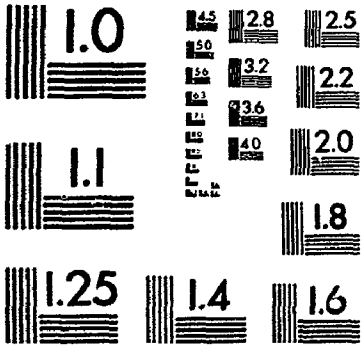
PM-1 3½"x4" PHOTOGRAPHIC MICROCOPY TARGET
NBS 1010a ANSI/ISO #2 EQUIVALENT



THE USE OF THE MAGICAL IDEATION SCALE TO MEASURE MAGICAL THINKING

by

LINDA A. JOHNSTON, Hon.B.Sc., M.Math.

A dissertation submitted to
the Faculty of Graduate Studies and Research
of Carleton University
in partial fulfilment of
the requirements for the degree of

Doctor of Philosophy (Psychology)

Department of Psychology
Carleton University
Ottawa, Ontario, Canada

July 29, 1991

ISBN 0-315-70925-1

The undersigned hereby recommend to

the Faculty of Graduate Studies and Research

acceptance of the thesis submitted by

Linda Johnston

in partial fulfillment of the requirements

for the degree of Doctor of Philosophy

Chairman, Department of Psychology

External Examiner

Thesis Advisor

Carleton University

October, 1991

Abstract

The Use of the Magical Ideation Scale to Measure Magical Thinking

This dissertation research addressed the question of whether magical thinking is necessarily an indicator of psychopathology. This author contends that magical thinking is a characteristic of normal, healthy adults and indicates a propensity for imaginative thought processes. This contention does not, however, deny that magical thinking may sometimes be associated with psychopathology. This research verified that magical thinking in "normal" adults can co-exist with logical abilities. In addition this research began a preliminary investigation of background factors for magical thinking in adults.

The Magical Ideation Scale (Eckblad & Chapman, 1983) was developed as a predictor of schizophrenia or psychosis. Consequently researchers began using the Magical Ideation Scale, assuming that it predicted psychosis. Long-term followup, however, has to date failed to substantiate this hypothesis. An added complication in this research area stems from the practice of combining scores on the Magical Ideation Scale with scores from another scale that purports to measure perceptual aberrations. The present research investigated the characteristics of the Magical Ideation scale and

attempted to validate this instrument.

The Magical Ideation scale and the Perceptual Aberration scale were administered to university students in order to investigate the psychometric properties of these scales. In addition, four levels of magical thinkers were randomly selected to participate further: very high magical thinkers, fairly high magical thinkers, a control group and low magical thinkers. The two scales were re-administered along with measures of imagination and psychopathology, measures of logical ability and a questionnaire designed to identify background factors in adult magical thinking.

The principal findings concerning the characteristics of the Magical Ideation Scale and the Perceptual Aberration scale were threefold. The Magical Ideation scale had moderate test-retest reliability while the Perceptual Aberration scale had poor test-retest reliability. When these two scales were summed, the resulting Per-Mag entity had high test-retest reliability.

Despite the moderate reliability of the Magical Ideation scale and the high reliability of the Per-Mag entity, the major findings of the present study raise some questions about the validity of all three of these scales. Contrary to the hypothesis that these scales are strong predictors of psychopathology, Magical Ideation loaded only onto an imaginal factor. In addition, neither magical

thinking, perceptual aberration, nor Per-Mag predicted more than trivial amounts of variance in psychopathology, after the influence of normal imagery variables was statistically controlled. Level of magical thinking occasionally failed to relate in a monotonic fashion to indexes of psychopathology. In these cases, subjects with only relatively high magical thinking attained higher psychopathology scores than subjects with very high magical thinking. Magical thinking related indirectly to psychopathology through shared variance with the imaginal measures. High magical thinking was not inconsistent with logical abilities. Control subjects' scores failed to differ significantly from the scores of high magical thinkers.

Background factors in adult magical thinkers may include a family of origin in which conflict was relatively high, cohesion was low and an achievement orientation was emphasized. High magical thinkers reported (i) a happier childhood, (ii) higher fantasy orientation in childhood, (iii) a greater degree of group orientation in childhood, and (iv) a greater level of adult adjustment.

