AN EXAMINATION OF THE PERCEPTUAL ASYMMETRIES OF DEPRESSED PERSONS AS MEDIATED BY HYPNOSIS

DISSERTATION

Presented to the Graduate Council of the
North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

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August, 1986

Wilson, Lucy Erma, *An Examination of the Perceptual Asymmetries of Depressed Persons as Mediated by Hypnosis*. Doctor of Philosophy (Counseling Psychology), August, 1986, 70 pp., 16 tables, 1 figure, references, 69 titles.

This study evaluated the role of asymmetric processing of information in depression. Depression has been hypothesized to involve a deficit in the global processing of information (Tucker, 1982). This type of global processing has been manipulated through the use of hypnosis by Crawford and Allen (1983). In the current study, a 3 x 2 ANCOVA design allowed the comparison of three groups of subjects on their performance on a perceptual task measuring global perception. The task chosen was designed by Navon (1977) and consisted of designs which differed on global or local features. The groups were screened with the Beck Depression Inventory, the Harvard Group Scale of Hypnotic Susceptibility, and the Edinburgh Handedness Inventory, yielding 46 subjects divided into three groups of right-handed males and females. The experimental group consisted of high susceptible depressives from the community. The controls were one group of high susceptible normals and one of low susceptible depressives. All groups performed the Navon task under both waking and hypnosis conditions. Analysis of the results revealed a main effect for group ($F(2, 86) = 9.60$, $p < .01$) on the global scores. In addition, high social desirability scores predicted slower presentation times. However, hypnosis was not effective in creating a significant change in performance on the dependent measure. The results are discussed as support for the hypothesized differences between depressives and normals. Differences between the measures used in the present study and that of Crawford and Allen suggest that hypnosis may mediate imagery at a conceptual level but not at the level of the primary visual-perceptual system.

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AN EXAMINATION OF THE PERCEPTUAL ASYMMETRIES OF DEPRESSED PERSONS AS MEDIATED BY HYPNOSIS

The word depression conjures up images of an overwhelming state which pervades every part of one's life. Striking for a few hours, or for years, depression can result in multiple problem areas through its effect on emotions, cognitions, and even the chemical balance of the body. Depression's pervasive nature has guaranteed that no one simple and straightforward answer will be found. Research focusing on the descriptive or explanatory level has been approached from several directions. Each of the systems involved in depression has been the focus: the emotional, the cognitive, the behavioral, and the physical. This study concentrated on an examination of the cognitive system, specifically, the process of dealing with incoming information. Manipulation of the type of processing of information was accomplished through a hypnotic induction.

The pervasiveness of the disorder has been related to both the overwhelming symptom complex as well as the high incidence of depression. One report estimated that 75 percent of all psychiatric hospitalizations are for depression and that 15 percent of adults between the ages of 18 and 74 will suffer depression in any given year (Secunda, Katz, Friedman, & Schuyler, 1973). Schuyler and Katz (1973) estimated that 12 percent of the adult population will suffer depression significant enough to seek treatment. In addition, no age group has been immune to depression; it strikes children as well as the elderly.

The DSM-III described the principle feature of a major depressive disorder as loss of interest or pleasure in usual activities. Other symptoms noted include disturbances in behavior such as loss of appetite, insomnia or hypersomnia, and psychomotor agitation or retardation. Cognitive system disturbances are manifested in thoughts of worthlessness, guilt, suicide, slowed thinking, and difficulty in concentrating. Affective problems were described as an omnipresent sadness and feelings of loss and hopelessness, often accompanied by extreme and irrational anxiety (American Psychiatric Association, 1980).

Placing primary emphasis on the behavioral aspect has been one approach to the study of depression. Lewinsohn (1974), a pioneer in this field, has approached depression through his descriptions and treatment paradigms, as has Seligman in his development of the learned helplessness syndrome (Seligman, 1975). Essentially, behavioral theorists have viewed depression as the result of a series of learned behaviors. These behaviors are conceptualized as being maintained through the law of effect (McLean, Ogden, & Gruer, 1982).

Biological theories of depression have focused on the physical components of depression such as fatigue, confusion, and sleep disturbances. Work in this area has led to the discovery of chemical imbalances in depressed persons (Carlson, 1980). While a specific system has not been identified conclusively, both the noradrenergic and serotenergic neurotransmitter systems seem to be involved. Moreover, there has been some speculation that another neurotransmitter, histamine, is also involved in modulating mood changes in affective disorder.

Affective theories of depression have concentrated on the predominance of sadness and expression of anger targeted inward. These theories hypothesized early losses could lead to a predisposition to react strongly to losses later in life. Instead of experiencing a natural grief process, the depressed person has been seen as unable to acknowledge the anger at the loss and turns this anger inward, leading to the self-destructiveness characteristic of depression. The exaggerated reaction to the loss, whether real or imagined, amplifies the sad feelings which would be a natural reaction to any loss (Gendlin, 1979; Janov, 1971; Mendel, 1970; Rogers, 1979).

Finally, cognitive theories of depression have placed primary importance on the negative cognitions present in the disorder. Beck (1967) introduced a theory and treatment of depression which highlighted the role of thinking in creating and maintaining depression. Beck found that depressed people tended to have a preponderance of negative thoughts that revolved around what he called the negative triad: oneself, one's future, and one's world. Certain patterns of beliefs, or schemas, have been hypothesized to underlie the negative thoughts.

Each of the theories introduced has allowed for the presence of symptoms in all of the other systems described. However, each has made the assumption that one system is primary and symptoms or changes in the others will follow from working with one primary system. This study was designed to perform an examination of one aspect of the cognitive system involved in depression, without making any claims as to the primacy of cognitions or the lack of importance of the other theories.

Cognitive Processing

Much of the recent work on depression has served to elucidate the role of cognition in influencing the depressed person (Beck, 1976; Beck, Rush, Shaw & Emery, 1979). Generally, however, work has focused on the contents of the cognitions. Some of the questions which have not been so thoroughly investigated revolve around the process of the cognitions. That is, whether depressives process information differently than normals.

Some theorists have hypothesized that people process information differently (Tucker, 1981). One of the ways to conceptualize individual differences has been to focus on the different cognitive strategies used in processing information. The process of dealing with incoming information according to differential strategies has been useful as a way of differentiating groups. In speculating about the individual differences involved in depression, it may be possible that the processing of information could be used to maintain a depressed state. For example, if a depressed person has been ruminating over negative self-thoughts, some types of information processing could serve to perpetuate the negative thoughts through a very focused attention to these thoughts, rather than taking in new and perhaps distracting information (Beck et al., 1979).

Cognitive processing in the research literature has often been presented as belonging to dichotomous categories, even though the defining characteristics of these categories seem to have changed with some researchers. Thus, Bogen's (1969) work described a right vs. left hemisphericity, Levy (1969) proposed synthetic vs. analytic, and Ornstein (1972) differentiated holistic and intuitive from logical and rational. Although each investigator has developed different classifications, most have agreed on the existence and utility of the dichotomies.

Navon (1977) applied the concepts of analytic versus global to characterize the process of visual discrimination. Analytic was defined as a processing of information bit by bit, concentrating on the separate details of a situation to form a conclusion. Global processing was described as taking in a large range of information at once, perceiving the whole of the situation. Forming a mental image of a complete picture and comparing it to another complete picture would be an example of a global strategy. Comparing small details back and forth between the pictures would be an example of an analytic focus. Navon (1977) tested the hypothesis that perceptions initially focus at a global level and then proceed to a more detailed analysis. His work involved visual discrimination tasks with various forms of target and probe stimuli. The results confirmed the hypothesis that global precedence is an inherent property of visual perception through the finding that gross differences were detected more quickly than detailed ones. In summary, Navon provided groundwork in this area as well as useful measures for determining the type of cognitive processing. However, caution must be used when generalizing from the level of immediate visual perception to a more general style of processing complex information.

Sergent's (1982, 1984) work has concentrated on the cooperative nature of the hemispheres in processing information. She designed a series of studies to test the hypothesis that the right hemisphere is not solely responsible for spatial processing. Instead, the left hemisphere contributes by providing a different kind of processing skill; namely a top-to-bottom sequential analysis of spatial configurations. The right hemisphere performs a gross analysis which is superior for less detailed shapes or those whose characteristics include low or distorted spatial-frequency components.

Her work tested this hypothesis by showing subjects pairs of faces which differed on one or a combination of features such as eyes, hair, ears, or jaw. When the faces differed only on the hair feature, subjects were faster using the right visual field (left hemisphere). However, when the faces differed on other features or were the same, the left visual field (right hemisphere) outperformed the RVF. Sergent's work thus provided an expansion of Navon's by determining that each hemisphere was responsible for performing different, yet cooperative types of visual processing. However, her work differs in postulating different types of processing.

