psychology
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Dr. Fred Bryant
Professor, Psychology
Loyola University of Chicago

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is, therefore, accepted in partial fulfillment of the requirements for the degree of Master of Arts.

Dec. 13, 1991

Date

Joseph F. Rychlak

Director's Signature