This study found that magical thinking is consistent with normal functioning and that high magical thinkers have a propensity to imaginative thought. Suggestions that high magical thinking is an indicator of psychopathology

may reflect a problem in the very subjective nature of psychologists' definitions of psychopathology.

Acknowledgements

The experience gained through working on this doctoral dissertation adds an important element to both my personal and professional development. The assistance and encouragement of others has made this experience both pleasurable and possible.

For the direction, encouragement, and coaching provided by my thesis advisor, Dr. Nicholas P. Spanos, I am most thankful. The breadth of his knowledge and experience combined with his caring, compassionate and positively critical approach provided a solid base upon which I could carry out my research.

Robert Whittaker has provided support and understanding over the past many years. His role as my life partner is much broader than this dissertation research. He is there to help me in my times of need and, throughout the span of time spent on this dissertation research, Robert has been there to encourage through the times of doubt and discouragement. I thank Robert for his giving and his encouragement and for the time I have taken very much for myself over the past few years.

Clifford and Norene Johnston deserve credit for providing me with a healthy set of personal values which direct me in my work and my life. I thank them for a hopeful and optimistic outlook on life, a sense of purpose and high valuing of drive and persistence. I am grateful

for their encouragement and belief in me.

My clinical supervisor, Dr. Nedra Lander merits special thanks for her unique vision of magical thinking both in a clinical setting and in day-to-day life. I dearly value the time we have spent discussing magical thinking as a set of beliefs and as a world view, in the psychotic individual's life, in the normal individual's life, in clients'/patients' lives and in therapists' lives. Her model and views of beliefs and aspects of personality have served to support and to assist me in building some of my own views.

Finally, Carleton University has provided a helpful environment for my learning and growth during my doctoral program. I have received help and guidance from many staff and faculty in the Department of Psychology as well as in Graduate Studies and numerous other departments and resource/service groups.

To all those I have mentioned and to those who remain unnamed, I wish to acknowledge my gratitude for the assistance you have so freely given. Without your support this dissertation research would not have been possible.

Table of Contents

List of Tables and Figures

THE USE OF THE MAGICAL IDEATION SCALE TO MEASURE MAGICAL THINKING

Introduction

This dissertation first presents a review of magical thinking from three perspectives: magical thinking as a characteristic of child development, magical thinking in the context of causality and logic, and magical thinking as an indicator of psychopathology. Given that a large portion of the investigation focused on the efficacy of the Magical Ideation Scale as a predictive measure of psychopathology, the introductory literature review includes a major subsection on the development of magical thinking as an indicator of psychopathology and research involving the Magical Ideation Scale.

In Piagetian development theory, children go through a phase in which they believe in a magical, non-causal reality. Multilinear developmental models (Flavell, 1963; Kahana, 1970; Price-Williams, 1975; Werner, 1948) describe the parallel development of non-causal, magical thought with other forms of thought including logical thought. There is a paucity of information, however, concerning the childhood antecedents of magical thinking in adults.

Lesser and Paisner (1985) found that adults whose spiritual beliefs denied the existence of chance had a stronger belief in the supernatural and a higher internal

orientation than a control group. The spiritual believers did not, however, differ from controls in logical abilities. This work (Lesser & Paisner, 1985) supports the contention that logical abilities and magical thinking can co-exist in the same individuals.

Magical thinking defined in terms of certain beliefs that lack scientific support and that are frequently labelled as occult has been included among the DSM-III-R diagnostic criteria for both schizophrenia and schizotypal personality disorder. This usage is based upon a questionable foundation in that the definition of magical thinking used encompasses many common, and not necessarily psychopathological, beliefs. This pathological conceptualization of magical thinking has been incorporated into the Magical Ideation Scale (Eckblad & Chapman, 1983) which purportedly predicts schizophrenia. Previous investigation into the nature of magical thinking in adults (Johnston, 1987) found that high magical thinking may be both an indicator of an imaginative inner orientation and an indicator of psychopathology.

This dissertation research investigates each of these three research issues; namely, the childhood antecedents of adult magical thinking, the co-existence of magical thinking and logical abilities, and magical thinking as an indicator of an imaginative inner orientation and an indicator of psychopathology.