Tucker and Williamson (1984) proposed a theory of individual differences in cognitive processing based on asymmetric neural control systems for human self-regulation. They built this proposal upon the foundation of Pribram and McGuinness's (1975) attentional control theory, which suggested two systems for human self-regulation. One of these is an arousal system mediated through predominantly norepinephrine pathways. The other is an activation system mediated through dopaminergic pathways. The arousal system is responsible for regulating the organisms' perception of novel environmental stimuli through habituation. Were it not for this system and its control, the organism would be flooded with an overabundance of novel, distracting, and ultimately, memory-draining information. Therefore, this system must be able to scan the stimulus field rapidly while taking in large amounts of information and habituating to those bits which are no longer novel.

On the other hand, the activation system is responsible for a tonic muscle preparedness which enables the organism to respond to the novel stimulus. The result is a vigilant, active attention control. However, activation is not simply an increase or decrease in muscle activity, rather it is the tight, sequential control of muscle movements. An absence of this system would lead to random, repetitive, and undirected motor movements.

Tucker and Williamson's (1984) expansion of the Pribram and McGuinness (1975) work focused on the hemispheric asymmetries of these systems. They contended the arousal system, based in the right hemisphere, leads to that hemisphere's capacity to perform global cognitive operations. The need to maintain a phasic state of arousal to the environment leads to the capacity to process information quickly and globally. Conversely, the left hemisphere's specialization in a tonic muscular readiness necessitates a more detailed and sequential focus. The two systems thus work in tandem to regulate the organism's orientation and subsequent response to the environment.

Cognition and Depression

Even though it has been postulated that any one individual has the flexibility to use either type of processing, it also appears that individuals show characteristic preferences for one (Levy, Heller, Banich, & Burton, 1983). However, even with characteristic preferences, it is possible that the kind of task may interact with the preferred type of processing by calling for a more global or analytic processing under specific conditions. Such interactions have not been clarified at this point. Nevertheless, the important finding for the present study has been that although individuals can use more than one processing mode, they also show characteristic and stable preferences for specific modes of information processing (Levy et al., 1983).

Cognitive processing in depressed persons has been hypothesized to take on a unique complexion. Research has indicated that depressives are able to use analytic strategies adequately, but fail to utilize global ones when necessary (Tucker, 1981). Overall, this leads to a deficit in global and subsequent overdependence on analytic processing.

Studies from the fields of cognition, neuropsychology, and perception all contributed to our understanding of this phenomenon. In the field of cognition, Tyler and Tucker (1982) conducted an experiment using subjects with either high or low trait anxiety. Since trait anxiety shares a significant correlation with depression, the results of their study could have implications for depression. The authors used Navon's design discrimination task to measure the style of cognitive processing under high and low stress conditions. Navon's task consisted of a same-different discrimination of visually presented triangles. The triangles differed on either a global or analytic basis, yielding a measure of the cognitive style used to perform the discrimination. Tyler and Tucker found that high trait anxious subjects tended to use analytic strategies in processing Navon's task. Moreover, when asked to perform right hemisphere tasks under an induced stress condition, the high trait anxious subjects were not as accurate as under a low stress condition. This suggests that an increase in anxiety may have hindered the use of global processing skills, since tasks specialized to the right hemisphere are more likely to require the use of global analysis (Levy, 1979; Tucker, 1976). The relationship between anxiety and depression suggests that similar results may be found with depressives.

Tucker and his associates furthered the investigation of pathological states and hemispheric asymmetries by using college students identified as depressed on the Multiple

Affect Adjective Checklist (Tucker, Stenslie, Roth & Shearer, 1981). Using Betts' imagery scale, they found that the students who described themselves as depressed also reported low vividness in imaging various scenes. Imagery has also been shown to be lateralized to the right hemisphere and hypothesized as using global strategies (Morgan, McDonald, and McDonald, 1971). Morgan's conclusions thus supported Tucker's hypothesized relationship between deficits in global processing and depression.

Tucker has also extended this work to normal subjects. Tucker, Stenslie, Roth, and Shearer (1981) induced depression and euphoria in college students. The pattern of results resembled the work with trait anxious students in that the depressed condition resulted in lowered performance on the right hemisphere tasks. This study did not employ the same design as Tyler and Tucker (1982) nor Navon's measure perceptual processing. It would have been interesting to have had the same measure used for both depressed and anxious subjects. Since they did not, however, the possibility of finding similar results for depressed and anxious subjects has remained only a strong speculation.

Hemisphericity, Cognition, and Depression

Another set of evidence for the concept of global processing deficits in depressives deals with physiological hemisphere. Although it is not possible to make direct conclusions from physiological evidence to cognitive events, the connection between cognitive tasks and hemispheric arousal can be inferred. In the study mentioned previously, Tucker et al. (1981) measured hemispheric activation in the college students while under different moods. They found differential patterns of electroencephalographic (EEG) activation dependent on the induced mood. These results were interpreted as indicating that cognitive tasks and affect covary with hemispheric activation.

Levy et al. (1983) conducted a study to determine a possible explanation for the inconsistencies researchers in the hemispheric laterality field had found. Although they used only normal subjects, the results have some implications for depressives and their reliance on analytic processing. They hypothesized that handedness, which was previously considered an accurate predictor of dominance, is actually not an accurate reflection of hemispheric dominance. Instead, they hypothesized that even righthanders may differ in their degree of hemispheric dominance. Moreover, they postulated a model of hemispheric dominance based on the degree of hemispheric arousal. Using a free vision test, they demonstrated that the righthanders could be differentiated on the basis of the strength of the ratio of right to left hemisphere arousal. They then divided the subjects into two groups: those who showed strong left hemisphere preference vs. those who showed little or no asymmetrical left hemisphere preference. A nonsense syllable task was then administered and several differences between the groups resulted.

The finding that had implications for this study was that subjects in the strong asymmetry group reported a significant negative bias in self-estimates of their performance on the task. The negative self-estimates were in contrast to the fact that the groups showed no difference in their performances on the task. This finding seemed especially interesting in light of the fact that depressives also tend to have negative beliefs about their performance. Although the connection between degree of hemispheric arousal and negative estimates of performance has not been clarified, it is possible that the left hemisphere's mode of analytic processing contributes to negative bias. This could certainly contribute to depressive's negative view of self and the world.

The tie between right hemisphere activation and global processing has given further weight to the literature demonstrating right hemisphere deficits in depressives. Flor-Henry's (1974, 1976; Gruzelier & Flor-Henry, 1979) pioneering work in this area was some of the first to identify specific neurological deficits with psychological disorders. Goldstein, Filskov, Weaver, and Ives (1977) administered the Halstead-Reitan neuropsychological test battery to clinically depressed patients who were scheduled to receive electroconvulsive therapy (ECT). They found a pattern of results which indicated a right hemisphere deficit.

A more elaborate study by Kronfol, Hamsher, Digre, and Waziri (1978) consisted of administration of a battery of neuropsychological tests to clinically depressed patients. When comparing the results of the tests after these patients had received ECT, they discovered an improvement in right hemisphere functioning after treatment.

If right hemisphere deficits are responsible for depression, then perhaps unilateral right hemisphere ECT would be more effective in alleviating depression than bilateral or unilateral left hemisphere ECT. Cohen, Penick, and Tarter (1974) compared equivalent groups of depressed patients who received either right or left unilateral ECT and found the right ECT was effective in alleviating the depression while the left ECT actually worsened the symptoms.

Research in perception has also suggested that depressives rely on less right hemisphere capacity when responding to stimuli. One area of work has used measurement of the direction of conjugate lateral eye movements. Depressives tended to look to the right when answering questions, indicating left hemisphere activation. However, hysterics were more likely to look to the left, indicating more right hemisphere activation (Gur & Reyher, 1976; Sackheim & Gur, 1978; Shapiro, 1965; Smokler & Shevrin, 1979; Yozawitz & Bruder, 1979).

The conclusions drawn from the research on depression and right hemisphere deficits lend support to the central thesis of this study. Although caution must be taken when attempting to directly connect physiological systems with cognitive tasks, the consistent covarying of hemispheric arousal and cognitive tasks in the studies mentioned did offer evidence to suggest some implications for this study. Specifically, depressives have demonstrated consistent deficits in right hemisphere activation as measured by EEG and these deficits were reduced by electroconvulsive shock. In addition, ECT was more effective when applied to the right hemisphere than both left and right hemispheres. This suggested that it was the change in the activation of the right hemisphere that was responsible for the alleviation of the depression. Furthermore, performance on tasks which have been shown to be specialized to the right hemisphere also improved after unilateral right hemisphere ECT. This finding strengthened the case for the tie between hemispheric activation and cognitive task performance (Cohen et al., 1974).

Since global processing has been conceptualized as being lateralized to the right hemisphere, the evidence indicating right hemisphere deficits in depressives supported the hypothesis that depressives demonstrate lowered global processing. The question this study pursued was whether treatments other than ECT can create a change in global processing.

<u>Hypnosis</u>

Although exaggerated claims regarding the use of hypnosis for treating every malady known have prejudiced many professionals against its use, careful study has revealed that while hypnosis may not be appropriate for all things, it is useful and effective in many cases (Kroger & Fezler, 1976). One of the conditions which has been well documented is the application of hypnosis to alter mood states. These states include happiness, anger, fear, sadness, and anxiety (Damaser, Shor, & Orne, 1963; Levitt, Persky, & Brady, 1967). Furthermore, the successful manipulation of mood has allowed research to delve into the effect of mood on other psychological processes, such as learning and memory (Gilligan, 1982).

