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Does Hypnosis Facilitate Primary Process Mentation? An Inquiry Into the Psychoanalytic Theories of Hypnosis and Thinking

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I am submitting herewith a thesis written by Gyrid Lyon entitled "Does Hypnosis Facilitate Primary Process Mentation? An Inquiry Into the Psychoanalytic Theories of Hypnosis and Thinking." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

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Does Hypnosis Facilitate Primary Process Mentation?

An Inquiry into the Psychoanalytic Theories of Hypnosis and Thinking

A Thesis Presented for the

Master of Arts

Degree

The University of Tennessee, Knoxville

Gyrid Lyon

May 2016

DEDICATION

To my mother

Mary Natali

my father

Bernie Lyon

and my grandmother

Gloria Lyon

For their love and support

ABSTRACT

The distinction between primary and secondary process mentation is an important part of the psychoanalytic model of cognitive functioning. Primary processes are most characteristic of unconscious thought, loose associations, dreams, and reverie; and secondary processes predominate during the waking, conscious life of most mature adults and are characterized by logical thinking and planning. It has been theorized that one characteristic of the hypnotic state is that it facilitates an increase in primary process mentation. The present study tests this theory using a recently developed, brief, and nonverbal measure of primary process mentation: the GeoCat. Specifically, the current study tests the degree of primary process mentation in highly hypnotizable participants in a hypnotized state as compared with highly hypnotizable participants in a non-hypnotized control condition. I hypothesized that, in accordance with theory, highly hypnotizable participants would evidence more primary process mentation as measured by the GeoCat during hypnosis than in a resting control condition. The hypothesis was confirmed, thus providing additional evidence of construct validity for the GeoCat and further support for the psychoanalytic theories of thinking and hypnosis.

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CHAPTER I: REVIEW OF THE LITERATURE

Introduction

In *The Interpretation of Dreams*, Freud (1900/1953; 1911/1958), drawing from the evidence of clinical observation, proposed a theory of thinking involving two distinct types of mentation. He posited that one type, which he termed *primary process* mentation, was characterized by a loose, free stream of thoughts unburdened by reality or logical associations. He also proposed that primary process mentation involved the transformation of thought into mental imagery as occurs in hallucinations, daydreaming, and forms of creativity. Although he believed that primary processes were prototypical of the unconscious, he wrote that, in certain circumstances, they could be readily observed in consciousness. He theorized that, among adults, these penetrations of primary processes into consciousness occur most often in the context of dreams, fantasies, slips of the tongue, and certain types of psychopathology, such as hallucinatory psychosis. Freud contrasted primary processes with the type of thinking he observed in normal, alert adult planning and problem-solving. He referred to this more structured and organized type of thinking as *secondary process* mentation.

Later psychoanalytic theorists, having observed the regressed style of thinking that is characteristic of the hypnotic state, extended Freud's theory of primary process mentation to encompass hypnosis specifically (Gill & Brenman, 1959; Nash, 1991). Indeed, the difference between primary and secondary process thinking has become so well recognized within the fields of psychoanalysis and hypnosis that it has, on occasion, been referenced in popular culture. For instance, the fictional psychiatrist, Dr. Haber, in Ursula K. Le Guin's novel *The Lathe of Heaven*, prepares a patient for hypnosis by explaining, "sleep, dream, and trance… tend to employ primary-process thinking" (1971, p. 23).

The present research is an inquiry into this proposed connection between mentation in the hypnotic state and the psychoanalytic theory of thinking originally proposed by Freud. Subsequent to Freud's development of the theory, many psychoanalytic researchers have successfully endeavored to measure the construct of primary process in mental states that are defined theoretically by an increase in primary process mentation, e.g., hypnosis, psychosis, and dreaming. The current project aims to test whether a new measure of primary processes detects more primary process mentation among hypnotized people than among non-hypnotized people.

Primary and Secondary Processes

According to Robert Holt (2009), primary and secondary processes are readily observed in the commonplace way that adult humans typically describe the experience of their own cognitive function: "Most of us speak of thinking in dualistic ways, contrasting careful, controlled, precise, tightly ordered, considered, and responsible thinking with careless, uncontrolled, imprecise, loose and disordered, heedless and self-centered thinking" (p. 25). As such, Freud's theory of mentation can be roughly understood as a careful, descriptive, and scientific depiction of the ordinary, informal observations that people tend to make about the ways in which they think and process information.

According to Freud (1900/1953) and Holt (2009), certain mental states *and* certain personal attributes can both increase access to primary process mentation. States that can facilitate manifestations of primary process include sleep, reverie, being under the influence of certain psychoactive substances such as marijuana, and the experience of anxiety. Personal attributes that tend to increase primary process phenomena include the qualities of being a small child, a creative person, or a schizophrenic patient. Hypnosis, in a way, straddles the line between the state and attribute categories. While hypnosis is certainly a state, there is an

important trait one must possess in order to truly experience the hypnotic state: high hypnotizability. There will be more to say about this later.

Secondary process mentation. Freud proposed that secondary process mentation constitutes the dominant mode of thinking in the everyday waking life of conscious adults (Freud, 1900/1953, 1911/1958; Holt, 2009). It is governed by the reality principle, and it therefore enables the kind of structured, logical thought that is necessary for problem solving and the successful navigation of adult reality. This more advanced mental functioning begins to take shape in infancy as babies gradually learn to tolerate frustrations of instinctual yearning and thereby develop an increasing capacity to comfortably delay gratification. These new capabilities mark the beginnings of what will evolve into the adult ability to problem solve effectively within the confines of reality. As secondary process mentation develops, it does not extinguish the ontogenetically earlier primary process mentation, but rather begins to supplant it in conscious mental life. That is, secondary process mentation becomes superimposed, in a sense, over primary process mentation, which becomes principally relegated to the unconscious. By the latency years, at about the age of seven or eight-years-old, secondary processes overtake the primary processes in conscious thought (Shapiro & Perry, 1976). The preconscious aids in solidifying this development by actively working to inhibit protrusions of primary process products from the unconscious into consciousness.

Another characteristic of secondary process mentation, and one that is of particular importance to the project at hand, is its tendency toward abstract, relational thinking (Brakel, Kleinsorge, Snodgrass, & Shevrin (2000); Vanheule et al., 2011). In other words, secondary process thought, tailored for problem solving in complex adult realities, flows on the basis of

conceptual or theoretical links. This is in sharp contrast to the relatively simplistic and concrete nature of primary process mentation.