Magical Thinking

Magical Thinking in Child Development and Onward

Piaget (1926, 1929, 1951, 1960, 1974) has written a great deal about the evolution of various stages of the development of thought in children and about their characteristic world views. Many researchers have shown that the tendency of young children to engage in fantasy and the ability to distinguish fantasy from reality is a developmental process (Klinger, 1969; McGhee & Johnson, 1975; Morrison & Gardner, 1978; Prentice, Manosevitz, & Hubbs, 1978). Piaget's model and theory (1929, 1951, 1960) indicate that the preoperational child (ages 1 to 8) has shifted from the earlier held belief that environmental stimuli are physical extensions of the self to the egocentric belief that these stimuli are filled with thoughts and feelings identical to her or his own. This egocentric phase is characterized by three distinct, yet related, basic thought processes collectively described as "nonnaturalistic thought" (Piaget, 1929; Piaget, 1951): artificialism, animism and magical thought.

Artificialism is the belief that natural phenomena and objects are created by man. Children at this stage believe, for example, that people made mountains for children to slide on and it gets to be winter because children like to ice skate (Piaget, 1960). Animism is the belief that inanimate objects are actually animate.

Things that move or appear to move are seen as live, feeling creatures with a mind of their own - often matching the cognitions and feelings of the child. The sun sets, for example, because it wants to and dreams come from the night or from the sky. Animism includes the anthropomorphizing of animals; so a pet dog converses with a child. Magical thought is at the heart of the child's beliefs. From the Piagetian perspective, it is the belief that she or he can control the fate of external objects through various thoughts (e.g. wishes) and actions (e.g. looking, counting). The child tries to influence objects or events by magic but these events appear to be full of feelings and intentions which can be both friendly and hostile. This is the logic of magic, of psychological as opposed to physical causality. It snows, not because of precipitation in the sky, but to play in. These beliefs can be resistant to change. Koutsourais (1984) attempted to modify beliefs about a remote event such as evaporation by giving more realistic information about the event. Koutsourais (1984) predicted that in this group of 4- and 5-year-old children the more naturalistic causal explanation would be adopted and would generalize to a subsequent explanation. These attempts to alter magical conceptions were unsuccessful. Preoperational magical thought also predisposes to ritual. A child may think that if he counts the number of times the radiator makes a

noise or counts his breaths, his mother will not die (Piaget, 1960). Or if a child holds hands with, for example, a lazy boy, she may believe that she will become lazy too (Piaget, 1960). To counteract these effects, she may create a magical ritual of vigorously rubbing her hands together or removing the laziness by rubbing her hand against a wall. Piaget (1929) sees magical thinking as a natural outcome of egocentrism: "... from the moment the child confuses thought, or names, etc., with things, though not realizing the internal and subjective nature of the act of thinking, it becomes natural for him to use these names or thoughts to influence things..." (p. 155).

Brunnquell (1982) defines magical thinking as the "resultant shift in the organization of thought" (p. 11) when an individual attempts to adapt to unusual or difficult circumstances. Brunnquell's work focused on magical thinking in a group of normal children whose ages (4.5 to 7 years) would be expected to span a period of transition in magical thinking. He found a surprising absence of age differences on his composite measure of magical thinking. This Magical Thinking Composite Score was the mean score derived from individual answers on three measures of magical thinking; namely, Scout Stories, Sue and Scout Stories and Why-do-you-think Stories. The three measures all used brief stories, four or five sentences long, followed by several questions. Brunnquell

developed these stories such that "each story depicts the effect of some thought, word, or action representing a thought, on a being or thing in the child's external world" (p. 60). An example of a Sue and Scout Story is the following:

> One day, when Sue and Scout were playing outside, Sue's Mom came out and told her she had to come inside now. Sue didn't want to go, and got mad at her Mom for ruining her fun, and she was thinking bad things as she went inside. Then suddenly she was afraid that her Mom might get hurt because she was thinking bad things.
>
> 1. If Sue thinks bad things about her Mom, could that make her Mom get hurt?
>
> 2. What might happen if she thinks bad things about her Mom?
>
> 3. If you think bad thoughts, do bad things happen because of your thoughts?

The child is required to invent answers which are judged to be "magical" or rational.