Some of the first experimental work in this area involved the production of anxiety using direct suggestion through hypnotic induction (Branca & Podolnick, 1961; Levitt et al., 1967; Milechin, 1957). Measurement of anxiety was confirmed through the use of various indexes such as the Rorschach, TAT, Taylor Manifest Anxiety Scale, heart rate, electrodermal response, and respiration.

Damaser, Shor, and Orne (1963) demonstrated an ability for hypnotized subjects to manipulate physiological variables (e.g. GSR and heart rate) similarly to subjects experiencing the same emotions. Included in their study were the emotional states of fear, calmness, happiness and depression. Zimbardo, Marshall, and Maslach (1971) were able to produce affective states through a hypnotic induction. Dudley, Holmes, Martin, and Ripley (1964) measured increases in respiration associated with suggestions of anger and anxiety while hypnotized, as did Hepps and Brady (1967). The production of sadness while under hypnosis also resulted in changes in heart rate, muscular activity, palmar skin resistance, and gastric secretions (Kehoe & Ironside, 1964; Martin & Grosz, 1964).

Hypnosis and Cognition

If hypnosis is successful in manipulating mood states, perhaps it might also serve as a means of influencing the psychological process of cognition. Several theoretical formulations of the hypnotic experience focus on the cognitive component. Sarbin and Coe (1972) hypothesize that it involves "as if" behavior, Hilgard (1977) speaks of a dissociative process that involves a shift in cognitive control systems, while several researchers conclude that it involves the use of right hemisphere and global processes (Bakan, 1969; Frumpkin, Ripley, & Cox, 1978; Graham & Pernicano, 1979; McLeod-Morgan, 1982).

Crawford and her colleagues have been researching the cognitive component in hypnosis for several years. Crawford and Allen (1983) focused on the use of visual imagery as well as global and analytic processing in and out of the hypnotic state. Part of their interest was in determining any possible interaction of state (hypnosis vs. waking) and trait (high vs. low susceptibles). Their concern with visual imagery led to the selection of a visual discrimination task as the dependent measure. Simultaneous or sequential presentation of pairs of complex visual scenes were presented on cards for the subjects to discriminate. The task was performed under both waking and hypnosis conditions. To identify the cognitive strategy used by the subject in the discrimination, a posttest questioning by the examiner probed for a self-report description by the subject. Correlations performed between independent judges' ratings of type of processing and subjects' self-report of style were high. The results showed that high susceptible and low susceptible subjects both preferred analytic processing in a waking state, but that the high susceptible subjects reported a greater amount of global processing while under the hypnosis condition. The authors proposed that their results support the hypothesis that hypnosis facilitates global processing. Although Crawford and Allen (1983) used only normal subjects, their findings that hypnosis facilitated global processing suggested the possibility of similar findings with depressives.

Another set of research which has examined cognitive processing in hypnosis has been two studies by Ingram, Sacuzzo, McNeill, and McDonald (1979) and Sacuzzo, Safran, Anderson, and McNeill (1982). Using an information processing paradigm to measure the speed of processing, they discovered that high susceptible subjects were faster than low susceptible subjects. Although Crawford and Allen's (1983) study employed a longer time span, their high susceptible subjects also displayed significantly faster reaction times than the low susceptible subjects.

Navon's (1977) speculations on the nature and utility of each type of processing may have some utility in explaining these findings. Navon hypothesized that global processing has an advantage over analytic processing in the initial stages of perception. Arguing that the use of a global strategy allows for the rapid intake and evaluation of incoming information, Navon saw the two strategies as working in concert. The early global processing of information allowed for a rapid reaction, with more detailed analysis following when needed. It may be that the global processing component in hypnosis allowed the high susceptible subjects in the above studies to process information more quickly. While these conclusions do not directly relate to the concept of perceptual asymmetries in depression, they have supported the hypothesized link between global processing and hypnosis and led to the conclusion that hypnosis may be useful as a mediator of cognitive processing in depressives.

Rationale for the Present Study

The speculations in this study rested on several points. Evidence has been presented that hypnosis can affect cognitive processing. The specific manner in which hypnosis influences cognitive processing is through an increase in global processing as demonstrated by Crawford & Allen (1983). That depression involves a deficit in global processing has been suggested by the work of Tucker and his associates (1976, 1981, 1982), as well as the physiological evidence with clinical populations of depressives (Cohen et al., 1974; Kronfol et al., 1978).

Studies exploring cognition and depression have been quite successful in linking depression to a deficit in global processing and a concomitant reliance on an analytic mode of processing incoming information. The accompanying literature which might establish some connection between the cognitive components of depression and hypnosis has been sparser. Tucker et al. (1981) were able, however, to demonstrate a decrease in right hemisphere activation during a hypnotically-induced depressed mood. The task remains to investigate the global processing of depressed individuals while experiencing hypnosis.

This study attempted to contribute to the understanding of depression through the elaboration of one system involved in depression - the cognitive system. Moreover, the approach to that cognitive system was not through the content of cognitions, but through the cognitive processing of information. Specifically, the purpose of the study was to investigate the question of whether global processing can be increased in depressives through the use of hypnosis.

That depression involves a distortion of incoming information has been postulated by Beck et al. (1979). It may be that the way in which the depressives processed that information was responsible for the distortion.

Navon defined global processing as using a larger field of information to be considered in making a judgment, while analytic processing considers only focal details of the incoming information. An overreliance on analytic processing may lead the depressed person to remain entrenched in cognitive patterns through having limited new information. Even though information which would dispute negative self-thoughts might be available at any time, the preponderance of analytic processing may have affected the depressive's ability to attend to that contradictory information. Instead, being focused only on a certain portion or kind of information leads to a perpetual circle of negative thoughts. If an increase in global processing allowed depressives to consider a wider range of information, a change in patterns of thoughts might follow.

The design of this study was based on elements found in the work of Navon (1977) as well as Crawford and Allen (1983). Specifically, Navon's work contributed an objective measure of cognitive processing, while Crawford and Allen's study contributed to the selection of groups and procedure. Crawford and Allen's design allowed the investigation of cognitive strategy as a function of hypnotizability and hypnotic condition. However, they did not consider special populations such as depressives. The current study proposed to examine the effects of hypnotic condition on the cognitive processing of depressed individuals through the comparison. Moreover, to insure comparability with the Crawford study, a group of high susceptible, non-depressed subjects will also be compared with a group of low susceptible, non-depressed subjects. Performance on the Navon task will also be the basis of this comparison.

Hypotheses

I. High susceptible, depressed subjects will show no difference on global processing in the hypnosis condition, as compared to high susceptible, non-depressed subjects.

II. The depressed subjects will show less global processing than non-depressed subjects when compared in the waking condition.

III. In the hypnotic condition, depressed and non-depressed high susceptible subjects will show greater global processing than in the waking state.

IV. Low susceptible subjects will show less global processing as compared to high susceptible depressed and non-depressed subjects when in the hypnosis condition.

Method

Subjects

The subjects for this study answered the following advertisement in the St. Francis Methodist Church bulletin or the faculty-staff newsletter of the University of Arizona Health Science Center.

> HYPNOSIS AND DEPRESSION STUDY: I am a psychology intern conducting research into the effects of hypnosis and depression for my doctoral dissertation. This study requires both depressed and non-depressed participants; however, only right-handed persons are eligible. Most people find this experience quite enjoyable and interesting. If you would like to volunteer for 1 to 3 hours, please call Lucy Wilson at 742-6963.

The sample included 25 men and 21 women ranging in age from 22 to 65 with a mean age of 44. All subjects participated in group administrations of the Harvard Group Scale of

Hypnotic Susceptibility, Form A (Shor & Orne, 1962) and the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).

Measures

Beck Depression Inventory (BDI). The BDI is a 25 item multiple choice scale designed to measure depression. Validation has included comparison with the depression scale of the MMPI as well as clinically depressed psychiatric inpatients and outpatients, yielding a correlation of .67 with psychiatrists' ratings (Beck, 1976). Moreover, reliability has been demonstrated and the BDI is commonly used for research with depressed populations (Beck, 1976; Beck et al., 1979). Bumberry, Oliver, and McClure (1978) validated the BDI on a college student population, establishing a cutoff score of 10 as indicative of mild depression. The conservative use of 13 as the cutoff for this study insured the presence of depression in the subjects.

Crowne-Marlowe Social Desirability Scale (CMSDS). Since this study employed several self-report measures to screen the subjects, a social desirability index was included to control for any influence of response desirability. Reliability and validity have been established with the MMPI validity scales and the Edwards Social Desirability Scale (Crowne & Marlowe, 1960). The test-retest correlation was established at .89, as well as a correlation .54 with the

MMPI L scale. This scale measures the subjects' tendency to respond in socially desirable ways, rather than the attempt to hide psychopathology measured by the MMPI.

Edinburgh Inventory. This inventory provides a measure of handedness by questioning one's hand preference for performing activities such as writing, throwing, and using scissors. This yields a decile score which was normed on a population of 1,128 college students (Oldfield, 1971).

Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A). The HGSHS:A was designed to allow group testing of hypnotic susceptibility and was based on the Stanford Hypnotic Susceptibility Scale, Form A (Weitzenhoffer & Hilgard, 1959). Scores on the scale range from 0 to 12, with 0 to 5 indicating low susceptibility, 6 to 7 moderate, and 8 to 12 high susceptibility. Both reliability and validity have been established (Bentler & Hilgard, 1963). Laurence and Perry (1982) conducted a comparison of 535 students with the data from Shor and Orne's (1962) original normative sample. They found correlations ranging from .76 to .85.

Long Stanford Depth Scale. The Stanford Depth Scale is designed as a measure of the depth of trance by the subject while under hypnosis. The subject is taught to assign a number from one to ten to his level of trance, with one being not at all hypnotized to ten being as deeply hypnotized as possible. This provides a check on the state of the subject and is significantly correlated with both the Field Inventory of Hypnotic Depth (.79) and the Stanford Hypnotic Susceptibility Scale (.72; Tart, 1970; 1978)

State-Trait Anxiety Inventory (STAI). Spielberger's anxiety inventory is divided into two 20 item scales. One scale is designed to measure a generalized trait of anxiety which is characteristic of a persons functioning over an extended time period. The state scale measures heightened arousal in the individual as experienced at the time of the test administration. Validity and reliability have been established (Spielberger, Gorsuch, & Lushene, 1970). This measure was included in the study in order to test whether subjects scoring high on the depression scale would also do so on an anxiety scale, allowing an adequate comparison with Tyler and Tucker's (1982) work.

Navon Design Discrimination Test. Navon (1977) designed a visual discrimination task consisting of a series of triangles which can differ on either a global or analytic dimension (see Figure 1). Each large triangle consisted of nine squares grouped in three clusters of three squares each. Each cluster of three squares forms a small triangle and also serves as one of the points of the large triangle.

The arrangement of the small triangles was varied such that they could point either up, down, left or right. However, all of the small triangles within a given large triangle pointed in the same direction and formed what was called the local, or analytic, arrangement. The large called the local, or analytic, arrangement. The large triangles comprised the global pattern and could also be manipulated in such a way that they could point in either of the four directions. Thus, the various combinations of small and large triangles yielded a total of 16 patterns, any pair of which could be the same or differ on either the global or analytic dimension.

Presentation of the designs was in pairs. A masking stimulus of random squares, designed to disrupt the retinal afterimage of the target, preceded and followed the target stimulus for 200 milliseconds. The probe stimulus followed the mask, at which time the subject responded with an answer of same or different. Presentation times were varied from 100 to 550 msec to produce an overall accuracy for each subject between 70 and 80 percent. Scores were obtained by assigning a value of one to each correct different response. The total correct of the analytically different pairs resulted in an analytic score. The total correct of the discriminations based on pairs which differed along the global dimension yielded the global score. An overall ratio was computed by subtracting the global score from the analytic and dividing by the sum of the two scores (A-G/A+G).

Apparatus

The Navon task was performed with the use of a Radio Shack TRS-80 Color Computer II, using the Extended Basic software. This included both assembly language and graphics capabilities, enabling it to present the designs (see Appendix B for program). A black and white, 12 inch screen television from Montgomery Ward was used in conjunction with the computer to display the designs. The subjects were seated 90 centimeters in front of the screen.

Procedure

All of the subjects participating in this study were given an informed consent to sign and included in a group screening with the HGSHS:A and the Beck. Scores on these instruments resulted in placement in one of three groups: 1. low susceptible non-depressed (LND), 2. high susceptible non-depressed (HND), and 3. high susceptible depressed (HD). Subjects scoring 13 or above on the Beck were assigned to depressed group while subjects with scores below 10 were placed in the non-depressed groups. Scores of 8 and above on the HGSHS:A resulted in assignment to the high susceptible groups, while scores of 4 and below led to placement in the low susceptible group. After the subjects were screened with the BDI and the HGSHS:A and assigned to their respective groups, an appointment was made for the testing session over the telephone. All subjects were tested under both waking and hypnosis conditions. The order of the conditions was counterbalanced to check for any order effects, so that half of the subjects in each group experienced the hypnosis condition first and half the waking.

When the subjects arrived for their appointment, they were ushered into an 8 x 8 foot room. They were seated in a straightback chair facing a desk, upon which was placed the computer keyboard and screen. After being welcomed, the remaining inventories (STAI, CMSDS, and the Edinburgh) were administered. All subjects received instructions and a demonstration of the Navon, followed by the pretesting to establish the appropriate presentation time. Subjects who were assigned to the hypnosis condition were then led through a hypnotic induction procedure similar to Gilligan's (Appendix D). After achieving trance, the subjects were asked to rate their trance by using the Long Stanford Depth Scale. They were then allowed to practice maintaining their state while opening and closing their eyes. This was done to insure uniformity of trance while performing the experimental task. Additionally, they rated their trance after each block of the experimental task.

The subjects performed the task while seated in a chair 90 centimeters in front of the computer screen. They were required only to answer same or different in response to each pair of pictures presented, while the experimenter recorded their answers. The designs were presented in blocks of 16 trials each. Pretesting was done on each subject to determine the appropriate timing of the presentation of the designs. This was accomplished by varying the speed of presentation until the subject was able to identify 70 to 80 percent of the discriminations correctly. At that time, the hypnotic trance was strengthened by reading over a portion of the induction material. The experimental task of four blocks of 16 trials was then administered. Within each block, 50 percent of the designs were the same, 25 percent differed on the global dimension and 25 percent differed on the analytic dimension.

When the hypnosis procedure was finished, the subjects were brought out of trance. After being given a few minutes to insure that the subjects were no longer in trance, the experiment was repeated without the hypnotic induction. For the subjects who experienced the waking condition and then the hypnosis condition, the experimental tasks and procedures were exactly the same except for the order of the conditions. The subjects were then thanked for their participation and dismissed.

Statistical Analysis

Four independent 3 x 2 analyses of covariance were performed. The dependent variables used were the ratio, global total, analytic total and presentation times on the Navon Design Discrimination task. The groups were low susceptible non-depressed, high susceptible non-depressed, and high susceptible depressed, compared on the dimension of waking vs. hypnosis conditions. The use of an ANCOVA procedure allowed for reduction of within subject variability while also reducing variability due to social desirability response set.

Results

In the initial analysis, the Navon ratio, global total, analytic total and time of presentation were used as dependent measures. Since social desirability correlated significantly with both time (r = .25, p < .05) and Navon score (r = .28, p < .05) in the hypnosis condition, an analysis of covariance was performed to remove the effect of the social desirability scores. For the Navon ratio score, a significant main effect for group was found with this analysis ($F(2,85) = 6.32$, p < .05). The same analysis was then performed on the simple totals of global and analytic correct. This yielded a main effect for group with the global scores ($F(2,85) = 9.598$, p < .05). However, the analytic scores did not produce any significant main effects (see Table 5). In addition, there were no significant main effects for the dependent measure of presentation time. No significant interactions or effects of condition existed for any of the dependent measures.

Post hoc analysis of the groups using the Tukey-HSD procedure revealed the significant differences to be between groups 2 and 3 for both the ratio (Means = .05, .31, p<.05) and global (Means = 10.25, 6.71, p < .05) scores. Group 2 equals high susceptible non-depressed; group 3 equals high susceptible depressed (Table 1).

Table 1

Ms and SDs of Dependent Variables by Group

Variable	Group 1	Group 2	Group 2
Navon ratio			
M	.19	.05	.31
SD	.33	.48	.40
Navon global			
M	8.65	10.25	6.71
SD	4.15	4.66	4.12
Navon analytic			
M	11.73	10.47	11.97
SD	3.44	5.99	3.35
Presentation time			
M	265.85	282.19	274.88
SD	88.09	61.37	100.89

Note. Group 1 = Low susceptible, non-depressed.
Group 2 = High susceptible, non-depressed.
Group 3 = High susceptible, depressed.

Table 2

Order of Presentation Effects

Variable	M	SD	df	*t*
Ratio				
group 1	.23	.44		
group 2	.12	.42	44	.80
Analytic				
group 1	11.91	3.61		
group 2	11.53	4.01	44	.32
Global				
group 1	8.06	4.79		
group 2	9.11	4.21	44	-.79
Time				
group 1	294.82	99.52		
group 2	248.53	79.85	44	1.82

Note. Group 1 = hypnosis condition first.
Group 2 = waking condition first.

Several analyses were performed to determine the effects of order, fatigue, practice, and sex (see table 2). These yielded negative results with one exception. Women performed faster than men in both conditions; however, this difference was significant only in the hypnosis condition, t (44) = 2.30, $p < .05$ (see table 3).

