Subliminal Psychodyanmic [sic] Activation and Its Relation to the Unconscious: Royal Road Or Blind Alley?

Robert James Swanson
Loyola University Chicago

Recommended Citation
http://ecommons.luc.edu/luc_theses/3100
SUBLIMINAL PSYCHOEDYANMIC ACTIVATION
AND ITS RELATION TO THE UNCONSCIOUS:
ROYAL ROAD OR BLIND ALLEY?

by
Robert Swanson

A Thesis Submitted to the Faculty of the Graduate School of Loyola University of Chicago in Partial Fulfillment of the Requirements for the Degree of Master of Arts
July
1979
ACKNOWLEDGMENTS

The author would like to express his appreciation to Mark S. Mayzner, thesis director, and Alan S. DeWolfe, committee member, for their guidance and support throughout the entire project. Special thanks are due to Robert Casas for his participation in data collection and for many thought provoking discussions. Finally, the author wishes to thank Lloyd Silverman for providing many of the experimental materials used as well as for his interest and suggestions regarding the investigation.
VITA

The author, Robert James Swanson, is the son of John Charles Swanson and Eleanor (McKnight) Swanson. He was born December 2, 1952, in Geneva, Illinois.

His secondary education was obtained at Guilford High School, Rockford, Illinois, and at Deerfield High School, Deerfield, Illinois, where he graduated in June, 1970.

He received the Bachelor of Arts degree with a major in psychology from St. Olaf College, Northfield, Minnesota, in May, 1974.

In September, 1974, he entered the graduate program in clinical psychology at Loyola University of Chicago. From June to August, 1975, he completed a clerkship at the Lakeside Veterans Administration Hospital, Chicago. He completed an internship in clinical psychology from September, 1976, to September, 1977, at Chicago-Read Mental Health Center. From September, 1977, to August, 1979, he received post-internship training at the Loyola University Guidance Center and Day School.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>ii</td>
</tr>
<tr>
<td>VITA</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>CONTENTS OF APPENDICES</td>
<td>vi</td>
</tr>
<tr>
<td>Chapter Section</td>
<td></td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>II. REVIEW OF THE RELATED LITERATURE</td>
<td>5</td>
</tr>
<tr>
<td>Psychoanalytic Theory and Subliminal Perception Research</td>
<td>7</td>
</tr>
<tr>
<td>Critique of the Subliminal Perception Paradigm</td>
<td>17</td>
</tr>
<tr>
<td>Silverman's Research on &quot;Subliminal Psychodynamic Activation&quot;</td>
<td>27</td>
</tr>
<tr>
<td>The Present Study</td>
<td>39</td>
</tr>
<tr>
<td>III. METHOD</td>
<td>43</td>
</tr>
<tr>
<td>Subjects</td>
<td>43</td>
</tr>
<tr>
<td>Materials</td>
<td>43</td>
</tr>
<tr>
<td>Procedure for the Replication (Part 1)</td>
<td>49</td>
</tr>
<tr>
<td>Procedure and Materials for the Extension (Part 2)</td>
<td>52</td>
</tr>
<tr>
<td>Analysis of Data</td>
<td>55</td>
</tr>
<tr>
<td>IV. RESULTS</td>
<td>59</td>
</tr>
<tr>
<td>Results of the Replication</td>
<td>59</td>
</tr>
<tr>
<td>Results of the Extension and Discrimination Task</td>
<td>64</td>
</tr>
<tr>
<td>V. DISCUSSION</td>
<td>68</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>81</td>
</tr>
<tr>
<td>APPENDIX A</td>
<td>89</td>
</tr>
<tr>
<td>APPENDIX B</td>
<td>100</td>
</tr>
<tr>
<td>APPENDIX C</td>
<td>105</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Thresholds for Stimuli Grouped by Lightness Gradations</td>
<td>51</td>
</tr>
<tr>
<td>2.</td>
<td>Summary of Procedure</td>
<td>56</td>
</tr>
<tr>
<td>3.</td>
<td>Mean Critical and Baseline Dart Scores for the Replication</td>
<td>60</td>
</tr>
<tr>
<td>4.</td>
<td>Matched-Pairs t Test Results for the Replication</td>
<td>61</td>
</tr>
<tr>
<td>5.</td>
<td>Matched-Pairs t Test Results Using Only First Four Dart Throws Following Each Stimulus Exposure</td>
<td>63</td>
</tr>
<tr>
<td>6.</td>
<td>Mean Critical and Baseline Dart Scores for the Extension</td>
<td>65</td>
</tr>
<tr>
<td>7.</td>
<td>Matched-Pairs t Test Results for the Extension</td>
<td>66</td>
</tr>
</tbody>
</table>
CONTENTS FOR APPENDICES

APPENDIX A. EXPERIMENTAL PROCEDURES ........................................ 89
   I. Room Diagram ................................................................. 90
   II. Details of Experimenter-Subject Interaction ...................... 91
   III. Information about "The Effect on Competitive Performance Through Subliminal Presentation of Conflictual and Non-Conflictual Stimuli" .................................................. 94
   IV. Standard Consent Form .................................................. 95
   V. Priming Questionnaire ................................................... 96
   VI. Story for Story Recall (to Card 6 BM) ............................. 97
   VII. Discrimination Task .................................................... 98

APPENDIX B. STIMULUS MATERIALS FOR THE REPLACEMENT .................. 100

APPENDIX C. STIMULUS MATERIALS FOR THE EXTENSION ....................... 105
CHAPTER I

INTRODUCTION

Beginning with Freud's (1900/1967, p. 284, footnote) reference to Poetzl's (1917/1960) study of the role of unnoticed stimuli in dream formation, many psychoanalysts have viewed subliminal perception as an important research method. For example, Klein (1959, 1967) used the method to investigate the differential effects of peripheral versus focal awareness of stimuli and ideas. Here, inputting stimuli at subliminal levels was viewed as a means to manipulate peripheral trains of thought. Pine (1964) noted that in many studies, the effect of a subliminal stimulus was often indirectly or symbolically related to the stimulus content. These transformations of subliminal stimuli were thought to result from primary process thinking (i.e., use of condensation, symbolization, and displacement). For these authors, subliminal perception was seen as a powerful tool for studying cognitive processes hypothesized to occur at unconscious or preconscious levels.

More recently, Lloyd Silverman and his associates at New York University have published over twenty-five studies (summarized in Silverman, 1976) using a laboratory
technique termed "subliminal psychodynamic activation." These studies typically present some wish- or conflict-related stimulus at subliminal levels and compare its effect on behavior to that of some (relatively) neutral stimulus. Relationships between particular unconscious conflicts and psychopathologies hypothesized by psychoanalysts have been investigated with this method. For example, Silverman and Silverman (1967) found that subliminal presentation of stimuli containing aggressive content resulted in increases in measured thought disorder in a group of schizophrenics. Predicted results have also been obtained with groups of depressives (Rutstein & Goldberger, 1973), stutterers (Silverman, Klinger, Lustbader, Farrel, & Martin, 1972), homosexual males (Silverman, Kwawer, Wolitzky, & Coron, 1973), insect phobics (Silverman, Frank, & Dachinger, 1974) and overweight women (Silverman, Martin, Ungaro, & Mendelsohn, 1978). In a review of his work, Silverman (1976) concludes that the results offer strong support for the psychoanalytic notion that conflicts occurring below awareness can account for many specific symptomatologies. Given the complexity of many of the stimuli used and the wide range of behavioral effects observed, these results are not easily explained by most current theories of visual information processing (e.g., Neisser, 1967).

Despite a prodigious outpouring of supportive
research from Silverman's laboratory, the few independent replications of his work found in the literature have obtained disappointing results (Greenberg, 1977; Emmelkamp & Straatman, 1976). In an attempt to encourage replication and to demonstrate the effects of the method on a type of behavior not previously studied, Silverman, Ross, Adler and Lustig (1978) report results of four experiments using a relatively simple methodology and college males as subjects. The major intention of each experiment was to manipulate, through subliminal presentation of conflict-related material, the degree of oedipal conflict in the subjects and to observe the effects of this on subjects' accuracy in dart-throwing competition. Thus, the study purports to test the psychoanalytic proposition that males can unconsciously inhibit themselves in competitive performance because winning has the hidden connotation of defeating father for mother's love (Beisser, 1961). The goal of the first part of the present investigation is to replicate as exactly as possible the major parts of this study.

In order to better understand the psychological processes involved in this phenomenon, the second part of the present study will extend the original findings to investigate which elements of the original stimuli are necessary to produce the experimental effects. To test whether the specifically oedipal elements of the stimuli are essential, reference to defeating father will be
eliminated in a further set of stimuli. Finally, reference to competition will be eliminated and only a non-specific behavioral injunction included in an additional set of stimuli. These procedures provide a partial test of Silverman's hypothesis that activation of an unconscious oedipal conflict is necessary to explain the results of the original experiments.

In order to place Silverman's research program in historical perspective, earlier studies using the subliminal perception paradigm to test various psychoanalytic propositions are reviewed in the following section. This is followed by a summary of methodological and theoretical criticisms of the paradigm and then a critical review of Silverman's work. Methods and results of the current study are presented in subsequent sections. Finally, results are discussed as they bear on issues in subliminal perception research, visual information processing, and psychoanalytic personality theory.
CHAPTER II

REVIEW OF THE RELATED LITERATURE

Dixon (1971) has traced the notion of subliminal perception to the writings of Democritus, Plato, and Aristotle. Systematic research is generally considered to have begun with Suslowa's (1863; cited by Wolitzky & Wachtel, 1973) study of the effects of weak electrical stimulation upon the two-point threshold, and Pierce and Jastrow's (1884; cited by Dixon, 1971) finding that subjects judged weights at a better than chance rate even when they expressed no subjective confidence in their judgments. Guided by Freud's notion of the role of day residue in dream formation, Poetzl (1917/1960) published an important study in which subjects were exposed to pictures of landscapes tachistoscopically and asked to draw and describe what they had seen. Parts of the stimulus that were unnoticed following tachistoscopic exposure frequently appeared in the content of subjects' dreams later that night. Except for replications of Poetzl's study by Malamud and Linder (1931) and Allers and Telers (1924/1960), little was published in the area until the 1950s.

The voluminous literature on subliminal perception
published since that time can be divided into three main lines of investigation (Wolitzky & Wachtel, 1973). The first line of research, usually undertaken within the orientation of psychophysics or signal detection theory, attempts to determine the information-processing limits of the perceptual apparatus. Bevan's (1964) experiments on the effect of subliminal anchors upon psychophysical judgments are typical of this research. A second line has grown from the classical conditioning paradigm. These studies usually look at verbal conditioning without awareness, focusing largely on establishing experimental analogues of therapeutically effective learning (e.g., Greenspoon, 1955; Spielberger, 1962). These two areas of research have been periodically reviewed (Adams, 1957; McConnell, Cutler, & McNeil, 1958; Bevan, 1964; Dixon, 1971) and so will not be considered here.

The third line of research stems largely from "New Look" approaches to perception. Beginning with McGinnies (1949) report that taboo words had elevated recognition thresholds compared to other words, many studies followed which investigated the relationship between perception and personality processes. Much of this research was guided by psychoanalytic notions of preconscious and unconscious thinking, primary and secondary process thinking, and conflict and defense. For example, recent work by Erdelyi and Kleinbard (1978) and Erdelyi and Goldberg (in press) bears
on psychoanalytic notions of repression and the retrievability of lost ("unconscious") memories.

Among New Look investigations using a subliminal perception paradigm, perhaps the theoretical and empirical work of George Klein (1959, 1967) is most significant. Klein (1970) was interested in the issue of the differential effects of peripheral versus focal awareness of stimuli and ideas. He proposed the model of "schema activation" (Klein & Holt, 1960) by which subliminal or incidental inputs are likely to activate drive-related ideas and lead to behavioral effects under certain subject and stimulus conditions. As will be seen, Silverman's (1976) recent work on "subliminal psychodynamic activation" appears closely related to ideas advanced by Klein. Before considering Silverman's research program however, a partial review of studies using the subliminal perception paradigm to test various psychoanalytic hypotheses and a consideration of methodological and theoretical criticisms of the paradigm are advanced.