According to cognitive development theory, the age range studied by Brunnquell (1982) covered the basic shift from preoperational to concrete operational thought and he confirmed a highly significant age difference between younger and older subjects on a Piagetian measure of causality. But the Magical Thinking Composite Score did

not correlate with Piagetian development level as measured by age nor did it correlate with the measure of causality. Brunnquell also found that degree of magical thinking was not an indicator of behavioral problems as measured by teachers. It was concluded that the presence of magical thinking in normal children and the lack of correlation to behavioral problems and classroom performance problems indicates that magical thinking is a natural phenomenon in children, is independent of age within the age range studied, and is not necessarily pathological.

Although many of the Piagetian shifts in cognitive structure occur by the time of Piaget's concrete operational phase (ages 8 to 12), remnants of this magical reality live on into adolescence and adulthood (O'Connor, 1984). Some of the natural rituals and natural obsessions and compulsions of children can persist into adulthood and can range from normal through unusual to pathological behaviours. Piaget (1962) noted the presence of occasional magical thinking in adults but described it as occurring only under certain unusual conditions: anxiety, involuntary or sympathetic imitation, psychopathology, and 'monoideic desire' in which the desire for something outside one's control gets so strong that it 'becomes hypostatised in the things and by projection personifies fate and events' (p. 164). It would appear that many forms of magical thinking in normal adults falls within the

realm of normal or somewhat unusual behaviour as opposed to pathological behaviour. O'Connor (1984) points out that "One can notice the vague and uncertain boundaries between self and world when adults clear their throats upon hearing another with a husky voice, or by any superstitious behaviour or thought in which people engage. Golfers or bowlers are magical thinkers when they exercise 'body English' on the ball that has been hit or thrown or when gamblers ritualistically shake and blow on dice with prescribed verbal chatter." (p. 507).

In other words, magical thinking is a thought form that never completely disappears, no matter how mature the individual (Nemiah, 1975). It is only covered by a layer of rational thinking, and it reappears readily in daydreams, creative activities, dreams - or under stress. Magical thinking may creep into the logical processes whenever the understanding or control of reality does not seem possible.

Pilette (1983) gives four examples of magical thinking as practised by psychiatric inpatient staff, namely: the taboo against mentioning discharged patients by name, the unspoken rule against the unrestrained expression of optimism, the use of the full moon theory, and the "never say never" rule when discussing certain subjects, such as, "We've never had a suicide here."

Just as magical thinking occurs in adulthood, so too

does its relative, animism. Most authors (Brown & Thouless, 1965; Looft & Bartz, 1969) conclude that animistic thought in adults differs from its childhood form in that adults use this form of thought by choice, or in the 'service of higher ends'. Brown and Thouless (1965) indicated that one of the uses of adult animistic thought is as a means of transcending the limits of language through the use of metaphor.

Although rituals and a magical world view from cultures different from our own may be reported (eg Frazer, 1959) as primitive or very unusual, we have only to think of certain of our own cultural rituals to find parallels. Rituals such as baptism to eliminate sins, prayer, rites of passage such as confirmation or a bar mitzvah, or late nineteenth or early twentieth century remedies for illness and pain are very similar to the rituals of these other cultures (O'Connor, 1984).

Magical Thinking and Causality and Logic

Piaget (1974) described the relationship between the structures of causality and the structures of logical operations as interdependent. In Piaget's model, the two are initially undifferentiated. Gradually, the realms of logic and causality become differentiated. Causal structures become more tied to experimenting with objects and eventually generalize to the relations between the objects. Logic structures are developed through a more

internal process, through the individual's reflecting and abstracting from her internal co-ordinations of actions. The development of each of these structures builds upon the other. Causality may result in a relationship being applied to objects through physical experience (for example, a child discovers that turning on the knob on the bathroom door sometimes makes it open). This in turn may allow logical deductions about that relationship beyond the physical experience (for example, turning things makes things open or turning things lets me go into that room), which in turn may result in a new form of causality relationship being attributed to the same or other objects (for example, the child tries turning the knobs on the kitchen cabinets to no avail, but tries turning the knob on the television set and the TV turns on, thus leading to another possible inner logical deduction) (Lesser & Paisner, 1985, p. 58).