Table 3

Effects of Sex by Condition

Variable	M	SD	df	t
Ratio				
hypnosis				
male	.05	.43		
female	.27	.44	44	-1.64
waking				
male	.13	.39		
female	.32	.44	44	-1.51
Global				
hypnosis				
male	9.52	3.97		
female	8.00	5.23	44	1.12
waking				
male	8.72	3.85		
female	7.48	5.18	44	.93
Analytic				
hypnosis				
male	10.64	4.15		
female	12.57	3.44	44	-1.70
waking				
male	11.24	3.97		
female	12.86	2.90	44	-1.55
Time				
hypnosis				
male	308.88	112.05		
female	243.91	71.05	44	2.30*
waking				
male	290.76	94.24		
female	246.43	75.581	44	1.74

$p < .05$

Several planned correlations were performed to examine relationships among the variables. First, the relationship between the two dependent measures of presentation time and Navon global total yielded significant correlations. This was true for the hypnosis condition, $r = -.37$, $p < .01$, as well as the waking condition, $r = -.53$, $p < .001$. The analytic total also correlated significantly with presentation time under the waking condition, $r = .26$, $p < .05$. Both correlations were in the predicted direction, with global processing increasing with faster presentation time and analytic pro- cessing increasing with slower times.

The comparison of depression and anxiety scores resulted in the discovery of a strong relationship between the two. This was true for both state, $r = .51$, $p < .01$, and trait anxiety, $r = .74$, $p < .001$. In addition, a significant relationship existed between depression scores and hypnotic susceptibility, $r = .38$, $p < .01$ (table 15). Finally, the reliability of the measures was determined for this population using Cronbach's alpha (Cronbach, 1951). All measures reached acceptable levels of reliability (table 13).

Discussion.

This study supports the hypothesized relationship between cognitive processing and depression. The finding of a group main effect reveals that high susceptible depressed subjects differ significantly from high susceptible normals in their performance of the Navon discrimination task. Moreover, this difference is in the predicted direction, resulting in less global processing for the depressives, while maintaining a level of analytic processing similar to non-depressives. However, the failure to find a main effect for condition or an interaction between group and condition does not support the hypothesized relationship between hypnosis and cognitive processing. Hypnosis failed to create a significant shift to greater global processing or to differentiate the low and high susceptible groups.

These results indicate support of Tucker's work (1978; 1981; 1984). He contends hemispheric differences in psychopathology predict a poorer performance by depressives on tasks which involve global perceptions. The Navon task demands that the subject discriminate differences on either global or analytic features. In this study, the depressives showed a lower percentage of global discriminations, supporting Tucker's predictions.

In addition, Tyler and Tucker (1978) had similar findings with the Navon on a population of trait anxious college students. Anxiety measures are highly correlated with depression measures; therefore, it is likely that when screening for trait anxiety, a high proportion of depression will also be present. In the present study, the STAI correlated .74 with the Beck, accounting for 55 percent of the variance within this population. It is therefore not surprising to find results similar to Tyler and Tucker. This study contributed to Tyler and Tucker's work by extending it to a community population and to depressives.

In short, this study provides a way of looking at one mechanism that may account for the narrowed attention of depressives. Perhaps the depressive is stuck looking at the trees and can't see the forest. Being so caught up in isolated negative experiences leads one to miss the whole of life's experience. In additon, new information that may challenge entrenched negative beliefs is excluded through this narrow focus.

The absence of a main effect for condition fails to support Crawford and Allen's (1983) earlier work. One explanation may be the difference in measures. They employed a visual discrimination task composed of pictures such as a scene of trees and hills as opposed to the sets of triangles on the Navon. In addition, scoring of the measure involved judges' ratings, rather than standardized scoring. It is likely that these methodological differences were great enough that the two studies were actually measuring different things. For instance, the subjects in the Crawford and Allen study were allowed to view the first picture for 10 seconds, close their eyes for 5 seconds and then given 20 seconds to view and respond to the second picture. On the other hand, the Navon task in the present study was performed in milliseconds and employed an interstimulus mask designed to disrupt the imaging process. Therefore, Crawford and Allen's work was a test of the effect of hypnosis on cognitive processes at a conceptual rather than visual-perceptual system level.

The present results indicate that hypnosis may not exert its effect on cognition at the primary stages of visual perception. This is not inconsistent with Crawford and Allen's contention that hypnosis effects cognition through its enhancement of imagery. The use of a mask in the present study prevented the enhancement of imagery in order to test the power of hypnosis to influence the perceptual process. The results suggest hypnosis is not effective at the primary perception level, but at the conceptual level through an enhancement of imagery.

Navon's hypothesis of global precedence may be supported by the correlations between presentation time and global processing in both conditions. Those subjects who reach criteria at faster speeds are those who have the highest global scores. This suggests that the longer one looks at the figure, the more likely one is to perceive the analytic features of it. The correlation between social desirability and presentation time may provide some explanation for this effect. One characteristic of persons scoring high on social desirability is the tendency to tailor answers so that they are more likely to be socially acceptable. This process of tailoring one's answers is likely to take more time, slowing down the presentation time.

Examination of the method may provide some helpful information for replication efforts. The choice of more extreme cutoffs for the Harvard screening scale might decrease the variability within groups, and strengthen the effect of both treatment and group. The low susceptible group mean of 3.3 on the Harvard indicates that the group was at the high end of the 0 to 4 range, while the high susceptible group means of 8.4 and 8.8 place them at the low end of the 8 - 12 range. Several of the low susceptible subjects reported achieving a greater trance during the experimental task than during the screening. Since many of the low susceptible subjects had not experienced hypnosis previously, practice may have facilitated their experience. This would increase the within-group variance if selective subjects experienced a trance state, blurring between-group differences. More stringent criteria for the Harvard may decrease this variabilty; a bottom cutoff of 2 and a top cutoff of 10 is suggested for future studies.

The second major revision suggested is the addition of a visual imagery task such as the one used by Crawford and Allen. Hypnosis may well create the hypothesized shift in cognitive processing, but only when visual imagery is required and not at the more basic level of visual perception.

In summary, this study supports the hypothesis that depressives demonstraste less global processing than do non-depressives on a visual perception task. However, there is no evidence that hypnosis is able to mediate this effect at the early stages of perception. The limitation of this study is that it does not deal with the more sophisticated imagery process in Crawford and Allen's study. This makes it even more difficult to generalize from deficits in global perception to the possibility that depressives actually maintain different styles of processing information about their relationships in the world. However, the elucidation of one component in the depressive's information processing is important to the process of developing and refining effective treatments.

Appendix A

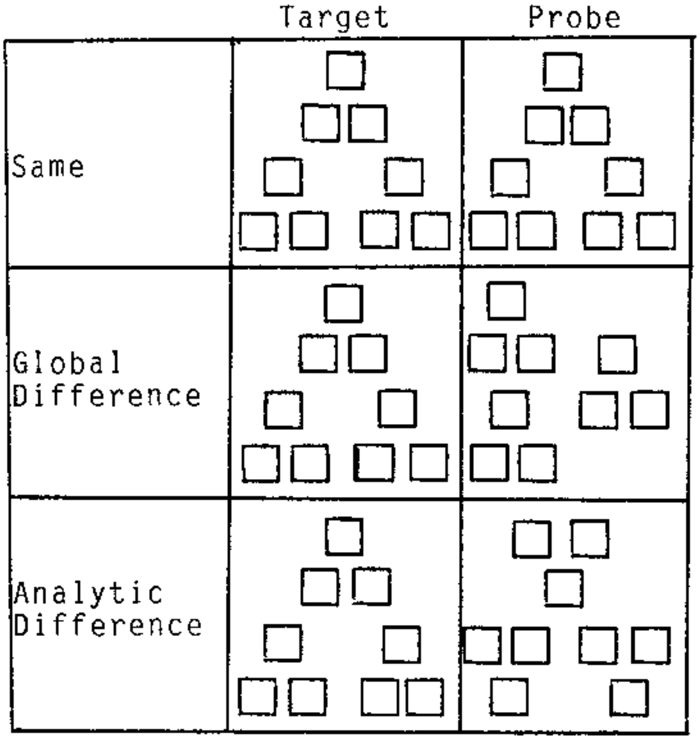

Figure 1. Sample designs of the Navon Design Discrimination Task. The designs can differ on on either the global or analytic dimensions.