Psychoanalytic Theory and Subliminal Perception Research

As Pine (1964) notes, a major reason for interest in the effects of subliminal or incidental (outside focal awareness) stimuli has been the hope that this research would permit controlled study of thought processes operating outside of awareness. Much of the research was guided by the notions of primary and secondary process thinking and
the role of day residue in dream formation advanced by Freud (1900/1967, Chapter VII). In order to study the workings of these hypothesized processes, several different methods for presenting stimuli have been used. In some studies (e.g., Pine, 1961), the critical stimuli are presented at above threshold intensities, while the subjects' attention is diverted to a separate focal task. As stimuli are not presented at a level below an independently determined threshold, this method is more properly termed "incidental" stimulation (see Dixon, 1971, for further discussion). Other studies (e.g., Klein, Spence, Holt, & Gourevitch, 1958) have used a backward masking method involving exposure of one (A) stimulus immediately followed by exposure of another (B) stimulus which is supraliminal. The effect of the unreported A-stimulus on subjects' reactions to the B-stimulus is analyzed. The most frequently used method involves presentation of stimuli at intensities or durations below some independently determined threshold of awareness (e.g., Spence & Holland, 1962; all of Silverman's work). Early research in the area (reviewed by Pine, 1964) appears based on the assumption that stimuli presented by any of these methods would bypass the mechanisms that govern the intake of supraliminal stimuli. Being less subject to critical judgment and inhibitory control, these stimuli were assumed to more directly effect preconscious and primary process mental events. By looking at the influence of
these stimuli on behavior, it was hoped that the workings of these thought processes would become more clear.

Wolitzky and Wachtel (1973) note that the influence of subliminal stimulation has been demonstrated on a wide variety of behaviors including: trait attributions (Klein, Spence, Holt, & Gourevitch, 1958; Eagle, 1959; Smith, Spence, & Kelin, 1959), drawings (Klein, et al., 1958), guessing (Spence, 1961), reaction time (Spence & Bressler, 1962), visual illusions (Smith & Henriksson, 1955), bias in intentional recall (Spence & Holland, 1962; Spence, 1964), TAT-like stories (Pine, 1960, 1961), Rorschach content (Silverman & Silverman, 1964), and formal aspects of thought (Silverman, 1967).¹

The influence of subliminal stimulation on dreams, images, and free associations has probably been most extensively studied. In the first study on this topic, Poetzl (1917/1960) exposed pictures of landscapes tachistoscopically for about 1/100 of a second and asked subjects to draw and describe what they had seen. Poetzl found that parts of the stimulus that were unnoticed following tachistoscope exposure tended to appear later in dream content. Allers and Teler (1924/1960) extended Poetzl's findings using free-

¹Given the large number of studies to be discussed, no attempt will be made here to analyze individual studies on methodological or theoretical grounds. Instead, criticisms applicable to many of the studies are discussed in the following section. Then, the work of Silverman is critically examined in some detail.
association and imagery tasks the day following stimulus exposure.

Since then, a number of investigators have pursued these findings further. Fisher (1954) showed that unnoticed parts of tachistoscopically presented pictures tended to appear in dreams and suggested that these stimulus elements were influenced by unconscious wishes and primary-process transformations. Using more rigorous techniques of threshold measurement, scoring criteria, and statistical analysis, he later demonstrated the effect of subliminal stimuli on both dream and image content (Fisher & Paul, 1959; Paul & Fisher, 1959). Shevrin and Luborsky (1958) reported supporting evidence and found that noticed aspects of the stimuli were also included in dreams.

Eriksen (1960) criticized the foregoing studies for ignoring the issue of base rates for appearance of ideas in fantasy without prior stimulation. A related problem is that if a subject perceives even only one element of the stimulus correctly (e.g., a boat), he is bound to fantasy other objects (e.g., a lake, pier) normally associated with the perceived object. As some of these associated objects are likely to have been in the original picture, a spurious "emergence" effect may arise which has nothing to do with below-threshold perception of the previously unreported elements. Eriksen also notes that subjects may have different criteria for reporting what they saw right after
exposure and for reports following an imagery task. Thus, "recovery" effects may reflect only a lower confidence criterion for report. Incorporating some of the controls suggested by Eriksen (1960), Hilgard (1962) investigated whether fantasy experience might facilitate recovery of initially unreported elements in a post-fantasy intentional recall task. Ambiguous results were obtained as judges rarely had great assurance that genuine recoveries were being scored. Johnson and Eriksen (1961) obtained no subliminal recovery effect in a replication of the Shevrin and Luborsky (1958) study with controls for base-rate production of stimulus related ideas. Dixon (1971) argues however that this failure to replicate may be due to the limited opportunities subjects had to demonstrate recovery.

In carefully controlled studies which appear to have met Eriksen's (1960) criticisms, Giddan (1967) and Haber and Erdelyi (1967) demonstrated subjects' recovery of initially unavailable material. In the Haber and Erdelyi study, the experimental group saw a picture briefly, attempted to recall it, then gave extensive free associations, followed by a second recall attempt. Two control groups were used. A "dart-control" group played darts instead of free associating, and a "yoked-control" group was shown the initial recall attempts of experimental subjects rather than the original stimuli, and then treated identically to the experimental group. Comparisons of
initial and post-association recall drawings showed that the improvement in recall of the experimental group was superior to that of either control group, indicating that free associations resulted in the recovery of initially unavailable material. The results were taken to support the psychoanalytic hypothesis that below-conscious psychic material continues to influence and manifest itself in a variety of behaviors. They also support the therapeutic claim that free-association (or other fantasy production techniques) aids in the recovery of below-conscious material. In the same vein, Erdelyi's more recent work (e.g., Erdelyi & Kleinbard, 1978) has focused on the growth of recall for pictures (and not words) over periods of up to one week after initial stimulus presentation.

The foregoing studies on recovery of initially unavailable material stem originally from Freud's (1900/1967) theory of the role of day residue (unnoticed stimuli) in dream formation. Here, barely noticed, unassimilated sensory impressions of the day are "selected" for dream content because of their resonance with unconscious wishes. They emerge in the dream as derivative representations of the wish owing to the requirements of censorship and nature of unconscious thinking. A somewhat different perspective for looking at subliminal perception research stems loosely from Freud's (1900/1967, 1911/1958) distinction between primary process (primary, non-logical, and drive-
dominated) and secondary process (intentional, reality-oriented) thinking. Klein's (1959, 1967) work on the interaction of central and peripheral trains of thought reflects this perspective. For Klein (1967), an important problem was specifying the conditions under which peripheral ideation will intrude upon or become incorporated into conscious, intentional thinking. He hoped to shed light on the role of consciousness in thinking (Klein & Holt, 1960) and to specify the conditions determining behavioral effects of peripherally aroused trains of thought. Assuming that subliminal stimulation would arouse peripheral trains of thought, the strategy here was to compare the effects of subliminal or incidental stimuli to those of supraliminal or focal stimuli.

Examination of studies which directly compare the effects of subliminal and supraliminal stimulation gives no clear-cut answer to the question of whether and how these effects differ. As noted earlier, Poetzl's (1917/1960) claim that unnoticed stimuli were more likely than noticed stimuli to appear in subsequent dreams was refuted by Shevrin and Luborsky (1958). Fisher (1960) presents evidence suggesting that inclusion of a stimulus in a dream is a complex interaction between awareness versus nonawareness of the stimulus, subject's conflicts and defenses, and meaning of the stimulus to the subject. Similarly, Spence and Ehrenberg (1964) found that food
deprivation was the key variable related to bias in recall, whether the stimulus "cheese" was presented above or below threshold.

Discussing the range of subliminal effects, Pine (1964) introduced the distinction between "direct" and "indirect" effects of stimuli. Direct effects are those that appear to have a relatively close or logical relationship to the initial stimulus, though are not literal replicas of it. For example, Zuckerman (1960) found that subliminal presentation of the messages "write more" or "don't write" resulted in significantly longer or shorter TAT stories. Interestingly, supraliminal presentations of the stimuli produced no consistent differences in story lengths. Here, it appears that supraliminal stimuli can be used as appropriate or discarded as irrelevant depending on the subject's intentions. Smith, Spence and Klein (1959) presented either the word "happy" or "angry" masked by a supraliminal picture of a face that was affectively neutral. The stimulus words biased responses towards more positive or more negative descriptions of the face, though the words themselves were rarely used in descriptions. Instead, common associates and words logically related to the stimulus words were often used, while remote symbolic associates were not.

Indirect effects are those which are not obviously related to the initial stimulus. They include symbolic
transformations of the original stimulus and often suggest primary process thinking (i.e., use of condensation, symbolization, displacement). Pine (1960) illustrated indirect effects in a study where subjects read a focal passage while overhearing another passage read in an adjacent room (incidental stimulus). Though the focal passage (emphasizing the phallic-aggressive aspects of a hook) influenced subsequent TAT stories in an undistorted manner, the incidental passage (emphasizing the oral-passive aspects of a cow) emerged in an indirect, distorted manner. Indirect effects included an increase in themes of passive and nurturant human relationships, but not an increase in cow-like content. Reviewing this issue, Wolitzky and Wachtel (1973) conclude that while indirect effects are less likely with supraliminal stimuli, subliminal stimuli can give rise to both direct and indirect effects given appropriate response measures. The issue of the differential effects of subliminal versus supraliminal stimuli appears to be a complex one probably involving other variables such as subjects' current drive state and intentional set.

Numerous other studies have investigated subject variables and stimulus conditions which facilitate or inhibit subliminal effects. These have been recently reviewed by Wolitzky and Wachtel (1973) and by Dixon (1971) who concludes that subliminal effects are facilitated when
subjects are in a low state of arousal, attention is unselective or broadened, and cognitions are intuitive, global, symbolic, and unbound by logical restraints. These conclusions have recently been complicated by Sackeim, Packer, and Gur's (1977) report of an interaction between hemisphericity and induced cognitive set ("intuitive" or "analytic") on subliminal effects.

Of the models advanced by various psychoanalytic writers to explain these results, the most representative is the "schema activation" model proposed by Klein and Holt (1960). They define a schema as an organized group of memory traces, including both conceptual associates and drive-related derivatives. They assume that every perceptual process includes scanning of memory schemata so that incoming stimuli can be recognized and take on meaning. Further, any schema may be activated by: (a) sets or anticipations, (b) the scanning process that selects traces which match incoming stimuli, and (c) connections to drives. The results of Poetzl (1917/1960) and followers are interpreted by Klein and Holt to indicate that stimuli can activate relevant schema and lead to behavioral effects even if they are not consciously noticed. Stimuli that make contact with an active drive schema seem to have an advantage for recovery. They note that in masking studies, the first or A-stimulus will activate certain schemas. If these are relevant to some ambiguous property of the second or
B-stimulus, reactions to the second stimulus will be biased. If the stimulus is a brief flash, the authors write that it may emerge into imagery if the subject can suspend realistic, problem-oriented thinking. Thus, schema activated by the stimulus become more available relative to other schema.

The foregoing model is part of a larger theoretical framework (Klein, 1967) which assumes that in addition to conscious concerns and focal intentions, there are concurrent trains of thought in a state of activation that also make claims on response channels. In so far as subliminal or incidental stimulation can be considered to activate these peripheral trains of thought, the method offers a way to study their emergence in various response channels.

Critiques of the Subliminal Perception Paradigm

Many of the studies reviewed above could have been criticized on various grounds, the most common being small sample size, weak or ambiguous results, and lack of independent replication. In addition, many studies fail to report relevant details such as illumination levels, stimulus size and contrast, method for determining threshold, and length of dark adaption. Because of these problems and an unknown number of negative results, the results of these studies must be regarded as tentative and interpreted with caution. The sequence of subliminal studies suggests that
researchers are often dissatisfied with weak results, think of some possible mediating variable and control for it in a subsequent study. Even if positive results are then obtained, systematic investigations of the new variable and replications are rarely reported. This apparent pattern has resulted in a plethora of variables possibly relevant to subliminal effects with little systematic knowledge about any one. Further, little attention is paid to establishing the reliability of earlier studies. Although there has recently been increased acceptance of the phenomenon due to use of signal detection techniques and persuasive theoretical accounts (e.g., Dixon, 1971; Erdelyi, 1974; Walker, 1978), some writers continue to question the validity of the concept (e.g., Neisser, 1967; Wiener & Kleespies, 1968).

Before discussing the research program of Silverman and associates, it will be helpful to review the major methodological and theoretical criticisms that have been directed towards subliminal perception research. The purpose here is not to evaluate the overall validity of the paradigm (see Dixon, 1971) but to lay the groundwork for judging the merits of a particular research program.

In his review of the literature on discrimination and learning without awareness, Eriksen (1960) notes that terms like "conscious," "unconscious," and "awareness" are often defined differently across studies. Especially important to studies using an absolute threshold paradigm is the
operational definition of threshold of awareness. Eriksen notes that this is usually defined in terms of subjects' verbal report, thus placing a burden on the adequacy of the language to reflect the richness of perceptual experience. Thus, the threshold of a given subject depends on several variables, including: adequacy of the experimenter's questions, use or lack of use of a ready signal, whether or not a forced-choice format is employed, and the adequacy of the scale used to classify subjects' answers. He suggests that drawings or use of forced-choice methods may reveal that subjects are aware of more than they can verbally report.