The adult concept of causality incorporates the concept of chance. Piaget (1951) described chance as the discovery of indetermination. It involves the dissociation of the possible and the necessary. In the thoughts of a young child, chance and necessity are undifferentiated. The child's search for order in the universe under the structures of logic and rational operations leads him to develop an "intuition of probability" (Lesser & Paisner, 1985, p. 59) and with it the notion of chance where chance

is seen as "interference of a causal series" (Piaget & Inhelder, 1951, p. xvi). The child must develop an understanding of combinatorial logic and ordered permutations during the period of formal operations in order that the probable (chance events) can become synthesized with the certain (operations). "A mature notion of chance is seen to be present in the 'normal civilized adult' except under states of passion or psychopathology; this is in contrast to 'the primitive mind' where every event is perceived as a result of a cause, hidden or visible" (Lesser & Paisner, 1985, p. 59).

Shweder (1977) sees most adults as being inclined to look for a resemblance between objects and events in order to find some meaning or symbolic connection. He stated that magical thinking is present in all adults and represents a natural aversion to being forced to draw complex, indirect or incomplete conclusions from experience. Magical thinking provides a more direct and/or simple symbolic connection or relationship than causal, relational or logical thinking.

Several models have been elaborated in which causal/noncausal thinking and logical thinking are seen as developing in parallel and co-existing in harmony (Flavell,1963; Kahana, 1970; Price-Williams, 1975; Werner, 1948). According to these theories, an individual's sphere of activity and affective state are among the variables

that determine the form of thinking used at any given time.

Lesser and Paisner (1985) supported this model by showing that a form of non-causal thinking can develop into adulthood and co-exist with logic. They selected, as their atypical group, members of a nonsectarian spiritual organization whose teachings deny the existence of chance while attributing great control to the individual. They found no significant differences between the atypical group and a control group on logic ability. But the atypical group had both a higher internal orientation and a stronger belief in the supernatural.

The present research conceptualized magical thinking and logical ability as two nonpathological forms of thinking that can co-occur in the normal adult. One purpose of the present study is to test this hypothesis.

Magical Thinking as Psychopathology

Definition and Use In DSM-III-R

In the clinical sphere, DSM-III-R (APA, 1987) defines both "schizophrenia" and "schizotypal personality disorder" using, as one of its diagnostic criteria "magical thinking, e.g., superstitiousness, belief in clairvoyance, telepathy, 'sixth sense', 'others can feel my feelings'" (p. 195 and p. 342). Relatedly, Meehl (1964) defined magical thinking as "belief, quasi-belief, or semi-serious entertainment of the possibility that events

which, according to the causal concepts of this culture, cannot have a causal relation with each other, might somehow nevertheless do so" (p. 54). Meehl's use of the term magical thinking clearly refers to a symptom of psychopathology - quite some distance from a normal, adaptive developmental function.

Over many years, numerous attempts have been made to develop scales to predict psychopathology. A number of investigators have worked on the development of scales to indicate psychosis proneness or schizophrenia proneness. Examples include Eysenck and Eysenck's Psychoticism Scale (1976), Golden and Meehl's Schizotypy Scale (1979), and the 2-7-8 profile of the Minnesota Multiphasic Personality Inventory (MMPI) all of which use single scales checking for many different symptoms. In more recent years, many indices have been developed to measure particular symptoms of psychopathology.

Meehl's Model for Schizophrenia

Meehl (1962) developed a highly influential genetically-based model for schizophrenia. In this model, certain individuals inherited the schizoid taxon. This genetic condition, referred to as "schizotaxia", involved an integrative neural defect predisposing the individual to the possible development of schizophrenia. All of these schizotaxic individuals then went on to develop "schizotypy". This term refers to the general personality

organization or personality structure that purportedly develops in individuals with schizotaxia. Meehl suggested that the schizotaxic individual's personality organization evolved through a history of social learning and, through the combination of genetic and environmental factors. The interaction of these factors produced either a schizotypic condition conducive to the development of schizophrenia or a schizotypic condition in which social learning and environmental factors were sufficiently positive to inhibit the expression and/or development of schizophrenia. A minority of schizotypes go on to exhibit schizophrenia. In this model, Meehl suggested that the schizotaxic genetic defect and its subsequent schizotypic personality organization were necessary preconditions to the development of schizophrenia; or, in other words, schizophrenia could not develop from any other source. Schizotaxia and schizotypy were not, however, sufficient conditions. Individuals exposed to a positive environment and social structure do not necessarily develop schizophrenia.