A clarifying example is in order. Suppose you are presented with the image of a dinner table and asked to associate to it. Under the sway of secondary process mentation, this image might inspire the thought of silverware or a warm, home-cooked meal. It is the abstract *relationship* of the dinner table to these other items that govern the way in which it is categorized and the way in which subsequent thoughts flow from the initial thought of the table.

Primary process mentation. Primary processes are less refined, more impulsive, and relatively unaffected by the constraints of reality when compared with secondary processes (Freud, 1900/1953, 1911/1958; Holt, 2009). Freud proposed that primary processes are governed by the pleasure principle, and as such, are characterized by shortsighted, impulsive pleasure seeking and the avoidance of discomfort. It is the sole mode of mentation to which humans have access as infants. It is relatively unencumbered by the demands of reality, and it is capable of enlisting fantasy and hallucination in efforts to ward off dissatisfaction. As such, the products of primary process mentation can often appear to be illogical and bizarre. Additionally, primary process mentation tends to be concrete and its associations loose and free from the structured thinking necessitated by the intricacies of adult life. As infants inevitably begin to learn that hallucination and fantasy cannot adequately fulfill wishes in the external world, primary process mentation becomes relegated to the unconscious as secondary process mentation, and its greater compatibility with reality, comes to predominate conscious life; however, primary processes remain active, principally in the unconscious.

As discussed earlier, secondary processes are characterized by abstract, relational functioning. The complimentary characteristic of primary processes is the tendency to operate

on the basis of concrete and superficial connections between thoughts (Freud, 1900/1953). As secondary processes flow on the basis of abstract or conceptual links, primary process mentation makes associations based on the concrete similarities of attributes shared by images or words (Vanheule et al., 2011).

Imagine again that you are presented with an image of a dinner table and asked to associate to it. In a state governed by primary process mentation, such as reverie or a dream, your mind might wander to the thought of a quadruped, such as a giraffe. This is because giraffes and dinner tables share a concrete *attribute*: each has four legs.

The Measurement of Primary Process Mentation

Subliminal stimulation. Following Freud's positing of the construct, several researchers have made attempts at systematically measuring primary process mentation. Early attempts employed subliminal stimulation, working from the premise that primary processes are most often limited to the unconscious. Shevrin and Luborsky (1958), in a review of the work of Viennese psychiatrist Otto Pötzl (1917), described Pötzl's method of presenting images to participants and then examining their dream reports for traces of the images. Pötzl reported that his participants tended to dream about aspects of the picture that they had not been able to consciously recall immediately after the picture had been presented.

In the same paper, Shevrin and Luborsky (1958) reported the findings of their own more systematic investigation into the phenomenon of preconscious perception. Upon having been presented with visual images by researchers, participants were asked for an immediate recall of what they had seen and were also instructed to write down the content of their dreams upon waking the following morning. The researchers asked judges to determine whether or not content from the visual images subsequently appeared in participants' verbally reported dream

content. Their findings were congruent with Pötzl's, showing that participants tended to dream about aspects of the image that had gone unreported immediately after the presentation of the image.

In later work, Shevrin and Luborsky (1961) created the rebus method in which participants were subliminally exposed to rebus images with a tachistoscope. The content of these images later appeared in participants' dreams but only after having undergone transformation by condensation, a mechanism of thought proposed to be characteristic of primary process mentation by Freud (1900/1953). For example, subliminally presented images of a pen and knee, manifested in dreams as pennies ("pen-knee") and themes of a financial or monetary nature.

Projective tests. Later attempts to measure primary process mentation used projective psychological tests. Rapaport, Gill, and Schafer (1945-46) and Holt (Holt & Havel, 1960; Holt, 1977) each developed methods for scoring primary process material in the responses to Rorschach cards. Holt (2007) also adapted his method for use with TAT response, and more recently, authored a book that reviews the history of the psychoanalytic theory of thinking (Holt, 2009). He draws connections between older theory and recent advancements in research and also includes a comprehensive manual for his measure of primary process mentation intended for use with projective tests, the PRIPRO. The PRIPRO measures overall primary process in addition to several distinct aspects, including content, formal aspects, and defenses against manifestations of primary process.

Other measures. Auld, Goldenberg, & Weiss (1968) systematically developed a reliable 7-point Likert-type scale intended to measure primary process material in dream reports by examining the presence of bizarre content and illogical associations or sequences of events.

Additionally, Martindale (1975, 1990) developed the Regressive Imagery Dictionary, a computerized system of text analysis that scans for preselected words that the researchers deemed highly indicative of either primary or secondary processes.

Reliability and validity.

Reliability. Most of the data on the reliability and validity of primary process measurement comes from studies that have employed Holt's PRIPRO system, which is the most widely used measure of primary process mentation in the literature by a wide margin. In an exhaustive review of over 200 studies that have used the PRIPRO, Holt (2009) found extensive evidence for the reliability of primary process measurement across the major indices of his system. In reviewing these studies, Holt (2002) reported a median correlation coefficient for inter-rater reliability of r =.92 for overall primary process scores. He also found good reliability for primary process content scores (median r =.94) and formal primary process scores (median r =.85). In examining test-retest reliability, Holt (2002) found correlation coefficients ranging from r =.38-78 in studies that re-examined participants anywhere from two to 17 years after the initial administration of the PRIPRO.

Other research has also reported good levels of inter-rater reliability. Shevrin and Luborsky reported good inter-rater reliability across the three indices of their preconscious percept measure (r =.92, .84, .95), and Auld, Goldenberg, & Weiss (1968) reported similar levels of inter-rater reliability (r =.88) for their Likert-type primary process scale.

Validity. There is extensive evidence for the validity of primary process measurement in the literature. Decades of research have resulted in well over 100 PRIPRO studies from both the published literature and doctoral dissertations. Holt has reviewed them in detail (see Holt, 2009 for comprehensive review). To summarize, the body of research evidences that, in accordance

with theory, being a creative person, a schizophrenic patient, hypnotized, or under the influence of mind-altering drugs all increase manifestations of primary process mentation.

Evidence for the validity of the Regressive Imagery Dictionary is apparent in research that shows relatively more primary process mentation among younger children as compared to older children (West, Martindale, & Sutton-Smith, 1985), creative participants as compared to uncreative participants (Martindale & Dailey, 1996), and schizophrenic patients as compared to healthy controls (West & Martindale, 1988).