Bevan (1964) and Eriksen (1960) note that threshold is a statistical estimate of something that varies over time and is commonly defined as the point at which a subject correctly discriminates (either a stimulus from a blank field or one stimulus from another) at a 50 percent rate. Because of this, subjects may sometimes be aware of the stimulus even when presented below this level. This could create the false impression of a subliminal effect. Clearly, the subliminal stimulus should be presented at a level below the range of values from which the threshold was derived. In response to these cogent criticisms and suggestions for determining threshold, many recent studies (e.g., Zwosta & Zenhäusern, 1969) have employed more rigorous threshold procedures using signal detection techniques to separate sensitivity from criterion factors.
Studies using a masking paradigm have also been criticized by Eriksen (1960) for rarely including careful threshold determinations (e.g., Smith, Spence, & Klein, 1958). He notes that in the study cited, some control subjects alerted to the fact that words would be flashed prior to the picture were able to detect the A-stimulus. Neisser (1967) criticizes the backward masking paradigm on evolutionary grounds. Given the specialized nature and unusualness of backward masking, he doubts that evolution would have equipped the mind with unconscious mechanisms for dealing with it. Dixon (1971) counters this argument claiming that natural selection probably favored organisms losing the least information from the environment.

Neisser (1967) also criticizes the Smith, et al. (1958) study for the possibility that "demand characteristics" were operating. In particular, he points out that the experimenter may have known the order of the A-stimulus exposures and so influenced subjects' reports of the B-stimulus accordingly. In the same vein, he criticizes studies using free association measures where the experimenter knows which are the critical cue words. Significant here is the attempted replication of Spence (1964) by Bruel, Ginsberg, Lukomnik, and Schmeidler (1966). Using the same free association task as the original experiment, they obtained non-significant results when using an experimenter naive to the hypothesis. However, an informed experimenter
instructed to emphasize the critical cue words also obtained non-significant results. As Dixon (1971) notes, the mechanisms underlying the alleged operation of "demand characteristics" in these studies are unknown and may involve communication processes on the same order of mysteriousness as subliminal perception. In any event, experimental controls guarding against this possibility are necessary for straightforward interpretation of results.

Perhaps the most cogent criticism (at least the most publically debated) of the subliminal perception paradigm is that the availability of partial stimulus cues may account for the observed effects. Advanced by Goldiamond (1958) and Eriksen (1960) as a possible explanation of perceptual defense studies, the position is stated most clearly by Kempler and Wiener (1963). The later authors draw a distinction between one-process and two-process views of perception. Briefly, the two-process view (their example, Klein, et al., 1958) assumes the existence of two relatively independent perceptual processes; a supraliminal one operating within awareness and a subliminal one operating outside awareness. Further, the subliminal process can make affective or evaluative reactions to the stimulus before the subject can discriminate and report it. Thus, the meaning of a stimulus is apprehended prior to correct recognition. The one-process view posits a single perceptual process described by a monotonic relationship between
stimulus intensity or duration and response strength. Thus, lowered stimulus intensity will lead to impoverished responses, but is not expected to produce qualitatively different responses. Kempler and Wiener argue that, in studies obtaining subliminal effects, refined threshold procedures would reveal the availability of partial cues to which subjects respond in a predictable manner. Differences in response to weak inputs are seen by the authors as "a function of differential response characteristics of a subject (or between subjects) to the specific seen part cues (1963, p. 352, their emphasis)."

Guthrie and Wiener (1966) offered empirical evidence for the "part-cue response-characteristic" model as a tenable explanation of results obtained by Eagle (1959). Eagle used the masking paradigm in which either an aggressive or benevolent picture was immediately followed by supraliminal exposure of a neutral picture. Subjects' ratings of the neutral picture varied systematically with the different masked stimuli. Noting that the two masked stimuli appeared to vary in structural attributes as well as in content, Guthrie and Wiener asked subjects to rate supraliminal presentations of line drawings varying in angularity and line thickness. As predicted, angular lines were rated negatively while curved lines were rated positively. To show that this structural cue may have been available to Eagle's subjects, they demonstrated that sub-
jects rated the original aggressive stimulus as more angular than the benevolent stimulus when presented in an ascending series (starting below threshold). Finally, they constructed stimuli which varied in angularity and thematic content (presence or absence of a gun) and presented these as stimuli masked by an ambiguous supraliminal stimulus. As predicted, subjects' ratings of the ambiguous stimulus varied significantly with the angularity of the masked stimulus and not with the presence or absence of the gun. In addition, the closer to recognition threshold the angular masked stimulus was presented, the more negative ratings were given. The authors conclude that predictable differences in response to available structural cues can account for the behavior ascribed to subliminal perception.

Responding to this study, Silverman and Spiro (1967) collected subjects' ratings of angularity of aggressive and neutral stimuli used in earlier studies which obtained predicted subliminal effects (e.g., Silverman, 1965). For both exposures in ascending series and at durations used in the experiments proper, the aggressive stimuli were never judged to be significantly more angular than the neutral stimuli. In three comparisons, neutral stimuli were judged more angular, contrary to Guthrie and Wiener's (1966) findings. Silverman and Spiro also note several studies (e.g., Spence & Holland, 1962; Fiss, Goldberger, & Klein, 1963; Silverman & Silverman, 1964) that employed a
"discrimination task" in response to the partial-cue criticisms of Eriksen (1960) and others. In this task, experimental and control stimuli are presented randomly under the same tachistoscopic conditions as they were in the experiment proper and the subject's task is to tell them apart (without having to identify them). If stimuli are yielding different partial cues, a better than chance discrimination presumably should be made. Though significant subliminal effects were obtained in these studies, almost no subjects were able to make this discrimination. Silverman and Spiro report that the subjects who could make the discrimination tended to show less subliminal effect than the majority who could not. Additionally, they cite a study by Spence and Holland (1962) which suggested that the availability of partial-cues significantly interfered with subliminal effects.

In a somewhat philosophical rejoinder, Wiener and Kleespies (1968) argue that one can never "prove" that some supraliminal cues are not available. Their position states that some cues are available, not necessarily angularity, which could account for observed effects. Finally, Silverman (1968) replies by claiming that part-cue adherents need to demonstrate structural differences between pairs of neutral and critical stimuli and also that these differences are likely to emerge during the experiment proper (e.g., by a "discrimination task"). Clearly, part-cue theory has
difficulty explaining how subjects can react differently to supraliminal cues of two stimuli when they are unable to tell whether the stimuli are the same or different.

The final criticism of the subliminal perception paradigm to be considered is that it implies some sort of "pre-perceiver" or "little-man-inside-the-head" that perceives and reacts to stimuli before they are consciously experienced. This debate appears to stem from different orientations towards psychology and semantic biases. For example, Eriksen's (1960) implication of a "superdiscriminating unconscious" seems to imply more of a homunculus than does Dixon's (1971, p. 90) "antecedent physiological processes which do not have phenomenal representation."

Erdelyi (1974) suggests that this problem is ameliorated if the phenomenon is understood in information-processing terms. He argues:

that a system with control processes for internal regulation, including regulation of input, violates no sacrosanct edict of science, nor does it imply the literal existence of little men or demons in the head (1974, p. 4).

Acceptance of these sorts of internal control processes does not imply acceptance of subliminal perception however. Neisser (1967) argues that the pre-attentive processes implicated by this view are cruder and less accurate than focal ones and so could not be expected to operate at an input level below that for attentive (i.e., conscious) processes. For the same reason, they could not
be expected to recognize and react to the meaning of stimuli prior to conscious recognition. The results of some subliminal studies (particularly those of Silverman) certainly do implicate some very complex and accurate processes occurring at below conscious levels. To account for these results, Dixon (1971) offers an information-processing model involving multiple inputs giving rise to preconscious parallel processing. Following a microgenetic view of perception (Werner, 1948), he posits a stage in perceptual processing where meaning is extracted while naming is impossible. As additional evidence of this stage, he offers observations of aphasics who clearly recognize but cannot name objects. He suggests that impoverished stimulation, as well as cortical damage, may operate to stop perceptual processing at this preconscious level.

In conclusion, the debate over subliminal perception has ranged across many psychological viewpoints for more than two decades. Perhaps the primary reason for the abundance of debate is the frequency of poorly controlled studies which show weak or ambiguous subliminal effects. This is complicated by the apparently small range of stimulus values between which the phenomenon is demonstrable (Hilgard, 1962). Secondly, the idea of subliminal perception has often appeared to contradict common sense notions of perception (e.g., "If I cannot see it, I cannot react to it.") and many epistemological assumptions about perception and
behavior (e.g., Wiener & Kleespies' [1968] "realism in perception" position). Nonetheless, the paradigm has gained increasing acceptance as theoretical viewpoints have changed (Dixon, 1971) and the part-processes hypothetically underlying the phenomenon are better understood (e.g., Moray, 1970). How several of the criticisms mentioned above apply to the research program of Silverman and associates will be examined in the following section.

Silverman's Research on "Subliminal Psychodynamic Activation"

Within the context of attempts to clarify and validate some aspects of psychoanalytic theory, Silverman and his collaborators at New York University have published over twenty-five studies (summarized in Silverman, 1976) using a laboratory technique termed "subliminal psychodynamic activation." The theory behind this technique derives from Freud's model of unconscious conflict and defense as they relate to psychopathological symptomatology. Following Klein and Holt's (1960) emphasis on the importance of the drive-relevance of subliminal stimuli, Silverman (1976) assumes that a stimulus containing wish-related content makes contact with derivatives of the related wish if the wish is currently active in the person. Thus, the subliminal input produces an effect analogous to that of an internally generated increase in intensity of an unconscious wish. In line with Pine's (1964) notion of indirect sub-
liminal effects and the theory of psychodynamic defenses, Silverman argues that the ideas and images activated by this input are likely to be transformed so that their wish-related character is obscured. They are thus not expected to directly come into awareness but rather to press for expression without the person's awareness. For Silverman, this is evidenced by increases or decreases in the psychopathological symptoms related to the unconscious wish, the direction depending on whether the stimulus has conflict-intensifying or conflict-alleviating connotations.

The idea of activation of an unconscious wish or conflict suggests that the present paradigm is closely related to the more comprehensive "schema activation" model proposed by Klein and Holt (1960). As noted earlier, Klein's (1970) programmatic research interest was to explore the interactions between peripheral and focal trains of thought. His work was directed towards understanding the cognitive and perceptual processes involved and specifying the conditions under which an incidental input effects behavior and conscious experience. In contrast, Silverman (1977) appears to implicitly accept a model of how subliminal input can affect behavior and goes on to use the technique to test specific hypotheses about psychopathology. His goal has been to validate and clarify psychoanalytic propositions relating particular symptoms (e.g., depression) to particular unconscious conflicts (e.g., aggression turned
towards the self). Before looking at the results of this research, the experimental method is reviewed.

Essentially, the effect on psychopathological behavior of subliminal presentation of wish-related stimuli is compared to that of subliminal presentation of (relatively) neutral stimuli. Sessions typically begin with a "baseline" assessment of subjects' propensity for whatever behavior is being studied. This is followed by 4-msec tachistoscopic exposures to conflict-related or neutral stimuli. Both pictorial and verbal stimuli are shown four times for each condition and both experimenter and subject are blind to stimulus content. A re-assessment of pathological behavior follows the tachistoscope presentations. This procedure is repeated for other neutral and critical stimuli in the same session or the next day. Silverman (1976) reports predicted results on a variety of behaviors, including thought process, feeling state, speech disorder, non-verbal behavior, and sexual attraction.

The bulk of the earlier studies in this program were directed towards investigating the role of aggressive wishes and merging fantasies in schizophrenic symptomatology (summarized in Silverman, 1975). A variety of aggressive and neutral stimuli were used, e.g., a lion charging versus a bird flying, man holding a dagger versus a man reading a newspaper, and the verbal stimuli CANNIBAL EATS PERSON versus PEOPLE ARE WALKING. Generally, the aggressive stimuli
led to increased pathological behavior measured by Rorschach content, TAT stories, word associations, and a six-point scale measuring "non-verbal pathological behavior" (e.g., inappropriate laughter). Later studies suggested that the effect was a delayed one (Silverman, 1971) and that it was more reliably obtainable with long-term rather than short-term schizophrenic patients (Silverman & Candell, 1970).

Other studies (e.g., Silverman, Spiro, Weisberg, & Candell, 1969) report that subliminal presentation of the message MOMMY AND I ARE ONE (a "symbiotic-gratification fantasy") led to a decrease in pathological behavior among differentiated but not undifferentiated schizophrenics. Silverman (1977) reports unpublished findings (Kaplan, 1976; Kaye, 1975) suggesting these amelioriative effects are specific to this message as several closely related messages (e.g., MOMMY IS ALWAYS WITH ME) had no effect on pathological behavior. These results are interpreted to support the hypotheses that symbiotic fantasy gratification reduces pathology in schizophrenics while activation of aggressive fantasy intensifies pathological manifestations.