Appendix B

```
1 'NAVON DESIGN DISCRIMINATION TEST - JOHN WILSON - 6/15/84
2 'FOR THE TRS-80 COLOR COMPUTER
10 CLEAR 200,&H3F7F
20 PCLEAR 4 : 'RESERVE 4 GRAPHICS PAGES
30 DIM D(4) : 'RESERVE SPACE FOR DELAY VALUES
40 S$ = "R12D12L12U12" : 'FORMULA FOR SQUARE
50 GOSUB 5000 : 'SET UP ASSEMBLY ROUTINES
60 GOSUB 4000 : 'SET UP PAGE 3 MASK SCREEN & PAGE 4 BLANK SCREEN
70 GOSUB 3000 : 'LOAD COORDS FOR MAJOR SCREEN TYPES
100 FOR G = 1 TO 8 : 'EIGHT GROUPS OF 16 SCREENS
110 CLS : IF G ±° 1 THEN PRINT "END OF BLOCK";G-1
120 PRINT "MS DELAY FOR BLOCK";G;"?"
130 INPUT "";DLY
135 IF DLY±1 THEN 120
140 D(0) = 1000
150 D(1) = 200
160 D(2) = DLY
170 D(3) = 200
180 D(4) = DLY
190 J=0 : FOR I = &H3FBA TO &H3FC2 STEP 2
200 H=INT(D(J)/256) : L=D(J)-(H*256)
210 POKE I,H : POKE I+1,L
220 J=J+1 : NEXT
230 READ CMD$
240 GOSUB 1000 : 'SHOW 16 SETS
250 NEXT G
260 CLS
270 PRINT "END OF SESSION"
280 END
1000 'SET UP & SHOW 16 GROUPS OF 3 SCREENS
1010 FOR I = 1 TO 61 STEP 4
1020 'SET UP NEXT 2 SCREENS
1030 FOR K = 0 TO 2 STEP 2
1040 IF K=0 THEN PMODE 0,1 ELSE PMODE 0,2 : 'SELECT PROPER PAGE
1050 PCLS : 'CLEAR THIS PAGE
1060 'GET SPECS FOR THIS SCREEN
1070 MAJ=VAL(MID$(CMD$,I+K,1)) : 'DIRECTION OF MAJOR TRIANGLE
1080 MIN=VAL(MID$(CMD$,I+K+1,1)) 'DIRECTION OF MINOR TRIANGLES
1090 'DRAW THE 3 TRIANGLES FOR THIS STRING
1100 FOR J = 0 TO 2
1110 'GET STARTING POINTS FOR EACH OF THE 3 TRIANGLES
1120 N=((MAJ-1)*6)+(J*2) : 'CALC INDEX TO ARRAY M
1130 MAJ$=STR$(M(N)) + "," + STR$(M(N+1)) : 'MAKE COORD STRING F
OR DRAW COMMAND
1140 'MOVE TO START POINT FOR 1 MINOR TRIANGLE
1150 DRAW "BM"+MAJ$
1160 'DRAW THE MINOR TRIANGLE
1170 ON MIN GOSUB 2010,2020,2030,2040 : 'DRAW MINOR TRIANGLE
```

Appendix B--Continued

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1180 NEXT J
1190 IF K=0 THEN N=USR1(1) ELSE N=USR1(2) : 'INVERT TO MAKE BLAC
K ON WHITE
1200 NEXT K
1210 'WAIT FOR KEYPRESS, THEN SHOW THE 3 SCREENS
1220 PMODE 0,4 : SCREEN 1,1 : 'SHOW BLANK SCREEN WHILE WE WAIT
1224 PLAY "C"
1225 IF INKEY$="" THEN 1225
1230 N=USR2(N) : 'SHOW THEM VIA ASSEMBLY ROUTINE
1240 NEXT I
1250 RETURN
2000 'ROUTINES TO DRAW TRIANGLES COMPOSED OF 3 SQUARES
2010 DRAW "BM-6,-16XS$;BM-16,20XS$;BM+32,0XS$;" : RETURN : 'UP
2020 DRAW "BM-4,6XS$;BM+16,-20XS$;BM-32,0XS$;" : RETURN : 'DOWN
2030 DRAW "BM+6,-6XS$;BM-20,-16XS$;BM+0,32XS$;" : RETURN : 'RIGH
T
2040 DRAW "BM-16,4XS$;BM+20,-16XS$;BM+0,32XS$;" : RETURN : 'LEFT
3000 'LOAD X-Y COORDINATES FOR EACH MAJOR SCREEN TYPE INTO ARRAY
 M
3010 DIM M(23)
3020 FOR I = 0 TO 23 : READ M(I) : NEXT I
3030 RETURN
4000 'SET UP MASK SCREEN IN PAGE 3
4010 PMODE 0,3 : PCLS
4020 FOR I = 1 TO 9
4030 READ MIN,X$,Y$
4040 DRAW "BM"+X$+","+Y$
4050 ON MIN GOSUB 2010,2020,2030,2040 : 'DRAW MINOR TRIANGLE
4060 NEXT I
4070 I = USR1(3) : 'MAKE BLACK ON WHITE
4080 'BLANK PAGE 4
4090 PMODE 0,4 : PCLS : I = USR1(4) : 'MAKE ALL WHITE
4100 RETURN
5000 'SET UP ASSY ROUTINE
5010 FOR I = &H3F80 TO &H3FF1 : READ N : POKE I,N : NEXT
5020 DEFUSR1 = &H3F80 : 'FLIPPER
5030 DEFUSR2 = &H3FC9 : 'FLASHER
5040 RETURN
6000 '***** ASSEMBLY ROUTINES *****
6010 'FLIPPER - 21 BYTES
6020 DATA &HBD,&HB3,&HED,&H86,&H06,&H3D,&H1E,&H89,&H1F,&H02
6030 DATA &H8E,&H06,&H00,&H63,&HA0,&H30,&H88,&HFF,&H26,&HF9,&H39
6040 'WAITER - 17 BYTES
6050 DATA &H10,&H8E,&H00,&H6E,&H31,&HA8,&HFF,&H26,&HFB
6060 DATA &H21,&H00,&H30,&H88,&HFF,&H26,&HF0,&H39
6070 'SHOWER - 20 BYTES
6080 DATA &H8E,&HFF,&HC6,&HC6,&H07,&H34,&H02,&H84,&H01,&HE7,&H86
6090 DATA &H30,&H02,&H35,&H02,&H46,&H5A,&H26,&HF2,&H39
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Appendix B--Continued