Finally, the work of Shevrin and Luborsky (1958; 1961) and Auld, Goldenberg, and Weiss (1968) supports the notion of a relationship between primary process mentation and dreams.

The GeoCat

In contrast to the above instruments, Brakel, Kleinsorge, Snodgrass, & Shevrin (2000) have developed a brief, nonverbal measure called the GeoCat (short for "geometric categorization") that requires no expertise to either administer or score. The GeoCat purports to distinguish between primary and secondary process mentation by using six simply-scored binary response items administered directly to the participant.

Development. The inspiration for the GeoCat came from the developers' observations of the similarities between the psychoanalytic ideas of primary/secondary process mentation and the cognitive psychology concepts of attributional/relational categorization (Brakel, Shevrin, & Villa, 2002; Brakel, 2004). In explaining the connection, Brakel (2004) quotes psychoanalytic theorist David Rapaport (1951): "Where the primary process… hold[s] sway… everything belongs with everything that shares an attribute of it…" (p. 708). Here Rapaport posits the idea that concrete properties, or "attributes," inform the associations and categorizations that occur in

primary process mentation. This is in contrast to the more abstract associations that occur during secondary process mentation. In cognitive psychology, attributional similarity relies on the shared concrete properties of objects, much like Rapaport's conceptualization of primary process mentation; and relational similarity depends on the more abstract relationships observed among objects, much like secondary process mentation (Murphy & Medin, 1985; Medin & Ortony, 1989; Medin, Goldstone, & Gentner, 1990, 1993; Gentner, 1988).

To explain further, Bazan and colleagues (2013) note that attributional thinking involves focusing on the particular features shared by objects. Similarly, in the realm of primary process mentation, four-legged giraffes belong with four-legged dinner tables. This is despite the fact that one may be an animal and the other a piece of furniture. Conversely, Bazan and colleagues (2013, p. 62) assert that "relational thinking… builds on logical relationships between even very different features and takes the total configuration of these components into account." Therefore, a dinner table and a roasted turkey are seen as similar because of their relationship to one another despite the fact that they hardly bear any concrete physical resemblance to one another.

Figure 1. An example of a GeoCat item.

Description. The GeoCat consists of six easily answered matching items administered directly to participants. The task of each GeoCat item is to view a top, central configuration of shapes and choose which of two configurations of shapes below it is most like the top figure (See *Figure 1*). One of the choices for each item is considered to be "attributional" (on the right in *Figure 1*) and the other is considered to be "relational" (on the left in *Figure 1*). Making an attributional choice means choosing the figure that includes the same shapes as the top figure regardless of the fact that the configuration in which the shapes appear differs from the top figure. This is considered to be a primary process choice. Making a relational choice means choosing a matching configuration of shapes regardless of the fact that the shapes themselves differ from those in the top figure. This is considered to be a secondary process choice.

Reliability and validity of the GeoCat. With regard to reliability, the GeoCat has been shown to possess good internal consistency and reliably measure differences between individuals (Vanheule, 2011). The GeoCat has a Cronbach's alpha of α=.88, indicating that it measures a single construct.

A number of studies using the GeoCat have produced results that suggest its validity in measuring the constructs of primary and secondary processes. In an initial study (Brakel et al., 2000), researchers used a tachistoscope to present participants with early GeoCat-like items, some of which were presented subliminally and others that were presented for a period of time long enough to register in participants' conscious perceptions. Consistent with theory, participants were found to make more attributional (primary process) categorizations when the stimuli were presented subliminally.

A second study was conducted by Brakel, Shevrin, & Villa (2002) to test whether preschool children showed more primary process mentation given that they have not yet reached

latency, which is the age at which many psychoanalytic theorists have posited that secondary process mentation comes to predominate mentation in conscious life (Shapiro & Perry, 1976). Indeed, the researchers found that children aged three to five-years-old made significantly more attributional than relational choices (r=.41) while children aged eight to nine-years-old (r=.41), high school students (r=.38), adults ages 19-69 (r=.42), and adults ages 70-79 (r=.34) all made significantly more relational than attributional GeoCat choices.

Brakel & Shevrin (2005) continued examining the construct validity of the GeoCat by measuring its relationship to anxiety in a naturalistic, correlational study. Adult participants in doctors' offices, whom the researchers presumed might be somewhat anxious, were asked to complete the GeoCat in addition to rating their anxiety from 1 (calm) to 10 (very anxious). Consistent with Freud's theory that anxiety results in regressive defenses and more primary process mentation, results showed that anxiety was negatively correlated with making relational categorizations (r=-.32). Additionally, participants who rated their anxiety between 2 and 10 made significantly more attributional choices than did participants who rated their anxiety at 1 (r=.28).

Finally, in another naturalistic study, Bazan, Van Draege, De Kock, Brakel, Geerardyn, & Shevrin (2013) found that patients in a psychiatric hospital made significantly more attributional categorizations than did a sample of healthy (non-psychiatric) adults (r=.41). Additionally, they found that within the psychiatric sample, patients with acute psychotic symptoms endorsed more attributional matches than did patients without acute psychotic symptoms (r=.18).

Hypnosis and Hypnotizability

The definition of hypnosis has long been contentious in academic circles. At current, the APA Division of Psychological Hypnosis (Division 30) offers the following concise definition: "A state of consciousness involving focused attention and reduced peripheral awareness characterized by an enhanced capacity for response to suggestion" (Elkins, Barbasz, Council, & Spiegel, 2015, p. 6). This definition, focusing as it does on the experience of the hypnotic subject, was a reaction to the previous definition (Green, Barabasz, Barrett, & Montgomery, 2005), which some theorists and practitioners criticized for emphasizing the procedure of hypnosis to the exclusion of the experience of the hypnotic subject (Barnier & Nash, 2008).

Along this line, Nash (2005) has observed that the word "hypnosis" is commonly used to interchangeably mean both the hypnotic "procedure" (inducing hypnosis and making suggestions to subject) and the "product," (the state of hypnosis as experienced by the subject). He argues the fundamental importance of distinguishing between the two meanings, explaining that the process of hypnosis, that is, introducing the procedure, inducing hypnosis, and making additional suggestions, does not guarantee that the subject will truly experience hypnosis. Rather, a subject can only be said to be hypnotized to the degree that he or she possesses the capacity to experience the hypnotic state. That is, the subject must be hypnotizable to a certain degree.