Further studies have investigated psychoanalytic hypotheses relating specific stimulus content to depression, homosexuality, stuttering, and competition. Rutstein and Goldberger (1973) found that presentation of aggressive stimuli led to significantly higher self-ratings of depression but to no change in Rorschach measures of "aggression
directed inward" among non-psychotic depressed patients. Supporting the psychoanalytic hypothesis that homosexuality involves (in part) a flight from incest, Silverman, Kwawer, Wolitzky, and Coron (1973) found that stimuli containing incestuous themes produced an increase in homosexual and a decrease in heterosexual feelings reported by a group of homosexual males. In another study (Silverman, Klinger, Lustbader, Farrel, & Martin, 1972), stuttering was found to increase after subliminal presentations of anal content as compared to neutral content. Finally, Silverman, Ross, Adler, and Lustig (1978) found competitive behavior (dart throwing) was effected by oedipally-related stimuli that either sanctioned or condemned the idea of defeating father. For Silverman (1976, 1977), these results support particular psychoanalytic notions relating forms of pathology to specific unconscious wishes and conflicts.

Noting that many of these results could be explained by the generally negative affective quality of the various stimuli rather than their specific meaningful content, Silverman, Bronstein, and Mendelsohn (1976) tested new groups of stutterers, homosexuals, depressives, and schizophrenics. Each subject was subliminally exposed to three sets of stimuli: (a) the "relevant" wish-related stimulus (aggressive for the schizophrenics and depressives, incest for the homosexuals, and anal for the stutterers); (b) an "irrelevant" wish-related stimulus, but one that intensi-
fied the symptoms of one of the other groups (incest for schizophrenics and stutterers, aggressive for the homosexuals, and anal for the depressives); and (c) a neutral-control stimulus. Three of the four groups showed significant increases in pathology after exposure to their "relevant" wish-related stimulus (depressives showed mixed results). In no instance did the "irrelevant" stimulus influence the symptom under consideration. These results were interpreted as support for the psychoanalytic position that symptoms have specific meanings and express an individual's struggle with a particular conflictual wish.

In other recent studies, subliminal presentations of the MOMMY AND I ARE ONE stimulus have been shown to enhance the effect of various therapeutic modalities with overweight women (Silverman, Martin, Ungaro, & Mendelsohn, 1978) and with insect phobics (Silverman, Frank, & Dachinger, 1974). Silverman (in press) reports unpublished findings (Parker, in preparation) that repeated exposures to this stimulus as compared to a neutral one resulted in higher exam scores for a group of college students. In perhaps his most provocative work to date, Silverman (1978a, in press) uses these results and those obtained with oedipally-related stimuli to advance a thesis regarding the role of unconscious fantasy in psychotherapeutic success. In particular, he posits that certain therapies (e.g., systematic desensitization, client-centered therapy, and meditation)
are apt to activate symbiotic-gratification fantasies in which the therapist is unconsciously perceived as the good symbiotic mother. Other therapies (e.g., Masters and Johnson type sex therapy, body contact therapies, assertiveness training, and encounter treatment) are more likely to activate fantasies of sanctioned oedipal gratification in which the therapist is unconsciously experienced as a permissive superego figure. In light of his research findings on the effects of subliminal activation of these two fantasies, Silverman argues that their inadvertant activation may play a significant role in the therapeutic success of many forms of therapy.

In sum, Silverman and his associates have put together one of the most ambitious and voluminous research programs on subliminal perception to date. More than twenty-five studies have been published while an additional thirty studies remain unpublished (Silverman, personal communication). As noted above, these findings may have far-reaching implications for understanding therapeutic processes (Silverman, in press) and for developing new therapeutic methods (e.g., Silverman, Martin, Ungaro, & Mendelson, 1978). Purporting to validate psychoanalytic hypotheses about symptom formation and unconscious motivation, the program may approach the "promise of a clinical-experimental psychology of unconscious phenomena (Wolitzky & Wachtel, 1974, p. 840)" hoped for by earlier investigators. Cer-
tainly, the experimental results are not readily explained by many modern perceptual and visual information-processing theories (e.g., Neisser, 1967). Given these implications and the claims made by the researchers, the need for careful evaluation and independent replication is clearly indicated. Some general criticisms reflecting on the validity and reliability of the overall research program are discussed next. This is followed by a description of a particular study with plans for a replication and extension of it.

Perusal of individual studies suggests that experimental results are rarely straightforward and unambiguous. This appears especially true for the hypotheses that have been most extensively investigated. For example, later studies using aggressive stimuli with schizophrenics obtained inconsistent results that were explained in terms of a "delayed effect" (Silverman, 1971) and differences between long-term and short-term patients (Silverman & Candell, 1970). Greenberg (1977) also notes the lack of consistency in effect across studies and complains that Silverman shifted rather hastily from one measurement technique to another without exploring in detail or depth the limits of the various measures of effect. In a similar vein, Shapiro (1978) notes that studies of symbiotic stimuli with schizophrenics have also obtained inconsistent results in that significance tends to occur on one or another
measure but rarely on all measures used in a study. Moreover, the effects appear on different measures from study to study. Shapiro argues that this raises some questions as to the nature of the effects and what underlies them. Silverman (1978b) replies to this criticism claiming that the common effect in these studies was greater adaptive functioning after stimulation and that the fact that it is found on different measures at different times raises questions for further research, but does not challenge the basic thesis. Silverman appears correct in asserting that these inconsistent results raise further research questions. His labeling the common effect as "greater adaptive functioning" however, ignores the direct challenge to replicability and reliability posed by these inconsistent results.

The reader also notes Silverman's tendency to invoke personality variables when accounting for inconsistent or weak results (e.g., the "deniers" in Silverman, Bronstein, & Mendelsohn's [1976] sample of depressives). Though these variables may well prove to be important and so should be investigated, attention need also be paid to specifying the range of stimulus conditions within which subliminal effects are obtained.² Given other reviewers'

²Given the present state of knowledge regarding subliminal phenomena, it may be argued that it is most appropriate to first establish the stimulus parameters for which subliminal perception is reliably demonstrable, and then to investigate the contributions of personality and other mediating variables.
(e.g., Dixon, 1971) emphasis on the small range of stimulus values for which subliminal effects occur, Silverman's lack of careful consideration here is somewhat surprising. For example, except for very recent reports (e.g., Silverman, Ross, Adler, & Lustig, 1978), this reviewer found no studies for which illumination levels were reported for both the blank and stimulus fields. Room illumination levels and time given for subjects to adapt to tachistoscope lighting before subliminal exposures are also notably lacking. Finally, details on the construction, brightness, and contrast of stimulus cards are usually absent. Beside prohibiting conclusions about the stimulus range of subliminal effects, these oversights make exact replication impossible. In one attempted replication, Emmelkamp and Straatman (1976) found that two of their twenty subjects could exactly reproduce the experimental stimuli following 4-msec exposures.

Except for one footnote (Silverman & Spiro, 1967, p. 329) referring to an earlier study (Silverman, 1966) in which no significant differences were found between 4-msec and 6-msec stimulus exposures, this reviewer found neither empirical evidence nor rationale regarding the choice of 4-msec exposure speeds, durations between exposures (usually three seconds) or number of exposures (usually four). Again, attention to and systematic variation of these variables could significantly contribute to understanding
what stimulus values underlie subliminal effects. Similarly, careful threshold determination procedures are rarely reported in the studies. Silverman, Ross, Adler, and Lustig (1978) do report threshold data obtained with one of the two tachistoscopes used in their study, but fail to specify the procedures used to collect the data. As Eriksen (1960) and others have noted, differing methods may obtain quite different threshold estimates. Thus, Silverman's data give little indication of how far below awareness the reported phenomena are demonstrable.

Many of the criticisms and the results of Emmelkamp and Straatman (1976) mentioned above raise a question regarding the possibility that partial cues were available to subjects in some studies. Silverman and Spiro (1967) and Silverman (1968) offer data and persuasive arguments against this possibility for (at least) many of their studies. Particularly impressive is their report that subjects were unable to discriminate between (without having to identify) neutral and critical stimuli when presented under the conditions used in several experiments. Unfortunately, the discrimination task has not been administered to subjects in all studies (e.g., Silverman, Frank & Dachinger, 1974). Silverman (1976) marshalls further support against the partial-cue hypothesis from several studies in which stimuli were presented at both 4-msec and 10 second durations (e.g., Rutstein & Goldberger, 1973). In none of the seven studies
mentioned did supraliminal exposures lead to significant changes in measured pathology while all obtained predicted subliminal effects. Though supportive of the subliminal hypothesis, findings that subjects react differently to completely available stimuli (or to different amounts of part-cue availability) cannot disprove the partial-cue hypothesis (Wiener & Kleespies, 1968). As an overstated example, one can easily imagine that subjects' reactions to the part-cue "HI" might differ considerably from those to the complete word "SHIT."

As some of the foregoing criticisms are applicable to most or all of the studies considered, the strength and reliability of the overall findings is called into question. These methodological flaws also create doubt as to whether the experiments are valid tests of the psychoanalytic hypotheses they are purported to test. In this regard, investigations testing the specificity of relationships between symptoms and stimulus content (Silverman, Bronstein, & Mendelsohn, 1976) and those comparing the effects of semantically related stimulus contents (reported in Silverman, 1977) are most provocative in their support for psychoanalytic hypotheses relative to other hypotheses.

Given these questions about the reliability of the overall findings and the validity of the "subliminal psychodynamic activation" construct hypothesized to underlie the results, the need for independent replication of any part
of this research program is clearly apparent. Silverman (personal communication) lists nineteen studies completed without his sponsorship. Only three of these have been published. Rutstein and Goldberger's (1973) study of depressives was completed while Rutstein was a graduate student at New York University and obtained inconsistent results. The other articles (Greenberg, 1976; Emmelkamp & Straatman, 1976) appear in journals published outside the United States and essentially fail to replicate Silverman's findings. Greenberg (1976) compared the effects of aggressive and neutral stimuli with schizophrenics. His only significant finding was an increase in a Rorschach measure of pathological thinking following exposure of the neutral stimulus, opposite Silverman's findings. Emmelkamp and Straatman (1976) found no subliminal effect with a symbiotic gratification stimulus on snake phobics in an attempted replication of Silverman, Frank, and Dachinger (1974). Unfortunately, all of these replication attempts suffer from many of the same methodological shortcomings discussed with regard to the original studies.

The Present Study

In an effort to encourage replication and to demonstrate subliminal effects on a type of behavior not previously studied, Silverman, Ross, Adler, and Lustig (1978) report results of four experiments using a relatively simple behavioral measure and college males as subjects. The major
intention of each experiment was to manipulate, through subliminal presentation of conflict-related material, the degree of oedipal conflict in the subjects and to observe the effects of this on subjects' accuracy in dart-throwing competition. Stimuli were chosen either to intensify oedipal conflict by condemning the idea of defeating father in competition or to alleviate the conflict by sanctioning this idea. The verbal message BEATING DAD IS OK was presented for the sanctioning condition, and BEATING DAD IS WRONG was used for the condemning condition. Each message was presented following congruous pictures of an older and younger man both smiling (sanctioning) or both frowning (condemning). Thus, the study purports to test the psychoanalytic proposition that males can unconsciously inhibit themselves in competitive performance because winning has the hidden connotation of defeating father for mother's love (Beisser, 1961).

In three of the four experiments, the results obtained were consistent with the expectation that exposure to the OK stimuli would enhance subsequent dart-throwing accuracy while the WRONG stimuli would diminish it. The authors note that for these three groups, forty of seventy-eight subjects (59 percent) obtained adjusted scores for the OK condition that were over one hundred points greater than their adjusted scores for the WRONG condition. In contrast, only one subject had a difference of this magnitude in the
opposite direction. For the experiment which failed to obtain significant results, uncontrolled illumination levels were blamed. A subsequent experiment varied illumination levels and found that stimuli exposed at higher levels failed to produce effects even though stimuli were then closer to threshold. Results from a discrimination task administered to most subjects following three of the experiments suggest that results cannot be attributed to the availability of supraliminal partial cues. ³

The first part of the present investigation is an attempted replication of the major parts of this study. Additional information on procedure and copies of the stimuli used in the original study were obtained (Silverman, personal communication). In order to more clearly specify stimulus conditions for which the effect occurs, ascending threshold data is collected for use in generating the stimuli used in the experiment proper. Apparent differences in procedure are discussed in the appropriate context.

In order to better understand the psychological processes involved in this phenomenon, the second part of the present study extends the original findings to investigate which elements of the OK and WRONG stimuli are necessary to produce the experimental effects. Silverman (1976) acknowledgements.