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6100 'FLASHER - 56 BYTES INCLUDING STORAGE
6110 DATA 00,00,00,00,00,00,00,00,00,00,&H09,&H03,&H09,&H06,&H0C
6120 DATA &H86,&H0C,&H8D,&HD9,&H1A,&H50,&H12,&H12,&H12
6130 DATA &HC6,&H05,&H31,&H8C,&HE3,&H30,&H8C,&HEA
6140 DATA &H34,&H34,&HA6,&H84,&HAE,&HA4,&H34,&H02,&H8D,&HB1,&H35
,&H02
6150 DATA &H8D,&HBE,&H35,&H34,&H30,&H01,&H31,&H22,&H5A,&H26,&HE9
,&H39
7000 'TRIANGLE TYPE, X-COORD,Y-COORD FOR 9 TRIANGLES IN MASK SCR
EEN
7010 DATA 1,60,40,2,120,100,3,180,150
7020 DATA 3,40,120,4,180,100,3,190,50
7030 DATA 2,130,60,1,90,160,1,140,130
8000 'X,Y COORDS FOR EACH MAJOR SCREEN TYPE
8010 'UP
8020 DATA 128,48,62,142,194,142
8030 'DOWN
8040 DATA 128,142,62,48,194,48
8050 'RIGHT
8060 DATA 194,94,62,142,62,48
8070 'LEFT
8080 DATA 62,94,194,48,194,142
9000 'SCREEN DESCRIPTORS - EACH LINE DESCRIBES 16 SCREEN PAIRS
9010 'EACH 4 NUMBERS DESCRIBE TWO SCREENS
9020 'EACH PAIR DESCRIBES 1 SCREEN - MAJOR DIRECTION, THEN MINOR
 DIRECTION
9030 'WHERE 1=UP,2=DOWN,3=RIGHT,4=LEFT
9040 'EACH LINE MUST HAVE EXACTLY 64 NUMBERS!
9050 DATA 2323323234244244212311121414442413133131123233332434441
4122234343
9060 DATA 1111444444142143433432121313324241312424243233434121222
2223333233
9070 DATA 4343334324343131323441424242232314141212222344442111111
1113433432
9080 DATA 4141232233331112131322222121242431341424124232324243431
3334344414
9090 DATA 2122242412123434332322234434424113131413314111112313411
4132324343
10000 DATA 114121211232141413143414242332333333434123234444222224
24241213131
10010 DATA 232313334141313124141212434232341414333422221112444444
23234342111
10020 DATA 333131314344131323221212333121131112221242411113432444
44142424343
```

Appendix C

Subject's Consent

I, ________________________, consent to participate in a program of study with Lucy Wilson. I understand that this study is being conducted to examine the influence of hypnosis on the visual perception process. I understand that there are tow parts to this investigation and that I may be chosen to participate in only the first stage or the first and second stages. I understand that the first stage will consist of a hypnotic induction and will take approximately forty-five minutes. I understand that the second stage will consist of the performance of a visual perception task twice, once while hypnotized, and once while in a normal waking state. I also understand that I may be asked to fill out one or more questionnaires while in a waking state. I understand that the total time required for the second stage will be approximately tow hours.

I understand that it is possible to benefit from my participation by experiencing some relaxation from the hypnotic procedure. I understand that any other benefits will be to the investigator in furthering the understanding of hypnosis and cognitive processing in persons. I understand that any risks include the possibility of some discomfort as a result of the unfamiliar nature of hypnosis and fatigue from the repetition of the visual discrimination task.

I understand that there will be no costs to me due to my participation in this study. I understand that my participation in this study is purely voluntary and that I may terminate my involvement at any time. Lucy Wilson may also terminate my involvement at any time. In the unlikely event I incur any injury as a direct result of participating in this investigation, I understand that no compensation is available from the investigator. Treatment will be provided at my own expense or at the expense of my health care insurer. I also understand that if I require further information about this matter I should contact Lucy at 602-626-6979.

I authorize Lucy Wilson to keep, preserve, use and dispose of the findings from this investigation with the provision that my name will not be associated with any of the results.

I have read the above 'Subject's Consent'. The nature, demands, risks, and benefits of the project have been explained to me. I understand that I may ask questions and that I am free to withdraw from the project at any time without incurring ill will. I also understand that this consent form will be filed in an area designated by the

Appendix C--Continued

Human Subjects Committee with access restricted to the principal investigator or authorized representatives of the particular department.

Subject's signature ________________________ Date________

I, the undersigned, have explained and fully defined in detail the research procedure in which this person has consented to participate. I hereby certify that to the best of my knowledge the subject who is signing this consent form understands clearly the nature, demands, benefits, and risks involved in his/her participation. A medical problem, language or educational barrier has not precluded a clear understanding of his/her involvement in this project.

Investigator's signature___________________ Date________

Appendix D

Experimental Induction

And now what I'd like to do is have you begin to develop a trance. You've had this experience before in similar situations so you really can recognize that developing trance is a very naturalistic, very easy, very effortless process. You start by simply making yourself comfortable, knowing that you really can enjoy the development of the relaxing feelings that can feel in gradually beginning to develop a trance. And there are so many different ways to develop and experience a trance, most of them involving an initial process of absorption. So why not allow yourself to focus visually on some external stimulus or stimuli? It really doesn't matter what you focus on . . . some people prefer to look at their thumb or hands, others prefer to look at that picture on the wall, others at different objects. You can select the place best for you. And as you do, what a nice thing to know that you can listen to my voice, hear my voice, and yet still remain absorbed in your ongoing, unfolding experience. Because trance really is a process of letting go of any need to actively attend and just let things happen instead. And you can feel very secure in knowing that with each breath that you take, you can let go of any unnecessary tensions and simply devote yourself to sheer comfort.

Appendix D--Continued

And what a nice thing to know that in developing trance, that process of effortless absorption that you've begun to develop can spread in a variety of interesting and secure ways. Some people feel it spreading at first to their kinesthetic sense, feeling their bodies become nicely absorbed in a state of comfort and relaxation. Others discover absorption in my voice, letting the voice take you deeper and deeper into trance. Because trance really is a naturalistic experience, one you really can allow yourself to let go into, one in which you can let go of any worries, let go of any cares, let go of any tensions, and just let yourself drop deeper and deeper into trance. That's right.

And you can let your eyes remain open only as long as they feel like staying open, knowing that when they feel tired you can let them close and drop even deeper into trance. And when you feel all the way in trance, you can signal by lifting the index finger of your hand. That's right . . . signal when you're all the way in trance by lifting the right index finger. But for right now, just allow yourself to continue to relax, to let go, to very comfortably drift deeper into trance, letting all the tension drain from your body. You can let go of tension in your feet . . . your legs . . . your thighs . . . that's right . . . just letting all that tension seep away . . . in your stomach . . . your chest..your shoulders . . . arms

Appendix D--Continued

. . . and hands . . . and really feel that comfort . . . that sense of security . . . the deepening of the trance . . . the relaxation of your face . . . your neck . . . all throughout your body . . . more and more relaxed . . . drowsy . . . and so pleasantly sleepy . . . knowing that if your eyelids haven't closed by now, they really can simply close, because there's really no need to orient externally anymore, except to the sound of my voice. What's more important is your unfolding internal experience.

And you can continue to hear the sound of my voice, knowing it needn't interfere with your experience. It can be done effortlessly, just as your finger can lift effortlessly to signal when you're all the way in trance. And to help you to go even deeper, I'm going to begin to count. And with each count, you can go deeper into trance . . . gently, gracefully . . . down, down, into a deep, restful sleep. Nothing will disturb you. One..continuing to listen to my voice. Two . . . letting go more and more. Three . . . four . . . more and more relaxed, deeper and deeper into trance. Five . . . that's right . . . you really can feel the security of that trance. Six . . . seven . . . eight . . . feeling the relaxation, feeling the deepening, feeling the security. Nine . . . all the way down . . . ten . . . now!

And really let yourself drift comfortably and securely in trance, all alone in the middle of nowhere with my voice.

All alone in the middle of nowhere, where you needn't be attached to any particular thoughts, any particular way of being, but can remain very secure and continue to listen to my voice. You can be aware of thoughts from time to time drifting in and out of your mind, and you can be aware of a variety of other transient processes. But you really don't have to actively attend to them . . . just let them come and go, easily and comfortably, and continue to listen and respond to my voice.

And there are very many things you can learn to do while maintaining your state of relaxation. And one of things I would like for you to learn to do today is to communicate while in trance. And the way you can learn to do that is by telling me how deeply you are in trance, on a scale of one to ten, with one being not at all in trance and ten being as deeply relaxed as you feel you could possibly be. You can answer easily and effortlessly, whenever I ask you "How deep are you now?" You won't have to struggle or think about an answer, it will just come to you. Perhaps you will see a number in your mind, or perhaps just feel like saying a certain number. Whatever happens, just let it happen, easily and effortlessly. Why don't you try that now. How deep are you now? That's very good.