Division 30 currently defines hypnotizability as "an individual's ability to experience suggested alterations in physiology, sensations, emotions, thoughts, or behavior during hypnosis" (Elkins, Barbasz, Council, & Spiegel, 2015, p. 6). The ability to experience these changes as real is what makes hypnosis an interesting phenomenon, and only highly hypnotizable persons possess this ability. While a person of low hypnotizability is perfectly capable of experiencing the hypnotic procedure, they are incapable of experiencing the product of hypnosis. In order to

experience the product, participants must not only undergo the hypnotic procedure, but must also possess a sufficient degree of hypnotizability. The current research assumes that in order to safely surmise that a participant has experienced hypnosis, they must undergo the hypnotic procedure *and* be highly hypnotizable.

The measurement of hypnotizability. There are a number of hypnosis scales that been developed in order to measure hypnotizability (Woody & Barnier, 2008). These scales consist of an introduction, induction, and a series of suggestions. The subjects' behavioral responses to these suggestions are measured as either present or absent and tallied on a scale of 0-12. A higher score indicates greater responsiveness to the suggestions, and therefore, greater hypnotizability. Individuals vary greatly in the ability to experience hypnosis, making it necessary to measure hypnotizability in hypnosis research. In a review of the hypnosis literature, Barnier and McConkey (2004) found that 98% of laboratory research on hypnosis used hypnosis scales to measure the hypnotizability of participants. The scale most often used, and the one intended for use in the current research, is the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A) developed by Shor and Orne (1962). This scale is intended for use with groups of participants and has the distinct advantage of allowing the experimenter to obtain hypnotizability scores from larger numbers of people in a relatively short period of time.

Given that only talented hypnotic subjects can be said to have experienced 'hypnosis-as-product,' I propose to use only participants of 'high' and 'very high' hypnotizability for the analysis in this study. Cox and Bryant (2008) point out that on 12-item scales, such as the HSGHS:A, participants who pass 11 or 12 of the total items are classified as 'very high,' and participants who pass 8-10 items are classified as 'high.' Therefore, I propose to use only

participants who score 8 or higher on the HGSHS:A. This will allow me to be reasonably certain that the participants I include in the research will have experienced the product of hypnosis.

Reliability and validity of hypnotizability. Hypnotizability is typically theorized as a trait rather than a modifiable or fluctuating ability (Laurence, Beualieu-Prévost, & Chéné, 2008). This is in part due to the mixed results of attempts to increase hypnotizability in participants through methods such as enhancing imaginativeness and modifying beliefs and expectations (Gorassini, 2004), but is also due to the high test-retest reliability of hypnotizability scores across the lifetime. Piccione, Hilgard, and Zimbardo (1989) found that 50 participants' hypnotizability scores remained significantly stable at 10 years, 15 years, and 25 years after an initial assessment. The authors note that this level of temporal stability is comparable to that of IQ. The correlations between different hypnosis scales and items on scales (responsiveness to suggestions) have also been observed to be high (Perry, Nadon, & Button, 1992).

Given that hypnotizability seems to be an enduring trait, one might expect to find that certain aspects of cognition or cognition correlate highly with it. Indeed, many studies have endeavored to measure the relationship between hypnotizability and personality characteristics as measured by personality inventories, such as the Big Five Inventory (Nordenstrom, Council, & Meier, 2002) and the Minnesota Multiphasic Personality Inventory (Parker, 1995); however, none have succeeded in obtaining robust or consistent findings (Laurence et al., 2008). One exception to the apparent nonexistence of hypnotizability correlates may be the concept of absorption, which Tellegen and Atkins (1974) define as "a disposition for having episodes of "total" attention that fully engage one's representational (i.e., perceptual, enactive, imaginative, and ideational) resources" (p. 268). Studies have shown that absorption and hypnotizability are generally correlated at about r=0.30 (Kirsch & Council, 1992), but others have emphasized that

this correlation tends to diminish to non-significant levels when absorption is measured *outside* of the context of hypnosis research (Barnier & McConkey, 1999; Milling, Kirsch, & Burgess, 2000). In sum, the research shows that hypnotizability is an abiding individual characteristic with meager cognitive and personality correlates.

The psychoanalytic theory of hypnosis. The psychoanalytic theory of hypnosis posits that induction into a hypnotized state involves a cognitive shift in the subject toward more primary process mentation. Freud believed that hypnosis involved a temporal psychological regression (Freud, 1921/1955). That is, he thought that the mind of the hypnotized subject reverted to a mode of functioning characteristic of an earlier developmental phase. Problematically, this requires that childhood systems of psychological functioning reside in the mind unaffected by ensuing cognitive and emotional maturation. There is no evidence in the research literature to suggest that the experience of the hypnotized adult is particularly like that of a typical child (Nash, 1987). There is, however, evidence for what Freud (1917/1957) called a topographic regression, a backward movement that Freud theorized as more spatial in nature than temporal. Whereas in non-regressed states, sensory perceptions inform one's thoughts or produce cognitive reactions, topographical regression is defined by the reverse process: "thoughts are transformed into images" (Freud, 1917/1957, p.227). Freud asserted that this backward movement was also characterized by a shift toward more primary process mentation.

This regressive shift is not at all exclusive to pathological conditions. When topographical regression is temporary and contained, it is believed that access to primary processes can be used productively, as can be the case with creativity and hypnosis. This type of contained and productive regression is often referred to as being 'in service of the ego' (Kris, 1936).

The measurement of primary process in the hypnotic state. Drawing from the work of Freud, Gill and Brenman (1959) specifically explored the theory that the hypnotic state facilitates primary process mentation. Their work was followed by a number of studies that successfully sought to test the claim empirically.

West, Baugh, and Baugh (1963), using a small sample of 10 participants and a repeated measures design, found greater primary process material in Rorschach and Draw-A-Person responses when participants were hypnotized as compared to when the same stimuli were presented in the waking state. Their method for assessing primary processes, however, was not described in the findings.

Three related studies that used Holt's (Holt & Havel, 1960) system to score the Rorschachs of 32 highly hypnotizable participants both during hypnosis and during an alert state found evidence for more primary process mentation during hypnosis than in the alert state (Fromm, Oberlander, & Gruenewald, 1970; Gruenewald, Fromm, & Oberlander, 1972; Oberlander, Gruenewald, & Fromm, 1970).

Wiseman and Reyher (1973) also used Holt's system in a study in which hypnotized subjects who had been asked to have a hypnotically-induced dream about a Rorschach card evidenced more primary process mentation than groups of either highly hypnotizable but non-hypnotized subjects or subjects that had been asked to fake hypnosis and were naïve to the hypnotic experience.