³Unfortunately, the discrimination task was not administered following Experiment I which used a three-field tachistoscope most similar to that used in the present study.
edges that many of his results could be explained by the generally negative affective quality of the various stimuli rather than by their specific psychoanalytically-meaningful content. Studies comparing the effects of several meaningful stimuli on different clinical groups (Silverman, Bronstein, & Mendelsohn, 1978) and studies varying stimulus content related to one theme (reported by Silverman, 1976) have supported the specificity hypothesized by psychoanalysts. The present study attempts to extend these findings to the dart-throwing paradigm. To test whether the specifically oedipal elements of the original stimuli are necessary, reference to defeating father is eliminated from a further set of stimuli. Thus, the stimuli WINNING DARTS IS OK and WINNING DARTS IS WRONG are presented with congruous pictures and followed by dart-throwing. Additionally, reference to competition is eliminated and only a non-specific behavioral injunction included. For this, the stimuli YOU DO OK and YOU DO WRONG with congruous pictures are presented. These procedures provide a partial test of Silverman's hypothesis that activation of an unconscious oedipal conflict is necessary to explain the original results. As a test of the specific relationship between competitive behavior and oedipal conflict posited by psychoanalysts, the results also reflect on the construct validity of the "subliminal psychodynamic activation" model.
CHAPTER III

METHOD

Subjects

Subjects for the experiment were thirty-eight males from the Loyola University Department of Psychology undergraduate volunteer pool. Only subjects who spent their childhoods in primarily English speaking homes were included (Silverman, Ross, Adler, & Lustig, 1978, p. 346). Subjects who wear (untinted) glasses or contact lenses for any reason were required to wear them during all tachistoscopic presentations (Silverman, personal communication). Eighteen of these subjects were randomly selected to complete the second part of the study. Prior to the actual experiment, an additional ten subjects drawn from the same population were used for piloting the procedure and for collection of threshold data. Subjects' ages ranged from 17 to 25 years, with a mean age of 19.0 years and a mode age of 19 years.

Materials

The experimental verbal stimuli for the replication include: (a) BEATING DAD IS WRONG, and (b) BEATING DAD IS OK. Each is printed in letters 1.3-cm high and occupies two
lines on a white card. The pictorial stimuli are 4 x 7-cm line drawings intended to be congruous with the verbal messages. Thus, for Stimulus a, the pictorial accompaniment consists of a simple line drawing of older and younger male figures looking at each other with lips turned downward, clearly conveying negative feeling. For Stimulus b, the pictorial accompaniment is identical, except that the lips are turned up, so that the figures appear to be smiling at each other. The baseline stimuli consist of (relatively) neutral verbal messages and congruous pictures. They include: (a) PEOPLE ARE SITTING, and (b) PEOPLE ARE STANDING. How these stimuli were generated from photocopies of the stimuli used in the original study will be detailed after other materials are discussed.

As in Experiment I of the original study, the stimuli are viewed through an electronically controlled Scientific Prototype three-field tachistoscope (Model N-1000). The viewing distance is 1.3 meters. The exposures of verbal message and picture (each from different fields) last 4-msec each. The tachistoscope is set up so that when the subject looks into the eyepiece, he sees the blank field with red fixation dot, which goes off each time the stimulus fields go on. After the instructions "Ready, set," the picture field is exposed for 4-msec followed by the blank field for three seconds followed by the verbal field for 4-msec followed again by the blank field. Then, with
five seconds of the blank field passing after each pair of exposures, this sequence is repeated three times, thus giving four pairs of exposures for each condition.

For the dart-throwing competition, an American-style dart board identical to that used in the original study was hung 96 inches from the throwing line with the bottom 58 inches from the floor. The dartboard (manufactured by General Sportcraft of Bergenfeld, New Jersey) is 18 inches in diameter and divided into seven equal concentric circles with the following point allotments: 10, 20, 30, 40, 60, 80, and 100. One defect should be noted. Part of the bullseye (the 100 point area) seems to be made of hard wood which the metal darts cannot penetrate. Thus, darts hitting this area and bouncing away from the board were scored as 100 points. The dart-throwing area is situated immediately adjacent to subject's seat for viewing the tachistoscope (see Appendix A-I, "Room Diagram").

Tachistoscopic illumination levels varied across the original experiments and were not reported for Experiment I in which the three-field tachistoscope was used. Silverman (personal communication) recommends however that the illumination of the stimulus fields be set at between four and five footlamberts with blank field and room illumination two to three times brighter than this.\footnote{Experiment II of the original study reports stimulus field illuminations of five footlamberts with the...} Averaging...
these figures, stimulus field illuminations were set at 4.5 footlamberts, and the blank field at 2.5 times brighter or 11.25 footlamberts. Illumination measurements were made using an Ilford photometer with experimental stimulus cards inserted in the fields. All fields were set at "constant-on" positions while measurements were made. Silverman (personal communication) also notes that subjects' exposure to glare from room lighting may interfere with subliminal registration. For this reason, room lighting was shielded from subjects' direct view thereby eliminating the possibility that glare from the fluorescent lighting could effect results. Room illumination was measured at 7.6 footlamberts. This measurement was taken of the wall which subjects faced when seated at the tachistoscope and when throwing darts (see Appendix A-I, "Room Diagram"). Finally, light rec-

blank field at nine footlamberts. Experiment IV used stimulus fields at five footlamberts with the blank field at fifteen footlamberts. Both experiments used a two-field tachistoscope and obtained the predicted effect.

It should be noted that after approximately half the subjects had been run, a slight flickering appeared in the stimulus fields when viewed in the "constant-on" position. All light bulbs were changed at this point and illumination levels recalibrated. Unfortunately, the lowest setting for the stimulus fields gave illumination readings slightly higher than those used previously. They were set at 5.1 footlamberts while the blank field remained at 11.25 footlamberts for the duration of the experiment. Additional measurements taken near the end of the experiment showed no more than an 8 percent variation from these figures, well within the standard error of measurement of the instrument at these illumination levels. Data obtained before and after this change will be compared to determine the effect, if any, of these slightly differing illumination levels.
fleeting from the tachistoscope housing immediately in front of subjects' chair was measured at 11.2 footlamberts.

Lack of the original stimuli made their exact replication in terms of brightness, sharpness, and contrast impossible. Photocopies of the original stimuli were used on three initial pilot subjects with stimulus fields set at the illumination levels discussed above. These stimuli met the two criteria suggested in the original article (p. 343): (a) all pilot subjects reported seeing flickers or flashes of light on four successive exposures of each verbal and pictorial stimuli, and (b) the flickers or flashes from the two sets of oedipal stimuli could not be distinguished from each other by any subject. The original article (p. 352) also reports ascending threshold data collected for two neutral stimuli. For illumination levels approximating those here, subjects' mean threshold for first reporting anything was 40.2 msec, while mean threshold for correct reading was 66.0 msec. In contrast, pilot subjects in the present study reported partial cues at around 15 msec and correctly read the stimuli at 20 to 25 msec. In his most recent statement, Silverman (personal communication) recommends that stimuli be constructed so that partial cues are available at about 30 msec and that correct reading occur between 40 and 60 msec. As the first stimuli tested here clearly did not meet these recommendations and the present illumination levels closely approximated those
recommended by Silverman, the decision was made to progres-
sively lighten these stimuli so that more comparable
threshold data could be obtained.

This was accomplished by photocopying with a piece
of tracing paper covering the stimulus cards. This process
was repeated on resultant copies three times, so that three
gradations of lightness were obtained for each stimulus.
Six neutral verbal stimuli and one critical stimulus (YOU
DO OK) were copied in this fashion. Following this, ascend-
ing threshold data for these 21 cards (7 stimuli x 3 light-
ness gradations) were obtained from 7 subjects drawn from
the population described above. Illumination levels for
stimulus and blank fields were those to be used in the
experiment (i.e., 4.5 and 11.25 footlamberts respectively).
Subjects were instructed to report everything they saw,
whether a flash, a line, a letter, or a change in bright-
ness, and to report all parts of the stimuli as they were
seen. For each threshold determination, the subject was
given forty-five seconds exposure to the blank field (with
fixation dot), told "Ready," and then exposed to the stim-
ulus for 4 msec. Each stimulus exposure was followed by
four seconds of the blank field. Stimulus exposure times
were increased by 2 msec increments until the subject first
reported a partial cue (e.g., a line, a letter) and then in
1 msec increments until a correct reading was made.
Threshold data with stimuli grouped according to lightness
gradation are presented in Table 1. Each mean reported is based on from twenty-four to thirty-eight threshold determinations.

Mean threshold scores obtained from the lightest group of stimuli (30.4 msec for first report and 46.1 msec for correct reading) most closely approximate the thresholds recommended by Silverman (30 msec and 40 to 60 msec, respectively). On the basis of these results, all remaining verbal and pictorial stimulus cards were lightened by the process described above so that they approximated this group of stimuli in terms of line thickness and contrast.6 The stimuli do not appear to differ with regard to angularity. (See Appendix B for photocopies of these stimuli that were used in the experiment proper.)

Procedure for the Replication (Part I)

A verbatim account of the experimenter's interaction with subjects is provided in Appendix A-II. This was adapted with only minor variations from the account obtained from the original authors. The major steps of the procedure are described below.

6These stimuli appeared dramatically lighter than the ones originally obtained. Copies of two of these lightened stimuli and a description of threshold data were sent to Dr. Silverman. He replied that the stimuli appeared no lighter than others he had used in two-field tachistoscope experiments. Further, he reminded the author that no illumination measurements had been made in Experiment I of the original experiment which used a Scientific Prototype three-field tachistoscope comparable to the one used here. This could clearly account for the observed differences.
<table>
<thead>
<tr>
<th></th>
<th>Light</th>
<th>Lighter</th>
<th>Lightest</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
<td><strong>Mean</strong></td>
<td><strong>Range</strong></td>
<td><strong>Mean</strong></td>
</tr>
<tr>
<td>Threshold for</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>first report</td>
<td>14-40</td>
<td>24.5</td>
<td>16-38</td>
</tr>
<tr>
<td></td>
<td>20-46</td>
<td>30.4</td>
<td></td>
</tr>
<tr>
<td>Threshold for</td>
<td>18-55</td>
<td>31.8</td>
<td>20-72</td>
</tr>
<tr>
<td>correct reading</td>
<td></td>
<td>22-94</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* All figures are in msec.
The thirty-eight subjects were randomly divided between the two experimenters involved in the study. When each subject arrived, he was asked by the experimenter to read an information sheet that explains the rudiments of the experiment and assures confidentiality (see Appendix A-III). He was then asked to sign a consent form (Appendix A-IV). If the form was signed, the subject was told of the dart-throwing competition for which cash prizes of $12, $8, and $5 would be awarded to the three highest scorers. After a brief explanation of the tachistoscope, the subject was given the "priming" material identical to that used in the original study. This consisted of a brief questionnaire (Appendix A-V) involving questions about the subject's relationships with his mother and father, Rorschach card IV (the "father" card), TAT card 7BM (a "father-son" scene), TAT card 6BM (a "mother-son" scene), and a story recall task. The latter involved the subject looking at TAT card 6BM while being read a story (Appendix A-VI) made up by the original authors to contain prominent oedipal elements. He then recalled the story and told it back to the experimenter. The purpose of these procedures was to "prime" the subjects for the oedipal content to be subliminally presented. Silverman (1965) reports that for subliminal effects to be obtained for normal subjects, the mental content that the stimuli were intended to trigger had to be activated by priming beforehand.
After eight practice dart throws, each subject was put through the two conditions of the replication. Each condition consisted of tachistoscopic exposure to a baseline stimulus pair and a baseline assessment of dart-throwing (all eight darts were thrown by the subject and then retrieved by the experimenter). This was followed by the tachistoscopic presentation of one of the two experimental oedipal stimuli already described and another eight dart throws. This was followed by the other condition, in which pretest and posttest assessments of dart-throwing were again collected. The sequence of baseline conditions remained fixed for all subjects, while the presentations of the critical stimuli were randomized.

Procedure and Materials for the Extension (Part 2)

Immediately upon completion of Part 1, the eighteen subjects run by the author received the procedure described above with exposures to the four non-oedipal stimuli and four additional baseline (neutral) stimuli. These new stimuli were constructed to resemble (as much as possible) the original stimuli in clarity, contrast, size, angularity, and brightness. Each stimulus was generated by tracing letters and figures used in the original stimuli. To test whether the oedipal elements of the original stimuli were necessary, the following stimuli were presented: (a) WINNING DARTS IS OK and a picture of two male figures of the
same age with upturned (smiling) lips looking at each other, and (b) WINNING DARTS IS WRONG and a picture of these two young men looking with lips turned down (frowning). Reference to competition was eliminated in a further set of stimuli: (a) YOU DO OK and a picture of one smiling young man, and (b) YOU DO WRONG and a picture of the same young man frowning. As mentioned earlier, all stimuli were lightened so as to most closely match stimuli from which recommended threshold data were obtained (Appendix C).