So you see that there are very many things you can learn to do and still maintain your trance. And one of the other

Appendix D--Continued

things I would like for you to learn today is to maintain your trance while keeping your eyes open. And to help you learn to do this, in a moment I'm going to ask you to open your eyes, glance at the wall and then close your eyes again. And this will be very easy and effortless for you. Why don't you try that now? Just open your eyes . . . glance at the wall . . . and close your eyes again . . . that's right. Now to help you practice this some more, in a minute I'm going to ask you to open your eyes, glance at the wall while I count from one to ten and then close your eyes again. And while your eyes are open you'll be able to maintain your trance, easily, effort- lessly, just floating, relaxing, enjoying the feelings that can feel as you drift all alone in the middle of nowhere. Why don't you try that now, open your eyes, glance at wall . . . one . . . two . . . three . . . four . . . five . . . six . . . seven . . . eight . . . nine . . . ten . . . close your eyes again . . . drifting floating . . . that's very good. Now that you have learned to maintain your trance while your eyes are open, in a moment I'll ask you to open your eyes, look at the screen, and perform the task that you learned earlier. And when you do this, you won't have to worry, just letting go, easily and effortlessly, floating drifting, comfortably, securely, all alone in the middle of nowhere. And each time that you do the task and close your eyes again, the closing of your eyes will serve as a cue to drift deeper into trance. That's right. Ready now, open your eyes and look at the screen.

(After establishing criterion on the Navon and each of the four experimental blocks, present the following.)

Okay. Close your eyes and as you close your eyes, allow their closing to serve as a cue to drift deeper into trance, easily, effortless, floating more and more comfortably, safely, securely in trance, all alone in the middle of nowhere. How deep are you now? (Continue with these suggestions until the subject reaches the same level of trance. Then have him open his eyes and repeat the task.)

Appendix E

Table 4

Analysis of Covariance Summary
for Navon Ratio Scores

Source	SS	df	MS	F
Covariate				
Desire	.97	1	.97	6.04*
Main Effects				
Condition	.09	1	.09	.53
Group	2.04	2	1.02	6.32*
Interaction				
Cond. x Group	.02	2	.01	.05
Explained	3.11	6	.52	3.22*
Residual	13.67	85	.16	
Total	16.78	91	.18	

p .01.

Table 5

Analysis of Covariance Summary
for Navon Analytic Scores

Source	SS	df	MS	F
Covariate				
Desire	55.23	1	55.23	4.01*
Main Effects				
Condition	4.79	1	4.79	.35
Group	33.09	2	16.55	1.20
Interaction				
Cond. x Group	6.57	2	3.28	.24
Explained	99.68	6	16.61	1.21*
Residual	1171.57	85	13.78	
Total	1271.25	91	13.97	

p .05.

Appendix E--Continued

Table 6

Analysis of Covariance Summary
for Navon Global Scores

Source	SS	df	MS	F
Covariate				
Desire	77.16	1	77.16	4.53*
Main Effects				
Condition	10.45	1	10.45	.61
Group	326.95	2	163.47	9.59*
Interaction				
Cond. x Group	8.67	2	4.34	.26
Explained	423.22	6	70.54	4.14*
Residual	1447.77	85	17.03	
Total	1870.99	91	20.56	

p .05.

Table 7

Analysis of Covariance Summary
for Navon Presentation Time

Source	SS	df	MS	F
Covariate				
Desire	39687.56	1	39687.56	4.48*
Main Effects				
Condition	1739.13	1	2759.02	.19
Group	6537.91	2	3268.96	.37
Interaction				
Cond. x Group	1014.87	2	507.44	.06
Explained	48979.48	6	8163.27	.92
Residual	753028.96	85	8859.16	
Total	802008.44	91	8813.28	

p .05.

Appendix E--Continued

Table 8

Analysis of Variance Summary
for Navon Ratio Scores

Source	SS	df	MS	F
Main Effects				
Condition	.09	1	.09	.48
Group	1.11	2	.56	3.06*
Interaction				
Cond. x Group	.02	2	.01	.05
Explained	1.21	5	.24	1.34
Residual	15.57	86	.18	
Total	16.78	91	.18	

p .05.

Table 9
Analysis of Variance Summary
for Navon Analytic Scores

Source	SS	df	MS	F
Main Effects				
Condition	4.79	1	4.79	.33
Group	14.16	2	7.08	.49
Interaction				
Cond. x Group	6.57	2	3.28	.23
Explained	25.52	5	5.10	.35
Residual	1245.73	86	14.49	
Total	1271.25	91	13.97	

p .05.

Appendix E--Continued

Table 10

Analysis of Variance Summary
for Navon Global Scores

Source	SS	df	MS	F
Main Effects				
Condition	10.45	1	10.45	.55
Group	208.05	2	104.02	5.44*
Interaction				
Cond. x Group	8.67	2	4.37	.23
Explained	227.16	5	45.43	2.37*
Residual	1643.83	86	19.11	
Total	1870.99	91	20.56	

p .05.

Table 11

Analysis of Variance Summary
for Navon Presentation Time

Source	SS	df	MS	F
Main Effects				
Condition	1739.13	1	1739.13	.19
Group	3830.65	2	1915.33	.21
Interaction				
Cond. x Group	1014.87	2	507.44	.06
Explained	6584.65	5	1316.93	.14
Residual	795423.79	86	9249.11	
Total	802008.44	91	8813.28	

p .05.

Appendix E--Continued

Table 12

Means and Standard Deviations of Dependent Variables by Condition

	Group		
	1	2	3
	Hypnosis Condition		
Navon ratio			
M	.17	.01	.29
SD	.31	.50	.43
Navon global			
M	9.15	10.88	6.65
SD	3.93	4.82	4.07
Navon analytic			
M	12.30	10.88	11.53
SD	3.09	4.74	3.76
Presentation time			
M	265.62	286.31	282.94
SD	103.81	110.57	91.62
	Waking Condition		
Navon ratio			
M	.21	.10	.33
SD	.39	.47	.39
Navon global			
M	8.15	9.63	6.76
SD	4.45	4.54	4.29
Navon analytic			
M	11.92	11.56	12.41
SD	3.30	4.38	3.04
Presentation time			
M	266.07	278.06	266.82
SD	101.54	93.74	76.20

Note. Group 1 = Low susceptible, non-depressed
Group 2 = High susceptible, non-depressed
Group 3 = High susceptible, depressed

Appendix E--Continued

Table 13

Reliability Coefficients
with Cronbach's Alpha

Measure	alpha value
Beck DI	.93
Harvard GSHS	.77
STAI - state	.93
STAI - trait	.93
CMSDS	.77

Table 14

Means and Standard Deviations of
Independent Variables by Group

	Group 1	Group 2	Group 3
Beck			
M	4.90	4.00	21.59
SD	3.08	3.00	7.73
Harvard			
M	3.31	8.43	8.80
SD	1.39	1.88	1.51
STAI - state			
M	34.61	37.25	48.94
SD	10.69	12.55	7.73
STAI - trait			
M	38.38	40.38	55.29
SD	7.43	4.04	8.42
CMSDS			
M	16.38	17.25	13.53
SD	5.12	5.36	4.36

Appendix E--Continued

Table 15

Pearson Correlation Coefficients

	Hyp time	Wake time	Edin left	Edin right	Beck
Hyp time	1.000 p = .000	.915 p = .001	-.175 p = .121	-.132 p = .190	.149 p = .160
Wake time	.915 p = .001	1.000 p = .000	-.097 p = .260	-.169 p = .130	.035 p = .407
Edin left	-.175 p = .121	-.097 p = .260	1.000 p = .000	-.189 p = .104	.037 p = .403
Edin right	-.132 p = .190	-.169 p = .130	-.189 p = .104	1.000 p = .000	.032 p = .415
Beck	.149 p = .160	.035 p = .407	.037 p = .403	.032 p = .415	1.000 p = .000
Hrvd	.051 p = .367	-.047 p = .377	-.112 p = .229	-.097 p = .260	.380 p = .005
State	.061 p = .342	.064 p = .334	.060 p = .345	-.071 p = .318	.517 p = .001
Trait	.172 p = .126	.122 p = .209	-.030 p = .421	.015 p = .461	.741 p = .001
CMSDS	.197 p = .094	.252 p = .045	.039 p = .398	-.167 p = .134	-.379 p = .005
Navon hyp	.262 p = .039	.404 p = .003	-.044 p = .385	.132 p = .190	.117 p = .218
Navon wake	.301 p = .021	.467 p = .001	.025 p = .433	.114 p = .225	.129 p = .195
Anlyt hyp	-.019 p = .450	.103 p = .247	.117 p = .219	.042 p = .389	-.075 p = .309
Anlyt wake	.088 p = .280	.260 p = .040	.077 p = .306	-.027 p = .429	-.013 p = .463
Globl hyp	-.371 p = .006	-.503 p = .001	.119 p = .214	-.116 p = .220	-.225 p = .066
Globl wake	-.384 p = .004	-.533 p = .001	-.056 p = .355	-.127 p = .199	-.191 p = .102

Appendix E--Continued

	Harvard	State	Trait	CMSDS	Navon Hyp
Hyp time	.051 p = .367	.061 p = .342	.172 p = .126	.197 p = .094	.262 p = .039
Wake time	-.047 p = .377	.064 p = .334	.122 p = .209	.252 p = .045	.404 p = .003
Edin left	-.112 p = .229	.060 p = .345	-.030 p = .421	.039 p = .398	-.044 p = .385
Edin right	-.097 p = .260	-.071 p = .318	.015 p = .461	-.167 p = .134	.132 p = .190
Beck	.380 p = .005	.517 p = .001	.741 p = .001	-.379 p = .005	.117 p = .218
Hrvd	1.000 p = .000	.263 p = .038	.302 p = .020	-.213 p = .077	.017 p = .454
State	.263 p = .038	1.000 p = .000	.740 p = .001	-.248 p = .048	.066 p = .330
Trait	.302 p = .020	.740 p = .001	1.000 p = .000	-.364 p = .006	.135 p = .184
CMSDS	-.213 p = .077	-.248 p = .048	-.364 p = .006	1.000 p = .000	.208 p = .082
Navon hyp	.017 p = .454	.066 p = .330	.135 p = .184	.208 p = .082	1.000 p = .000
Navon wake	-.039 p = .396	.059 p = .346	.131 p = .191	.275 p = .032	.875 p = .001
Anlyt hyp	-.019 p = .449	-.137 p = .181	-.094 p = .267	.238 p = .055	.797 p = .001
Anlyt wake	.013 p = .464	-.088 p = .280	-.044 p = .384	.176 p = .120	.750 p = .001
Globl hyp	-.040 p = .395	-.218 p = .072	-.240 p = .054	-.124 p = .205	-.905 p = .001
Globl wake	.066 p = .331	-.174 p = .124	-.210 p = .080	-.284 p = .028	-.805 p = .001

Appendix E--Continued

	Navon wake	Analytic hypnosis	Analytic wake	Global hypnosis	Global wake
Hyp time	.301 p = .021	-.019 p = .450	.088 p = .280	-.371 p = .006	-.384 p = .004
Wake time	.467 p = .001	.103 p = .247	.260 p = .040	-.503 p = .001	-.533 p = .001
Edin left	.025 p = .433	.117 p = .219	.077 p = .306	.119 p = .214	-.056 p = .355
Edin right	.114 p = .225	.042 p = .389	-.027 p = .463	-.116 p = .066	-.127 p = .102
Beck	.129 p = .195	-.075 p = .309	-.013 p = .463	-.225 p = .066	-.191 p = .102
Hrvd	-.039 p = .396	-.019 p = .449	.013 p = .464	.040 p = .395	.066 p = .331
State	.059 p = .346	-.137 p = .181	-.088 p = .280	-.218 p = .072	-.174 p = .124
Trait	.131 p = .191	-.094 p = .267	-.044 p = .384	-.240 p = .054	-.210 p = .080
CMSDS	.275 p = .032	.238 p = .055	.176 p = .120	-.124 p = .205	-.284 p = .028
Navon hyp	.875 p = .001	.797 p = .001	.750 p = .001	-.905 p = .001	-.805 p = .001
Navon wake	1.000 p = .000	.729 p = .001	.840 p = .001	-.793 p = .001	-.941 p = .001
Anlyt hyp	.729 p = .001	1.000 p = .000	.800 p = .001	-.508 p = .001	-.587 p = .001
Anlyt wake	.840 p = 001	.800 p = .001	1.000 p = .000	-.574 p = .001	-.642 p = .001
Globl hyp	-.793 p = .001	-.508 p = .001	-.574 p = .001	1.000 p = .000	.799 p = .001
Globl wake	-.941 p = .001	-.587 p = .001	-.642 p = .001	.799 p = .001	1.000 p = .000

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