In another study involving hypnotic dreams, Levin and Harrison (1976) induced hypnosis in 28 highly hypnotizable females and instructed them to have a dream inspired by a Rorschach card in addition to responding to a Thematic Apperception Test card. The participants produced

more primary process material in response to the projective tests when hypnotized than when in a waking state.

Diment, Walker, and Hammer (1981) devised a study in which 10 hypnotized participants listened and responded to the performance of a spoken poem. The content of their responses was analyzed and compared to highly hypnotizable but non-hypnotized participants. Consistent with previous findings, the hypnotized group evidenced more primary process mentation than the waking group participants.

Maré, Lynn, Kvaal, Segal, & Sivec (1994) found that a group of highly hypnotizable participants exhibited more primary process mentation during the course of a hypnotic dream than did low hypnotizable subjects who were instructed to simulate hypnosis. To assess for primary processes, the researchers used a 5-point Likert-type scale that measured bizarre content and abrupt shifts in time or location.

In a related study, Pinnell, Lynn, & Pinnell (1998) found that highly hypnotizable participants in hypnosis produced more primary process content in the context of a hypnotic dream than did highly hypnotizable participants who were instructed to remain in a waking, alert state. The latter participants were asked to simply imagine along with the hypnotic suggestions.

Notably, none of these studies have used a nonverbal measure of primary process mentation, and they all relied on either the PRIPRO or unsystematic measurements of primary process.

Rationale for this Study

There are several reliable and valid measures of primary process that have the capacity to provide rich and informative data; however, there are some notable drawbacks to these instruments. In particular, the most widely used method, the PRIPRO, necessitates the use of

projective measures, such as the Rorschach and TAT. It requires both highly trained judges and significant amounts of time to administer and score. Even Likert-type scales, though they can be scored more quickly, require considerable training in the theory and manifestations of primary processes in order for raters to produce reliable judgments. The parsimony of the GeoCat is appealing in comparison.

Additionally, the numerous studies that have been reviewed in the current research have used measures of primary process mentation that require participants' verbalizations. In comparison, the GeoCat relies on non-verbal responses. As such, it may be uniquely suited to measure primary processes. Freud (1923/1961) posited that "thinking in pictures… stands nearer to unconscious processes than does thinking in words" (p. 21). More recent authors have explicitly theorized a connection between primary processes and non-verbal communications (Dorpat, 2001; Epstein, 1994; Schore, 2011).

In sum, positive results would not only provide additional construct validation for a brief, nonverbal measure of primary process mentation, but would also further solidify psychoanalytic theory as it relates to hypnosis and thinking.

Hypothesis

Hypnosis increases primary process mentation such that highly hypnotizable participants (those who score between 8-12 on the HGSHS:A) administered the GeoCat during hypnosis (H) will score higher on the GeoCat than highly hypnotizable participants in a resting, non-hypnotized condition (NH). [H0:P(H>NH) = P(NH>H)] [H1:P(H>NH) > P(NH>H)] (p=.05)

CHAPTER 2: METHOD

Participants

Participants consisted of students at a large public university in the southeastern United States who have volunteered for research participation in order to obtain course credit for an introductory psychology class. Informed consent was obtained prior to the beginning of each session, and course credit was given to those students who complete the assigned tasks.

A power analysis was conducted using G* Power (Faul, Erdfelder, Lang & Buchner) in order to determine the number of participants needed to detect an effect. Given an alpha level (Type I error rate) of .05 (p=.05) for a one-tailed test, statistical power of .80, and Cohen's *d*=.65 (given the medium to large effect sizes found in the GeoCat studies), then the current research requires 32 participants in each of the two groups to measure the effect. In reviewing previous research on distributions of hypnotizability, Cox and Bryant (2008) report that between 5 and 7 percent of individuals score 'very high' and that between 17 and 34 percent of individuals score 'high.' Estimating conservatively by assuming that 25% of the total participants will meet the inclusion criteria (score of 8 or higher on the HGSHS:A), I needed about 256 participants total in order to obtain hypnotizability and GeoCat scores for 64 participants with 'high' or 'very high' hypnotizability.

Design

The study was conducted as a between subjects, independent measures experiment. That is, the dependent measure (GeoCat) was administered once to each participant. Participants were divided into two groups: hypnotized and non-hypnotized.

Materials

The GeoCat. As described above, the GeoCat (Brakel et al., 2000) measures primary and secondary process thinking in its respondents. It consists of six items and for each item asks the respondent to decide which of two lower figures is most like a top central figure. One of the choices is attributionally similar and consists of the same shapes in a different relational configuration. This is a primary process choice. The other choice is relationally similar in that the relational configuration between the shapes is preserved, but the shapes that make up the configuration are different. This is a secondary process choice. Results are counted 1 for a primary process response and 0 for a secondary process response. Scores range from 0-6. The GeoCat consists of a single 8.5 x 11 inch sheet of paper (see Appendix A).

Administration of the GeoCat typically requires participants to mark their answers using a writing utensil. I anticipated that the participants, presumably being in a very relaxed and possibly drowsy state during the hypnotic procedure, might accidentally knock their writing utensils to the floor. This problem was solved by altering the GeoCat slightly such that responses could be made without writing utensils. Each of the six GeoCat items was increased in size to take up one page in the packet. Participants were then asked to make a tear into an arrow at the bottom of each page that corresponded to their choice of figure.

The Harvard Group Scale of Hypnotic Susceptibility (HGSHS:A). The HGSHS:A (Shor & Orne, 1962) is a group hypnosis protocol that induces hypnosis among many participants simultaneously and measures their hypnotizability. To complete the protocol, the hypnotist induces hypnosis in the group and makes several suggestions before concluding by bringing the group out of hypnosis. The participants are then asked to rate their own responsiveness to the hypnotist's suggestions resulting in scores ranging from 0 (very low

hypnotizability) to 12 (very high hypnotizability). The HGSHS:A consists of a packet of 8.5 x 11 inch sheets of paper upon which the participant records their responses to the protocol.