The baseline stimuli for Part 2 were ones used in the original experiments. The verbal messages (with congruent pictures) included: (a) PEOPLE ARE THINKING, (b) PEOPLE ARE TALKING, (c) PEOPLE ARE LOOKING, and (d) PEOPLE ARE WALKING. The baseline stimuli were presented in the above sequence for all subjects. As there are twenty-four possible sequences in which the four new critical stimuli could appear, each subject was randomly assigned to a different sequence.

The procedure for insuring that the experimenter interacting with the subject was blind to stimulus content should be mentioned here. Before each subject appeared, the co-experimenter randomly chose one of the twenty-four possible orders for stimulus presentation. He then placed half of the stimuli (using all available stimulus holders) face-down on a table (out of subject's sight) in order of their presentation. Before each tachistoscopic exposure,
the subject was asked to look at the blank field (thus providing an approximate thirty second adaptation period) while the experimenter inserted the stimulus cards into the fields in such a way as to avoid seeing their front-side. Half-way through the procedure, it was necessary for the co-experimenter to arrange the remaining cards in their order of presentation. Subjects were asked to look at the blank field during this time and the experimenter temporarily left the room. If for any reason, either experimenter or subject became aware of stimulus content, data for that subject would have been discarded. This did not occur however.

Following presentation of the final critical stimuli and subsequent dart throws, all subjects completed a discrimination task patterned closely after that described in the original study (p. 346). Each subject was given twenty trials in which, under the same conditions as existed during the experiment proper, he was asked to distinguish the flickers made by one of the picture-message units from those made by another. The two BEATING DAD stimuli were presented on one set of ten trials (in random order), while a non-oedipal critical stimulus pair was presented with the PEOPLE ARE WALKING pair in another ten trials (Appendix A-VII).

Finally, subjects were told that a report of experimental results, prize money, and a description of the sub-
liminal content would be mailed to them at the end of the experiment. They had been requested to leave mailing addresses on the questionnaire administered earlier. If at this point, any subject insisted on knowing the content of the stimuli, they were revealed and the subject asked to keep this information secret. Other questions about the experiment were answered and subjects were then encouraged to contact the experimenter by phone at any time with any further concerns or questions. A summary of these procedures appears in Table 2.

Analysis of Data

Each subject received twelve dart scores (six critical and six baseline) based on the total of the eight darts thrown following each stimulus exposure. The effect of the critical stimuli was assessed by subtracting each critical dart score from the baseline dart score which had immediately preceded it. Matched-pairs t tests were computed to determine the significance of these (baseline minus critical) difference scores. All tests of significance were two-tailed.

Results for the two BEATING DAD stimuli were analyzed together and separately for each experimenter. Additional t tests were planned to compare the mean difference scores obtained by each experimenter for each critical stimulus. Thus, the presence of any differential experimenter effect could be assessed. The effect of the small
Table 2

Summary of Procedure

Part 1 (38 subjects divided between co-experimenters)

1. Introduction and signing consent form
2. Priming procedures
3. Eight practice dart throws
4. Baseline 1 stimulation (PEOPLE ARE SITTING)
5. Baseline 1 dart throws (eight throws for each condition)
6. Critical 1 stimulation (one of the BEATING DAD stimuli)
7. Critical 1 dart throws
8. Baseline 2 stimulation (PEOPLE ARE STANDING)
9. Baseline 2 dart throws
10. Critical 2 stimulation (the other BEATING DAD pair)
11. Critical 2 dart throws

Part 2 (18 subjects run by the author)

12. Baseline 3 stimulation (PEOPLE ARE THINKING)
13. Baseline 3 dart throws
14. Critical 3 stimulation (one of the four non-oedipal critical stimulus pairs)
15. Critical 3 dart throws

(At this point, the co-experimenter arranged the remaining stimulus cards.)

16. Baseline 4 stimulation (PEOPLE ARE TALKING)
17. Baseline 4 dart throws
18. Critical 4 stimulation (another non-oedipal stimulus pair)
<table>
<thead>
<tr>
<th></th>
<th>19. Critical 4 dart throws</th>
</tr>
</thead>
<tbody>
<tr>
<td>20. Baseline 5 stimulation (PEOPLE ARE LOOKING)</td>
<td></td>
</tr>
<tr>
<td>21. Baseline 5 dart throws</td>
<td></td>
</tr>
<tr>
<td>22. Critical 5 stimulation (non-oedipal stimulus)</td>
<td></td>
</tr>
<tr>
<td>23. Critical 5 dart throws</td>
<td></td>
</tr>
<tr>
<td>24. Baseline 6 stimulation (PEOPLE ARE WALKING)</td>
<td></td>
</tr>
<tr>
<td>25. Baseline 6 dart throws</td>
<td></td>
</tr>
<tr>
<td>26. Critical 6 stimulation (non-oedipal stimulus)</td>
<td></td>
</tr>
<tr>
<td>27. Critical 6 dart throws</td>
<td></td>
</tr>
<tr>
<td>28. Discrimination task</td>
<td></td>
</tr>
<tr>
<td>29. Debriefing</td>
<td></td>
</tr>
</tbody>
</table>
change in tachistoscopic lighting was also tested by comparing mean difference scores for each critical stimulus obtained before and after this change.

Finally, Silverman (personal communication) has suggested that the experimental effect obtained in the original study may be of a rather short duration. To investigate this possibility, matched-pairs tests were planned for the BEATING DAD stimuli using only the first four dart throws that followed each baseline and critical stimulus exposure.
CHAPTER IV

RESULTS

Results of the Replication

Means and standard deviations for dart scores obtained following the two BEATING DAD stimuli and their associated baseline stimuli are presented in Table 3. Results are presented separately for each experimenter and as combined for all thirty-eight subjects. The results of the matched-pairs t tests computed for these data are presented in Table 4. These reveal that the only statistically significant result obtained was for the author's subjects following exposure to the BEATING DAD IS WRONG stimulus ($p < .01$, 2-tailed). Dart scores increased significantly here, a finding directly opposite that of the original study. Fourteen subjects showed increases in dart scores following this stimulus while only four showed decreases, $X^2(1) = 4.55, p < .05$. The co-experimenter obtained no effect with the same stimulus. When results from both experimenters are combined, neither of the oedipally-related stimuli had a significant effect on dart scores. These results clearly fail to support Silverman's findings on the effects of subliminal stimulation with these stimuli.
Table 3
Mean Critical and Baseline Dart Scores
For the Replication

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Swanson (n=18)</th>
<th>Casas (n=20)</th>
<th>Combined (n=38)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BEATING DAD IS OK</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>445.56</td>
<td>461.00</td>
<td>453.68</td>
</tr>
<tr>
<td>SD</td>
<td>89.19</td>
<td>88.67</td>
<td>88.05</td>
</tr>
<tr>
<td><strong>Critical</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>437.22</td>
<td>458.50</td>
<td>453.68</td>
</tr>
<tr>
<td>SD</td>
<td>102.83</td>
<td>108.35</td>
<td>105.53</td>
</tr>
<tr>
<td><strong>BEATING DAD IS WRONG</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>419.44</td>
<td>458.00</td>
<td>439.74</td>
</tr>
<tr>
<td>SD</td>
<td>120.71</td>
<td>128.42</td>
<td>124.67</td>
</tr>
<tr>
<td><strong>Critical</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>465.00</td>
<td>451.00</td>
<td>457.63</td>
</tr>
<tr>
<td>SD</td>
<td>92.94</td>
<td>130.34</td>
<td>112.88</td>
</tr>
</tbody>
</table>
Table 4

Matched-Pairs t Test Results for the Replication

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Swanson (n=18)</th>
<th>Casas (n=20)</th>
<th>Combined (n=38)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BEATING DAD IS OK</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean difference</td>
<td>8.33</td>
<td>- 7.50</td>
<td>0.00</td>
</tr>
<tr>
<td>SD of difference</td>
<td>102.97</td>
<td>64.72</td>
<td>84.18</td>
</tr>
<tr>
<td>t</td>
<td>0.343</td>
<td>- 0.518</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>BEATING DAD IS WRONG</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean difference</td>
<td>- 45.55</td>
<td>7.00</td>
<td>- 17.89</td>
</tr>
<tr>
<td>SD of difference</td>
<td>65.64</td>
<td>80.20</td>
<td>77.40</td>
</tr>
<tr>
<td>t</td>
<td>- 2.944*</td>
<td>0.390</td>
<td>- 1.425</td>
</tr>
</tbody>
</table>

*p < .01, 2-tailed.
and, in one instance, are in the opposite direction of his original findings.

Differences in results obtained by the two experimenters were assessed by $t$ tests. There was no difference for the BEATING DAD IS OK stimulus, $t(36) = 0.558$, ns. In contrast, the experimenters obtained significantly different results with the BEATING DAD IS WRONG stimulus, $t(36) = 2.137$, $p < .05$, 2-tailed. This result suggests an experimenter or experimenter x subject interaction effect and raises serious questions as to the generalizability of the phenomenon.

As noted earlier, Silverman has raised the possibility that the experimental effect may be of a rather short duration following subliminal stimulation. That is, the effect may be evident for only the initial dart throws following each stimulus exposure. Table 5 presents mean differences (between critical and associated baseline scores) and matched-pairs $t$ tests computed using only the first four dart throws in each condition. These results are essentially the same as those obtained when all eight dart throw scores are used. No stimulus had a significant effect on dart scores, though BEATING DAD IS WRONG approached significance ($p < .10$, 2-tailed) for the author's subjects. For this stimulus, the average increase of 29.44 points for four dart throws compared to the average increase of 45.55 for all eight darts suggests that the obtained
<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Swanson (n=18)</th>
<th>Casas (n=20)</th>
<th>Combined (n=38)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEATING DAD IS OK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean difference</td>
<td>10.56</td>
<td>-15.00</td>
<td>-2.89</td>
</tr>
<tr>
<td>SD of difference</td>
<td>63.66</td>
<td>55.87</td>
<td>60.27</td>
</tr>
<tr>
<td>t</td>
<td>0.684</td>
<td>-1.201</td>
<td>-0.296</td>
</tr>
<tr>
<td>BEATING DAD IS WRONG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean difference</td>
<td>-29.44</td>
<td>0.50</td>
<td>-14.21</td>
</tr>
<tr>
<td>SD of difference</td>
<td>57.55</td>
<td>69.92</td>
<td>65.17</td>
</tr>
<tr>
<td>t</td>
<td>-1.741*</td>
<td>-0.032</td>
<td>-1.344</td>
</tr>
</tbody>
</table>

*p < .10, 2-tailed.
effect was fairly evenly distributed over the first four and second four dart throws. These results do not support the hypothesis of a short-lived subliminal effect.

Finally, the effect of the small increase in stimulus field illumination was examined. Average differences (between critical and associated baseline scores) obtained before and after the lighting change were compared using t-tests. None of these four (two experimenters x two stimuli) tests approached significance.

Results of the Extension and Discrimination Task

The two WINNING DARTS and two YOU DO stimuli and associated baseline stimuli were subliminally presented as a test of whether the specifically oedipal content of the original stimuli were necessary to obtain an effect on dart scores. Summary statistics for the eighteen subjects exposed to these stimuli are presented in Table 6. Examination of Table 7 reveals that none of these four critical stimuli had a significant effect on dart scores, although the WINNING DARTS IS OK stimulus approached significance (p < .10, 2-tailed). Again, the direction of this near-significant effect was surprising in that this stimulus tended to lead to decreases in dart scores. Similarly, the WINNING DARTS IS WRONG stimulus tended to produce increases in dart-throwing accuracy (p < .20, 2-tailed).
Table 6
Mean Critical and Baseline Dart Scores for the Extension

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>WINNING DARTS IS OK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>466.11</td>
<td>61.56</td>
</tr>
<tr>
<td>Critical</td>
<td>435.56</td>
<td>95.38</td>
</tr>
<tr>
<td>WINNING DARTS IS WRONG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>456.11</td>
<td>98.77</td>
</tr>
<tr>
<td>Critical</td>
<td>487.78</td>
<td>90.00</td>
</tr>
<tr>
<td>YOU DO OK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>433.89</td>
<td>74.61</td>
</tr>
<tr>
<td>Critical</td>
<td>436.67</td>
<td>71.21</td>
</tr>
<tr>
<td>YOU DO WRONG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>451.11</td>
<td>111.56</td>
</tr>
<tr>
<td>Critical</td>
<td>463.33</td>
<td>86.57</td>
</tr>
</tbody>
</table>

Note. N = 18.
Table 7

Matched-Pairs t Test Results for the Extension

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Mean Difference</th>
<th>SD of Difference</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>WINNING DARTS IS OK</td>
<td>30.55</td>
<td>70.50</td>
<td>1.839*</td>
</tr>
<tr>
<td>WINNING DARTS IS WRONG</td>
<td>-31.67</td>
<td>92.12</td>
<td>-1.459</td>
</tr>
<tr>
<td>YOU DO OK</td>
<td>- 2.78</td>
<td>85.74</td>
<td>-0.138</td>
</tr>
<tr>
<td>YOU DO WRONG</td>
<td>-12.22</td>
<td>114.05</td>
<td>-0.455</td>
</tr>
</tbody>
</table>

Note. N = 18.

*p < .10, 2-tailed.
Seventeen of these eighteen subjects were given a discrimination task to test for the availability of partial cues. Of the 20 discriminations required, one subject was correct 13 times, one subject 12 times, two subjects 11 times, five subjects 10 times, three subjects 9 times, one subject 8 times, one subject 7 times, one subject 4 times, and two subjects 3 times. With a minimum of 14 correct or incorrect discriminations comprising a nonchance performance ($p = .10$, 2-tailed), three subjects met this criterion. These three made significantly more incorrect discriminations than expected however. For the group as a whole, the mean number of correct discriminations was 8.76 which did not significantly differ from the expected 10 correct of 20 discriminations. As the stimuli were presented under the same conditions as existed during the experiment proper, these results provide no support for the presence of partial cues.

7One subject complained of eye strain and was excused from this task.
CHAPTER V

DISCUSSION

The major conclusion to be drawn from the present study is that it failed to replicate any part of Silverman, Ross, Adler, and Lustig's (1978) demonstration of "subliminal psychodynamic activation" with the dart-throwing paradigm. This was true for both oedipally-related stimuli and for two experimenters running separate groups of subjects. To appreciate the difference in results of the two studies, it should be noted that the original authors (p. 354) report that 86 percent (67 of 78) of their subjects produced results in the hypothesized direction. In contrast, the present study found only 42 percent (16 of 38) of the subjects produced hypothesized results, while 55 percent (21 of 38) had results in the opposite direction. Furthermore, the only significant result obtained here was limited to one experimenter and was a reversal of the results of the original study.

8 These percentages were derived by comparing the relative magnitude of difference scores (baseline minus critical) for the two BEATING DAD stimuli obtained by each subject. One subject obtained equal difference scores so percentages do not total one hundred.
non-oedipal critical stimuli, possible explanations for this failure to replicate are considered. These include differences in procedure and materials, subject groups, or experimenters. Procedurally, every attempt was made here to replicate the original study as exactly as possible. In both studies for example, the experiment was called "Tournament" on subject sign-up forms. The same kind of tachistoscope and dart board were used. Durations and frequencies of stimulus exposures were those reported by Silverman. Room and stimulus field illuminations were within the range of those reported for the original experiments. Further, stimulus materials were generated from copies of the original stimuli with the help of frequent consultation with Dr. Silverman. Ascending threshold data collected for the stimuli used here met the specifications of the original author. Finally, data collected from the discrimination tasks were quite similar and support the absence of partial cue availability in both studies. Though slight or non-obvious differences in equipment and stimuli were nonetheless present despite these precautions, it is unclear how they might account for the radically different results obtained in the two studies.

The present experimenters may in fact have been more meticulous than the original authors in specifying the methods for obtaining illumination measurements and in taking repeated measurements throughout the course of the experiment (see METHODS). The original study does not report measurement methods, gives only one illumination reading for each experiment, and fails to report any pertinent data for one experiment.
The introduction and priming stages of the experiments were almost identical for the two studies. One noticeable difference however was the mention here of the "co-worker [who] will come in and change the cards (Appendix A-II)." In the original study, stimulus cards were previously coded and then arranged for each subject by the experimenter according to a list. In an effort to better ensure that the experimenter remained blind to stimulus content, a second experimenter was introduced to arrange the cards in the present study. Of course, this second person did not enter the room until after the replication part of the experiment was completed, so that any differential effect must have been due solely to the mention of this procedure in the experimenter's introductory remarks (see Table 2).

Differences in subject groups are always possible and could account for the differing results. Available demographic data show that subjects' ages were almost identical (mean age of 19.0 here and 19.3, 19.6, and 19.5 for the original experiments). In both studies, all subjects were college males and most were from introductory psychology classes. Subjects whose native language was not English were excluded. As Loyola University enrolls a large proportion of Catholic students, differences in subjects' involvement in religion must be considered. For example, religious involvement or history may in part
determine personal meanings given to the words "ok" and "wrong." One can further speculate that the word "dad" may evoke special meaning for Catholic males if it is associated with the more religious "father." Along these lines, Silverman (personal communication) has noted that there may be regional differences in how subjects understand the word "beating." The word may connote physical attack, defeating in competition, fatigue or exhaustion, cheating or circumventing, or possibly the lifestyle of Jack Kerouac. Words such as "defeating," "winning over," or "whupping" may more clearly communicate the intended meaning for different subjects. Unfortunately, no data are available for either group of subjects that could shed light on the possible relevance of subjects' religious involvement or idiosyncratic and associative meanings given to stimulus words. The contributions of these variables remains a question open to further research.

Finally, differences in the experimenters need be considered. Three male experimenters ranging from twenty years to early thirties in age obtained the predicted results in the original study. In the present study, two male experimenters, ages twenty-four and twenty-six, failed

---

10 Along with the letter to subjects discussing results and stimulus content, the author plans to send a questionnaire inquiring as to the kind and extent of religious involvement of subjects both at present and as children, the term used to refer to their fathers, and the meaning they give to the word "beating."
to obtain the predicted results. Though differences in appearance, manner, or personality may have differentiated the two groups of experimenters, it is difficult to understand how they could have systematically affected subjects' responses to stimuli of which the experimenters were unaware. Clearly, one can only speculate as to how experimenter characteristics interacted with subliminally presented stimuli to change the unconscious meaning of the situation for subjects.

Differences in methods, materials, subjects, and experimenters between studies can never be completely eliminated. Given the present experimenters' careful attempts at replication however, there are clearly no obvious or straightforward reasons explaining the radically different results obtained. Thus, the present results suggest, at minimum, that the predicted effect is not "reliable and powerful" as described by the original authors (p. 354). Rather, it is more probable that the original effect was dependent on highly specific and unknown situational, subject, or experimenter variables. In this case, the original effect may be more accurately characterized as fragile and lacking generalizability.

In the second part of the present study, four additional stimuli were presented to eighteen subjects in an attempt to determine which elements of the oedipally-related stimuli were necessary to affect dart scores. None
of these stimuli produced a significant effect, although WINNING DARTS IS OK approached significance. Here, the direction of effect was opposite expectation as this stimulus produced average decreases of thirty points in dart scores. Similarly, the stimulus WINNING DARTS IS WRONG was followed by increases of over thirty points. Along with the significant reversal of original effect obtained in the replication attempt, these results (though only suggestive) point to the hazards of predicting the kinds of effects produced by subliminal stimulation. The observed relationships between stimulus content and effect could not have easily been predicted by psychoanalytic theory or more common sense notions. Pine's (1964) notion of "indirect" effects which are not logically or obviously related to stimulus content appears pertinent here. In addition, the fact that these results did not reach significance further highlights the fragile nature of subliminal effects in the dart-throwing paradigm.

Perhaps the most provocative result of the present study is the finding that for the author's subjects, BEATING DAD IS WRONG led to increases in dart scores (p < .01, 2-tailed). This is a reversal of findings in the original study. Additionally, this stimulus produced no significant dart-score changes for the co-experimenter's subjects.11 Given that both experimenters followed iden-

11 As noted earlier, the experimenters obtained sig-
tical procedures, were blind to stimulus content and that subjects were randomly divided between them, this result is not easily explained. Evidence bearing on the possibility of an experimenter effect, subject group differences, and random error are considered next.

The two groups of subjects here had almost identical ages (means of 18.9 and 19.0 years) and were largely college freshmen and sophomores. In an effort to identify any possibly relevant subject variables, data from the questionnaire, Rorschach, TAT, and story recall task collected as part of "priming," were informally analyzed at the conclusion of the experiment. These data suggested large variations between subjects on dimensions loosely labeled "defensiveness," "amount of oedipal content," "performance anxiety," and "guilt manifestations." A sorting of protocols on the basis of these variables failed to reliably differentiate between subjects run by either experimenter, or subjects who attained the predicted results from those who obtained reversals. Thus, this informal, post hoc analysis revealed no systematic differences between the subject groups. As noted earlier, variability in subjects' religious involvement or in idiosyncratic meanings associated with the stimulus words may have mediated the differ-

ificantly different results with this stimulus, $t(36) = 2.137, p < .05$, 2-tailed.
ferring results for the two groups. No data are available which could aid in determining whether the subject groups differed in other variables possibly related to subliminal stimulation effects, e.g., hemisphericity (Sackeim, Packer, & Gur, 1977), visual information processing speeds (Browning-Crinion, Dolmetsch, & Mayzner, 1978), state of arousal (Dixon, 1971), and level and type of drive-activation (Klein & Holt, 1960).

Any of these (or other unknown) subject variables could have acted directly or interacted with some difference between the two experimenters to produce the obtained results. In an attempt to assess this last possibility, the two experimenters ran each other through the replication procedures following the conclusion of the experiment. Though minor differences in manner, inflection, and pace were observed, it was difficult to imagine that these were responsible for the experimental results. It can also be noted that the experimenters are about the same age, dress in much the same style, and bear few striking dissimilarities in physical appearance. As none of these readily observable variables appears to clearly differentiate the two experimenters, one may speculate that the two may have been perceived differently on an unconscious level due to

---

12 Data obtained from the subject questionnaire discussed earlier will be analyzed for subject group differences. Any variable that appears to do so can be used as a predictor of subliminal effect in future research.
subtleties of communication and personality. For example, it may have occurred that subjects perceived the author and thus the experimental situation in such a way that the BEATING DAD IS WRONG stimulus was unconsciously experienced as a punishment which expiated guilt. This relief of guilt may have operated as a release leading to improved competitive performance. This explanation is clearly only one of many possible speculations and is quite loosely based on psychoanalytic notions of oedipal guilt and expiation. Further, the mechanisms mediating such a phenomenon are generally unknown making any test of the hypothesis difficult to envision.

The preceding discussion makes evident the difficulty of explaining why the effect of the BEATING DAD IS WRONG stimulus attained significance for one experimenter and not for the other, and why its direction was opposite that found by three previous experimenters. None of the

13 Interestingly, there is some evidence suggesting a general tendency for the author's subjects to improve dart scores following exposure to any of the three stimuli containing the word "wrong." Ignoring baseline scores for the moment, examination of Tables 3 and 6 reveals that mean dart scores following WRONG stimulation are greater than scores following their respective OK stimuli (by 27.78 points for the BEATING DAD pair, 52.22 for WINNING DARTS, and 26.66 for YOU DO). Another way to demonstrate this tendency is to compare overall mean difference scores (baseline minus critical) for the three OK stimuli to those obtained for the WRONG stimuli (Tables 4 and 7). Again, WRONG stimuli led to significant increases relative to changes following OK stimuli, \( t(52) = 2.462, p < .02, \) two-tailed. The significance of this finding is unclear.
possibilities mentioned are compelling for their evidence, logic, or parsimony. Perhaps a more credible explanation is that the result is due to random error, despite having attained statistical significance. That is, it may represent a Type I error in which the null hypothesis is falsely rejected. In any experiment, the likelihood of a Type I error increases as many statistical tests (t tests here) are applied to the data. This explanation has the value of additional parsimony as the results of the two experimenters here could then be considered consistent and the problem posed by the reversal of effect would be eliminated. Clearly, this possibility can be tested by a future replication of the significant parts of the present study.

Whether or not the significant result is a replicable phenomenon, the present study creates doubt regarding the generalizability of the original findings and the theoretical rationale advanced to explain them. Given the care taken to replicate the original study as exactly as possible, these results suggest that the findings of Silverman, Ross, Adler, and Lustig (1978) may have been dependent on highly specific and unknown situational, subject, or experimenter variables. The reversal of effect for one stimulus and the results for the non-oedipal stimuli raise questions as to Silverman's (1976) assertion that subliminal stimulation can directly activate unconscious wishes or conflicts leading to predictable behavioral consequences.
As noted earlier, the only published independent replication attempts of Silverman's work (Greenberg, 1977; Emmelkamp & Straatman, 1976) also obtained negative results. Though these two studies contained many of the same methodological flaws as the original experiments, the continued inability of independent investigators to successfully replicate raises serious questions as to the strength of the results of Silverman's overall research program. Contrary to the assertions of Silverman, Ross, Adler, and Lustig (1978, p. 354), subliminal effects do not appear to be strong and reliable even when experimental stimuli, subjects' motivational state, and type of response measure are (apparently) congruent. As in the 1950s and 1960s, subliminal perception appears to be an ambiguous phenomena that is not easily demonstrable (Eriksen, 1960; Wolitzky & Wachtel, 1973).