For the purposes of our research, the HGSHS:A administration was modified in order to accommodate administration of the GeoCat during the HGSHS:A protocol. Instructions for the completion of the GeoCat during the HGSHS:A were carefully authored such that they conform to the language and flow of the HGSHS:A script (see Appendix A) (Finn, Lyon, Goldman, & Nash, 2016). Once the hypnotist induced hypnosis and began making suggestions, each participant was assumed to be either hypnotized or not hypnotized as their individual hypnotizability indicates. It was also assumed that highly hypnotizable participants who became hypnotized did not have their hypnosis experience interrupted by the administration of the GeoCat. In previous studies, highly hypnotizable participants have been administered portions of the Rorschach Inkblot Method during hypnosis without having the experience of hypnosis disturbed (Fromm, Oberlander, & Gruenewald, 1970; Gruenewald, Fromm, & Oberlander, 1972; Oberlander, Gruenewald, & Fromm, 1970).

Procedure

There were two different procedures that differed slightly: one for groups of participants who were administered the GeoCat prior to experiencing hypnosis and another for groups of participants who were administered the GeoCat during hypnosis. For the former procedure, participants entered a university classroom and were handed a packet of paper that included informed consent, the GeoCat, the HGSHS:A self-response items, and a number of other self-report measures intended for use in a different line of hypnosis research. A psychology graduate student with training in hypnosis then welcomed the participants, and instructed them to complete the self-report measures, including the GeoCat. The graduate student then

administered the HGSHS:A. At the conclusion of the administration, participants were asked to complete the self-response items that comprise the measurement of their hypnotizability. Upon the completion of these measures, the packets were collected, and the participants were thanked and excused. Total scores on the HGSHS:A and GeoCat were tallied by this researcher, four other psychology graduate students, and an undergraduate research assistant. The second procedure was exactly the same except for the fact that the administration of the HGSHS:A was altered to include an administration of the GeoCat halfway through the HGSHS:A script.

Analytic Strategy

In previous studies using the GeoCat, experimenters have found that the distribution of GeoCat scores tends toward a "U," "J," or "inverse-J" curve (Bazan et al., 2013; Vanheule et al., 2011). As such, a Kolmogorov-Smirnov goodness of fit test was run on the data from each of the two groups to ensure that, as expected, the distribution of GeoCat scores within each group is non-normal.

A one-tailed Mann-Whitney *U* was used to test for the hypothesized difference in GeoCat responses. I propose that a one-tailed test is justified in this case due to a strong theoretical expectation that the hypnotized group will evidence more primary process mentation. The Mann-Whitney *U* test is a substitute for the *t*-test when the distribution of data is non-normal (Zar, 2010). The null hypothesis for the Mann-Whitney *U* test states that there is no difference between the distributions of the populations. It works on the basis of calculating the *U* statistic. *U* is calculated by the following formula: $U=R-\{[n(n+1)]/2\}$. *R* is equal to the sum of ranks and *n* is equal to the sample size. *U* is calculated for each comparison group. The smaller *U* is then retained and compared to a critical *U* (Zar, 2010). The alpha level for this study is .05

(p=.05). All statistical analyses were performed with Statistical Package for Social Sciences (SPSS) software.

CHAPTER 3: RESULTS

The study included a total of 269 undergraduate students. Of the 135 participants who were administered the GeoCat during hypnosis, 32 obtained scores of 8 or greater on the HGSHS:A and were classified as highly hypnotizable. In comparison, 134 participants were administered the GeoCat in a resting state before undergoing hypnosis. Thirty-seven of these participants produced scores of 8 or greater on the HGSHS:A and were deemed highly hypnotizable. As a result, the final analysis includes a total of 69 participants. Notably, the administration of the GeoCat during hypnosis does not appear to have significantly affected participant responses to HGSHS:A items. The distribution of total HGSHS:A scores (n = 135) obtained with the interruption of the GeoCat does not differ significantly from the distribution of total HGSHS:A scores (n = 134) obtained by the standard protocol (Mann-Whitney U = 7902.00; Z = -1.850; p = .07).

A Kolmogorov-Smirnov goodness of fit test showed that the distribution of GeoCat scores among highly hypnotizable participants who were assessed during hypnosis (n = 32) is non-normal (KS = .189; p = .005). Likewise, the distribution of GeoCat scores among highly hypnotizable participants who were assessed during a non-hypnotized state (n = 37) is also non-normal (KS = .291; p < .001). A visual inspection of histograms reveals that the distribution of non-hypnotized participants follows an inverse-J curve, and the distribution of hypnotized participants follows a U curve (see Figure 2). Given the expected non-normal distributions, I proceeded with my plan to use the non-parametric Mann Whitney U test to examine whether or not there were differences between the two distributions.

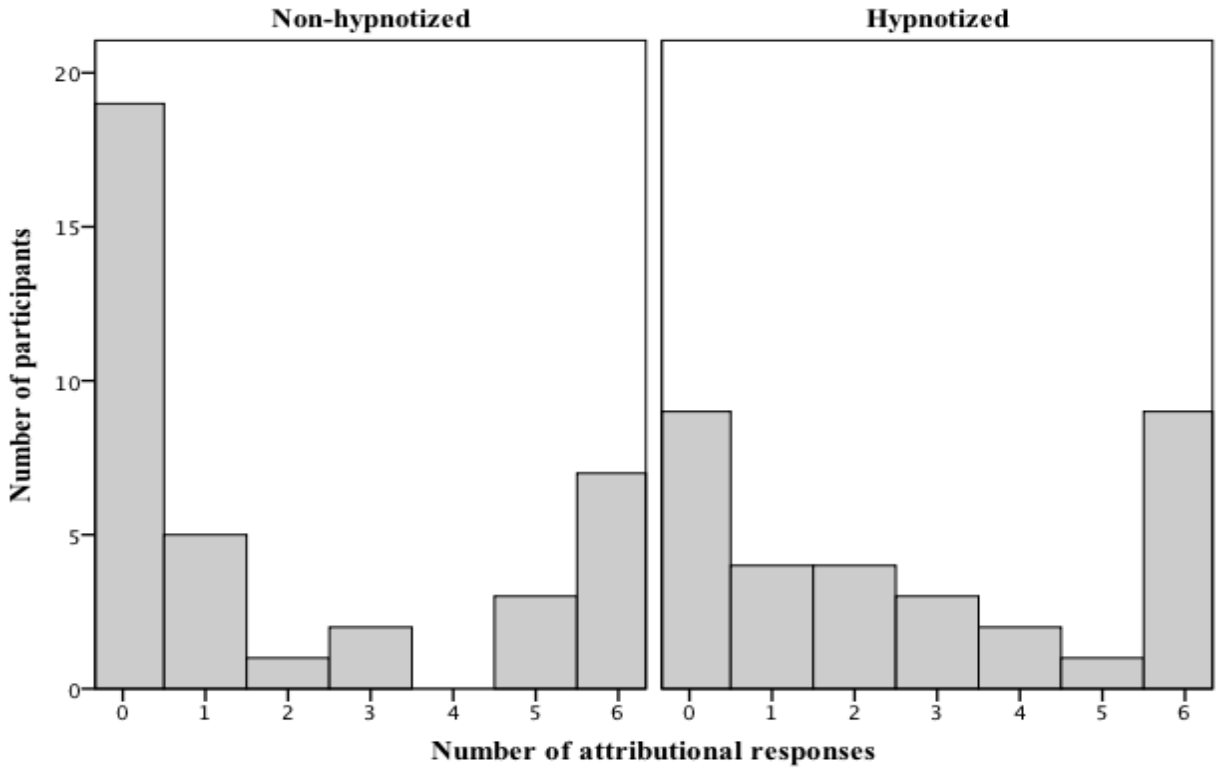

Figure 2. Distributions of attributional responses on the GeoCat for highly hypnotizable individuals who were either hypnotized or in a non-hypnotized, resting state.

The distributions of GeoCat scores differ such that higher levels of primary process as indicated by attributional responses on the GeoCat are more likely to be observed in the hypnotized condition as opposed to the non-hypnotized condition (Mann-Whitney $U = 452.50$; $Z = -1.75$; $p = .04$, one-tailed; $r = .21$). The observed effect size is small-medium. The mean number of attributional responses (indicating primary process mentation) for non-hypnotized participants (M = 1.89, SD = 2.48) is less than one fewer than the mean number of attributional responses for hypnotized participants (M = 2.75, SD = 2.45). However, given the non-normal

distributions of the GeoCat scores, the medians and modes are more informative. Whereas the median number of attributional responses for non-hypnotized participants is 0, the median number for hypnotized participants is 2. The mode number of attributional responses for non-hypnotized participants is 0; however, the distribution of attributional responses for hypnotized participants is bimodal (0 and 6). These results are summarized in Table 1.

Table 1. Descriptive statistics for attributional responses on the GeoCat by highly hypnotizable participants.

Condition of participants	*n*	Mean	Std. Deviation	Median	Mode(s)
Non-hypnotized	37	1.89	2.48	0	0
Hypnotized	32	2.75	2.45	2	0 and 6

CHAPTER 4: DISCUSSION

In this study, I examined both the psychoanalytic theory of hypnosis and the construct validity of a relatively new, non-verbal measure of primary process mentation called the GeoCat (Brakel, Kleinsorge, Snodgrass, & Shevrin, 2000). I accomplished this by investigating the GeoCat scores of a hypnotized sample as compared with a non-hypnotized sample. In order to be able to say with reasonable certainty that the participants used in the analysis had experienced the product of hypnosis (Nash, 2005), I retained the GeoCat scores of only highly hypnotizable participants (those who scored 8 or greater on the HGSHS:A) (n = 69). Thirty-two of these participants were administered the GeoCat during hypnosis, and 37 were administered the GeoCat in a non-hypnotized, resting state. My hypothesis was confirmed by a Mann Whitney U test, which found that the distribution of GeoCat scores in the non-hypnotized group differed from the distribution of GeoCat scores in the hypnotized group. Further exploration confirmed that this difference occurred in the hypothesized direction by revealing that the distribution of hypnotized participants contained greater mean, median, and mode values. In summary, relatively greater levels of primary process mentation as measured by attributional responses on the GeoCat were more likely to be found in the hypnotized condition than the non-hypnotized condition.

Despite previous research with the GeoCat having resulted in medium-large effect sizes, the effect in the current study is small-medium. The histograms in Figure 2 provide a visual representation of this finding. Whereas there were many more participants in the non-hypnotized condition who endorsed either 0 or 1 attributional item, the increases in the hypnotized group occurred mostly at scores of 2,3, and 4 attributional items. To put it another away, while non-hypnotized participants indeed exhibited more secondary process mentation, hypnosis appears to

have induced more mixed primary and secondary processes as opposed to more primary processes alone. This is supported by the observed increase in median between the two groups, which rose from 0 in the non-hypnotized group to only 2 in the hypnotized group. Interestingly, although hypnotized participants experienced comparatively more primary process mentation that non-hypnotized participants, hypnotized participants still experienced more secondary than primary process mentation overall.

Despite the smaller than expected effect size, the findings indicate that hypnosis did increase primary process mentation. This result has several implications. First, the current study provides further construct validation for the GeoCat as a measure of primary process mentation. In accordance with psychoanalytic theory, previous research on the GeoCat had shown that attributional responses (and therefore greater primary process mentation) are more likely to occur in preschool-aged children (Brakel, Shevrin, & Villa, 2002), anxious persons (Brakel & Shevrin, 2005), psychotic persons (Bazan et al., 2013), and in the unconscious (Brakel et al., 2000). Hypnosis is another state in which theory predicts a greater incidence of primary processes. The current research provides further evidence that the GeoCat indeed measures the psychoanalytic construct of primary process mentation. This study also suggests that the GeoCat is capable of measuring primary processes across the two types of regression posited by psychoanalytic theory: pathological and adaptive. Whereas conditions such as psychosis and anxiety indicate pathological regression, the hypnotic state is thought to be characterized by a regression that is adaptive (Gill & Brenman, 1959) and in service of the ego (Kris, 1936). The results of this study indicate that the GeoCat is able to measure an increase in primary process mentation as an adaptive regressive process as well as a pathological one.

The limited movement of hypnotized participants toward primary process mentation observed in the current study may be indicative of adaptive hypnotic regression. Nash (1991) has argued that in comparison to pathological regression, adaptive regression in hypnosis is "transient, contained, and reversible" (p. 161), as well as "flexible and effective" (p. 167). Perhaps it is the transient, contained, and flexible quality of hypnotic regression that led more hypnotized participants in the current study to exhibit mixed primary and secondary processes as opposed to more primary processes alone. This flexibility, as opposed to rigid secondary *or* primary process mentation, may allow for the therapeutic gains that can be made with hypnosis and the regression it entails.