In conclusion, possible reasons for the inability of researchers to consistently demonstrate subliminal effects are briefly considered. Within the psychoanalytic framework, many studies have been designed from somewhat simplistic theoretical notions. Silverman's work (1976), for example, appears based on the assumption that a complex verbally coded message can bypass usual defensive operations to directly affect significant unconscious fantasies or conflicts. This assumption appears to ignore the complex nature and purposes attributed to defense mechanisms
by psychoanalytic theorists (e.g., A. Freud, 1936/1966). It is also difficult to envision how stimulus content could have such a direct and specific effect on unconscious processes. The mechanisms underlying translation of a verbal or simple pictorial message into something impacting on primary-process or unconscious events are given scant attention by Silverman and other researchers. This casts doubt on the validity of the "subliminal psychodynamic activation" paradigm as a method for testing psychoanalytic hypotheses.

Finally, subjects differ on variables which may mediate subliminal effects. For example, rates of processing briefly presented verbal information show large individual differences (Browning-Crinion, Dolmetsch, & Mayzner, 1978). Similarly, one might expect large individual differences in the amounts and ways that information is processed when presented subliminally. This would make difficult the task of establishing stimulus parameters for which all (or most) subjects could show subliminal effects. Individual differences might also be expected in subjects' defensive organization and the meanings given to stimulus materials. Thus, stimulus content that has a significant emotional or unconscious wish-related impact for one subject may be affectively neutral for another. Related to this is the psychoanalytic notion that individuals differ widely in the
ways that unconscious wishes or conflicts are consciously experienced and behaviorally expressed (Fenichel, 1945). This may help to explain why subliminal effects are difficult to predict for a group of subjects. In light of these considerations, a more open-ended, exploratory approach to research on subliminal perception is recommended for the present.
REFERENCES


Emmelkamp, P. M. G., & Straatman, H. A psychoanalytic reinterpretation of the effectiveness of systematic desensitization: Fact or fiction? Behavior Research and Therapy, 1976, 14, 245-249.


Klein, G. S. On subliminal activation. *Journal of Nervous and Mental Disease, 1959, 128*, 293-301. Also as Chapter 9 in *G. S. Klein*, 1970.


McGinnies, E. Emotionality and perceptual defense. Psychological Review, 1949, 56, 244-251.


Pine, F. The bearing of psychoanalytic theory on selected issues in research on marginal stimuli. Journal of Nervous and Mental Disease, 1964, 138, 205-222.


I. Room Diagram

E stood here during dart throws

Dart line

96"

S's chair

Table with tachistoscope

E's chair

Dart Board

96"

64"

118"
II. Details of Experimenter-Subject Interactions


When S arrives: "I'm and as you may know this is a study of factors that influence competitive performance. We can begin by your reading this information sheet." [Show S information sheet, have him sign consent form, then say] "In addition to what was described on there, I want to add that the tournament part of the experiment will involve your throwing darts at the dart board up there. Before we get to that, however, let me explain about this equipment here."

Reassurance about tach: "The equipment here is called a tachistoscope, and will be used in the experiment. It can regulate precisely the amount of time a picture or message can be flashed and seen. In this experiment we will be flashing messages or pictures at a speed of four one-thousandths of a second, a speed at which you would probably be aware only of a brief flash or flicker of light. The messages or pictures should register in your mind however, and after the experiment you will have an opportunity to find out about the content of the stimuli you were shown. Do you wear corrective lens for any reason?" [If so, be sure S wears them during tach exposures.]

Questionnaire: "Now I would like you to fill out this questionnaire." [Be sure S includes his mailing address.]

Rorschach Card 4: "Now I am going to show you an ink blot, and I want you to tell me what you imagine you see. There are no right or wrong answers. Different people imagine different kinds of things. If you should see more than one thing in the card, then tell me everything it looks like to you." [Do inquiry as to location only and allow no more than 8 responses.]

TAT Card 7 BM: "Now I am going to show you a picture, and I would like you to make up a story about the picture, having a past, present, and a future or outcome." [Inquire into outcome if not spontaneously given. Inquire if an emotional description is used that is unclear.]

TAT Card 6 BM: "Now I am going to show you another picture, and I would like you to make up a story about the picture, having a past, present, and a future or outcome."

TAT Story (to Card 6 BM) and Recall: "Now I am going to read you a story we made up for the purpose of this experi-
ment about this picture, and I will ask you to recall it back to me after I finish reading it." [Read story.]
"I would like you to recall the story as best you can, and tell it back to me."

Explanation of Tournament: "Okay, now we come to the tournament. As you can see, the top places so far are listed over here. The top three places in the tournament will receive cash prizes of $12, $8 and $5. I am going to have you throw a total of 96 darts. You will throw 12 series of 8 darts, and before each series you will sit down and look into the tach. Your grand score will count in the tournament. Before I give you the instructions about that, why don't you step over there and throw eight practice darts? Stand behind that line and throw all eight darts. Make sure you throw them hard enough so they stick. If a dart doesn't stick in, or if it falls out, your score for that throw will be zero. However, if a dart falls out of the bullseye, it will count as 100 points." [S throws eight darts. After each series of eight darts, return darts to table next to S.]

Tournament Procedure: "Now I want you to sit in that chair and look into the tach. I will be at the controls over here, and I will say 'Ready, set' and then press a button which will produce two flickers of light three seconds apart. After seeing several flashes you will get up, walk to the line, and throw a series of eight darts. Then you will sit down and look into the tach again. In a while, my co-worker will come in and change the cards being put into the tach. That way, neither of us will know exactly what is being shown. If you have any questions, hold them until the end of the experiment, and we can discuss them then. Now, look into the tach. Do you see a red dot? Okay, try to focus on that. During the time we are doing this part of the experiment, try not to blink, and don't look up from the machine. I will show you a set of flashes, wait a few seconds, then show you another set. You will see four sets of flickers in all. Okay. Ready, set . . . " [After first few sets of flashes, ask] "Did you see any flickers? Tell me what you saw." [Then instruct S to just tell you if they don't see any flickers.]

Discrimination Task: [See instruction sheet.]

Debriefing: "We are finished now. As I told you at the beginning, our interest in this experiment was to see whether your dart throwing could be effected by the subliminal messages you were receiving. What we plan to do
at the end of this experiment is to send a letter to all of
our subjects and tell you what the results of the study were.
We will also tell you the exact messages that you sub-
liminally received. We would prefer to wait until every-
body has been run through the study before revealing to
anyone what the subliminal stimuli are. Is that alright
with you?" [If S insists on knowing at this time what the
stimuli are, reveal them to him and ask him to keep this
information secret.] "If you think of any other questions
or have any other concerns related to this study, feel free
to contact me at any time at the number listed on the
scheduling card."
III. Information about "The Effect on Competitive Performance Through Subliminal Presentation of Conflictual and Non-Conflictual Stimuli"

There are many things which affect a person's competitive performance. One important group of factors, we believe, is the way in which people see, and/or remember faint or indistinct experiences. By experimentally studying this group of factors in people involved in competitive situations we hope to better understand how performance may be hindered or improved.

If you decide to participate in this study you will be asked to throw darts at a dartboard, answer some questions, make up short stories, and look at quickly flashed lights which will be words or pictures. From past experience with these or similar procedures we expect no ill effect to you. Also, we expect to learn a great deal about how competitive performance is affected, which, hopefully, will be useful one day in helping people in various realms of endeavor.

You do not have to participate in this study, and if you do agree to participate you can still change your mind at any time and withdraw from this study. Your decision will in no way be held against you. This is simply a research study. All information will remain strictly confidential.
IV. Standard Consent Form

Please Read Carefully Before Signing

I have agreed to participate in the experiment "Tournament" and hereby give my consent to be a subject. The experimenter has explained the procedures of the experiment to me and has described discomforts or inconveniences I may be subjected to, if any. I understand that my responses will be kept in the strictest of confidence and anonymity. I have the option to withdraw from this experiment at any time and I also have the right to request that my responses not be used.

__________________________
Experimenter's Signature

SUBJECT'S SIGNATURES

__________________________

__________________________

__________________________

__________________________

__________________________

__________________________

__________________________

__________________________
V. Priming Questionnaire

Name___________________________________________ Age_____

Address__________________________________________

Level of Education_____G.P.A._____Married?_____Parent_____

Father's Occupation_________Your Occupational Goal_____

By circling the appropriate letter please indicate to what extent you agree or disagree with the statements below.

a) strongly agree  
b) agree  
c) disagree  
d) strongly disagree

A. I am a competitive person.  
   a b c d

B. I would rather be "alone, at the top" than part of the masses.  
   a b c d

C. I have a relatively conflict-free relationship with my mother.  
   a b c d

D. I am close with my mother.  
   a b c d

E. I have a relatively conflict-free relationship with my father.  
   a b c d

F. I am close with my father.  
   a b c d

G. It is difficult for me to be assertive with other people.  
   a b c d

H. I am prone to feel guilty about things more than most people.  
   a b c d

I. Most people would consider my father a success.  
   a b c d

J. I consider my father a success.  
   a b c d
VI. Story for Story Recall
(to Card 6 BM)

(Let S look at card while listening to the story.)

This is a mother and her son standing there in a state of stunned silence. Just moments before, the father was also there, but he has stormed out of the room feeling extremely angry towards his son. They had had a loud argument in which the son told his father that he was no longer competent to run the family business, that he should retire, and that he (the son) should take over. Since the mother plays an important role in the running of the business, this would give the son an opportunity to fulfill a long-harbored secret wish of his: to spend more time with her and enjoy more often the closeness they've shared in the past. In his anger at being criticized by his son, the father ostracized the son and threatened to exclude him altogether from the family business. As he stormed out of the room he cautioned: "Just remember who's still the father around here." The son is now feeling guilty and fears that he may have overstepped his bounds. He is also afraid that he has threatened the closeness which he and his father often experienced together. The mother is torn between her love for her husband and her love for her son.
VII. Discrimination Task

"Okay, there's just one more thing we're going to do. I have two sets of cards here and I want to see whether you can tell them apart when I flash them on at the same speed I did during the experiment. Try as hard as you can because the person who does the best on this will win a $5 cash prize. I am going to show you four pairs of exposures of one set of slides, which will be followed by four pairs of exposures of either the same set or a different set. After the second set of four exposures and after each set after that I want you to tell me whether you think the set you just saw was the same or different than the set right before it. You will be comparing each set of exposures to the set you saw right before it. Okay, now if you would put your eyes up against the viewer, we can get started. During this task, please don't look up; keep your eyes focused into the machine. Here's four exposures of the first set (exposures). Now I'm going to show you four more exposures of either the same or a different set. Just say 'same' or 'different' to indicate what you think (exposures). Now for another four exposures and tell me if they are the same as or different than the one you just saw (exposures)." Continue, following the order of trials in column I below.

"Now we're going to do the same thing with another two sets of cards. Here are four exposures of the first set (exposures). Now here are four exposures of another set and like before you say 'same' or 'different' (exposures)." Follow the order of trials in column II below.

Give the ten trials in column I utilizing the BEATING DAD IS OK and BEATING DAD IS WRONG stimuli pairs. Then give the ten trials in column II utilizing the PEOPLE ARE WALKING and one of the additional critical stimuli pairs (e.g., YOU DO OK stimuli pair). Be sure to show both the verbal and the pictorial stimuli for each set of exposures.

N.B. When you put in the same stimulus be sure to pull it out of the chamber and put it in again so that S is not cued by the sound of what you are doing as to whether the next exposures will be "same" or "different." Also, attempt to shield the pictorial stimuli from S's view when putting it into the booth.
I
S___
D___
D___
S___
S___
S___
D___
D___
D___
S___
D___

II
D___
S___
S___
D___
D___
D___
S___
S___
S___
D___
S___
APPENDIX B
BEATING DAD IS O.K.
BEATING DAD IS WRONG
PEOPLE ARE SITTING
PEOPLE ARE STANDING
APPENDIX C
WINNING DARTS IS O.K.
WINNING DARTS IS WRONG
YOU DO
O.K.
YOU DO
WRONG
PEOPLE ARE THINKING
PEOPLE ARE TALKING
PEOPLE ARE LOOKING
PEOPLE ARE WALKING
The thesis submitted by Robert Swanson has been read and approved by the following committee:

Dr. Mark S. Mayzner, Director
Professor, Psychology, Loyola

Dr. Alan S. DeWolfe
Professor, Psychology, Loyola

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.

Date: July 20, 1979

Director's Signature