The current study also provides further evidence for the psychoanalytic theories of thinking and hypnosis. While previous studies of mentation in the hypnotic state had established that an induction into hypnosis is accompanied by greater access to primary processes, these studies employed time consuming assessments of primary process mentation that require a great deal of training and knowledge of psychoanalytic theory to administer. The GeoCat, on the other hand, can be administered quickly and can be scored with little knowledge of psychoanalytic theory. As a result, the GeoCat is an easily accessible entry point into research on the psychoanalytic theory of thinking. As such, it has the capacity to spur interest in and exploration of one of Freud's earliest theories. But perhaps more importantly, the current study marks an instance of a non-verbal measure of primary process mentation being used to detect an increase in primary processes during hypnosis. It has been theorized that primary processes are more directly associated with visualization and non-verbal communications than spoken or written language (Freud, 1923/1961; Dorpat, 2001; Epstein, 1994; Schore, 2011). Therefore, the current

results provide a new and important confirmation of the psychoanalytic theory of hypnosis by establishing that changes in mentation that occur during hypnosis can be measured non-verbally.

Limitations and Future Directions

The current study has some methodological limitations that are important to consider. First, while use of the HGSHS:A has the advantage of obtaining hypnotizability scores from many participants at once, it also has some drawbacks. Primarily, it is self-scored and it is not as sensitive as some other scales of hypnotic susceptibility. An alternative scale that is scored by the researcher and better equipped to make fine distinctions regarding hypnotizability is the Stanford Hypnotic Susceptibility Scale: Form C (SHSS:C) (Weitzenhoffer & Hilgard, 1962), which is administered to participants individually. It is composed of items that are generally more difficult to pass than the HGSHS:A items. When researchers plan on using the SHSS:C, the HGSHS:A is typically administered first in order to screen for potentially highly hypnotizable participants. The SHSS:C is then administered to confirm or deny the participant's high hypnotizable status. Although a study similar to the current one using the SHSS:C would be a significantly greater undertaking, it would provide the researcher with a greater level of certainty regarding participants' levels of hypnotizability.

Another limitation involves the administration of the GeoCat during the assessment of hypnotizability. That is, the interruption of the standard protocol to administer the GeoCat may have had some effect on hypnotizability scores. As reported above, the distribution of scores for participants who took the GeoCat during hypnosis was not significantly different than the distribution of scores for participants who were administered the HGSHS:A uninterrupted. However, the difference does approach significance.

Future research involving the GeoCat might address the methodological limitations of the current study by employing a larger scale, more intensive design that screens participants by initially measuring hypnotizability with the HGSHS:A. High scorers could then be invited back to the laboratory for further investigation of their hypnotizability with a more sensitive instrument, such as the SHSS: C. Additionally, the measurement of primary process mentation might occur in a subsequent experience with hypnosis that would be more characteristic of the exploratory manner in which hypnosis is employed clinically. Participants would likely be more familiar and comfortable with hypnosis at that point, and the resulting greater immersion in the experience might produce larger shifts toward primary process mentation.

For additional construct validation of the GeoCat, further research might endeavor to measure primary process mentation in other situations that involve regression in service of the ego, such as creativity. For example, the GeoCat might be administered after participants have listened to a poem or after they have produced a painting. The results of a study that employs art and creativity in this manner could also illuminate additional differences between pathological and adaptive regressions.

Finally, future research on primary processes in general might involve the development of additional non-verbal measures of primary process mentation. For instance, instead of shapes, pictures or artistic renderings of familiar objects could be employed. To use an example from above, a GeoCat-inspired item in this vein might present subjects with a top central image of a dinner table and two images just beneath it: one of a giraffe and another of a roasted turkey. Respondents would be asked whether the giraffe or roasted turkey is most similar to the dinner table. The giraffe would be a primary process response because it shares the concrete physical

attribute of having four legs with the dinner table. The roasted turkey would be a secondary process response because it is abstractly related to the dinner table.

CHAPTER 5: CONCLUSION

In conclusion, the findings of the current research indicate that for highly hypnotizable people, an induction into the hypnotic state is characterized in part by a modest increase in primary process mentation. These results provide further construct validation for the GeoCat, a brief and non-verbal measure of primary vs. secondary processes, and also establish further evidence in support of the psychoanalytic theories of thinking and hypnosis. The results also suggest that the GeoCat is capable of measuring shifts toward primary processes that occur during adaptive regression in addition to its previously demonstrated ability to detect changes in mentation occurring during pathological regression. Finally, the findings indicate that an increase in primary process mentation during hypnosis can be measured by non-verbal responses to non-verbal stimuli. This is important because visual images and non-verbal communications are thought to be more closely related to primary processes than language. Although the study has some methodological limitations, the current findings are nevertheless important and open doors for further inquiry into the psychoanalytic theories of hypnosis and thinking.

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APPENDIX

HGSHS:A Alterations for Incorporation of the GeoCat

Now let's try something else. You are very relaxed now. Remain deeply relaxed... In a few moments, I shall ask you to interact with the packet of paper in front of you. When you do so, you will remain completely relaxed; as I ask you to open your eyes, you will remain as relaxed as ever.

Slowly and comfortably, open your eyes. You are relaxed. Now, turn over the first page of your packet... Look at the top central figure; decide which of the two figures below is most similar to the top central figure. Rip the line pointing to your choice.

All right. You are still very relaxed.

Now, turn to the next page. Which of the two figures below is most similar to the top central figure? Rip the line pointing to your choice.

Great. And turn to the next page. Which of the two figures below is most similar to the top central figure?

And the next page.

Which of the two figures below is most similar to the top central figure?

The next page.

Which of the two figures below is most similar to the top central figure?

Turn to the next page, still very relaxed.

Which of the two figures below is most similar to the top central figure?

And the next page.

Which of the two figures below is most similar to the top central figure?

There, you are done with the packet for now. Close the packet; return the pages to their original position and just relax.

Now again allow your eyes to become tightly shut. You feel them shut. Tightly shut. Now relax.

VITA

Gyrid Lyon was born in Chicago, Illinois to Mary Natali and Bernie Lyon. He has a younger brother, Anders. He grew up in Indianapolis, Indiana and attended Broad Ripple High School there. After graduation, he moved to Bloomington, Indiana where he studied at Indiana University, graduating with a Bachelor of Arts degree in Telecommunications in 2004. He then returned to Indianapolis where he worked at several excellent restaurants, holding varied positions such as busboy, server, wine buyer, and general manager. Before long, he began pursuing further undergraduate studies, this time in psychology, at Indiana University – Purdue University Indianapolis (IUPUI). In the autumn of 2012, he was admitted to The University of Tennessee, Knoxville as a doctoral candidate in the field of Clinical Psychology. Gyrid has a fiancée, Amanda, and soon-to-be step-son, Preston.