Meehl's model developed out of Bleuler's (1950) classic work on schizophrenia. Bleuler enumerated three fundamental symptoms of schizophrenia. These consisted of loss of continuity of associations, deterioration of affect, and ambivalence (of affect, of will, and of intellect). To these fundamental symptoms, Bleuler added

"autism", referring to the loss of contact with the outside world and the tendency to live inside oneself.

The Meehl model of schizophrenia postulated, in addition to its genetic foundation, four cardinal personality traits within schizotypic individuals who were predisposed to schizophrenia. These four traits were: cognitive slippage, social aversiveness, anhedonia, and ambivalence. Bleuler's associative dyscontrol became the basis for Meehl's "cognitive slippage". Meehl incorporated Bleuler's ambivalence and postulated that Bleuler's autism and deterioration of affect were covered by a combination of his slippage, anhedonia and aversiveness. Meehl's cardinal traits became central to subsequent research carried out by the Chapmans.

Golden and Meehl (1979) carried out research on the detection of the schizoid taxon. Their primary concern was that of the classic bootstrapping problem, or, the problem of where to begin. The schizoid taxon clearly could not be identified at the neural level since researchers were then (as they still are now) unable to identify the physiological correlates of the purportedly genetic defect. Similarly, looking at individuals with schizophrenia gave the researcher a multitude of behavioral and other measures, but with no clear mapping backward to the neural level. So Golden and Meehl approached the problem of identification of the schizoid

taxon, or schizoidia, through the use of mathematical models. This work resulted in their Schizoidia Scale (Golden & Meehl, 1979); an instrument comprised of only eight items from the MMPI which they showed could predict schizophrenia. The development of this scale also became a fundamental building block for subsequent work by the Chapmans.

The Chapman Scales

The Chapman Scales - Development

Loren and Jean Chapman have long been involved in research on various aspects of schizophrenia, including, early symptoms of schizophrenia (Chapman, 1966), verbal behaviour in schizophrenia (Chapman, Chapman, & Miller, 1964), and thought disorder and attention in schizophrenia (Chapman & Chapman, 1973; Chapman, Chapman, & Daut, 1976). Based upon the Meehl (1962) model and the Golden and Meehl (1979) methodology, the Chapmans went on to look at more specific aspects of schizophrenia (Chapman, Chapman, Raulin, & Edell, 1978) using the schizoidia/ schizotypy model.

More recently their research (Chapman et al, 1984; Chapman, Chapman, & Miller, 1982; Chapman, Chapman, & Raulin, 1976, 1978; Eckblad & Chapman, 1983; Mishlove & Chapman, 1985) has centred on the development of a number of scales to be used as predictors of schizophrenia. Their work has sparked a good deal of interest among researchers

and clinicians working with schizophrenia.

The Chapman's developed several scales (Chapman, Chapman, & Miller, 1982; Chapman, Chapman, & Raulin, 1976, 1978; Chapman et al, 1984; Eckblad & Chapman, 1983) based to a large extent upon Meehl's four cardinal traits; namely, cognitive slippage, social aversiveness, anhedonia, and ambivalence. Their earliest work along these lines (Chapman, Chapman, & Raulin, 1976) involved the development of true-false scales to measure anhedonia, the lowered ability to experience pleasure. Items were developed to measure the enjoyment of pleasure as defined by a strong positive mood, attitude, and affect, looking forward to the experience, satisfying memories of the experience, and actively putting forth energy to repeat the experience. Two categories of pleasures were measured: physical pleasures such as the pleasures of eating, smell, sound, touching, feeling, sex, temperament and movement; and interpersonal or social pleasures such as the nonphysical pleasure of being with people, talking, doing things with people, exchanging expressions of feelings, competing, loving, and interacting. Hence, the Physical Anhedonia Scale and the Social Anhedonia Scale were developed. Infrequency items to confirm valid test taking and desirability items to screen items for socially desirable responses were added to the scales.

In its final revised form, the Physical Anhedonia

Scale is a 61-item true-false scale measuring the lowered ability to experience physical pleasure. Sample items include "I have always had a number of favourite foods" and "I have always loved having my back massaged". The revised Social Anhedonia scale is a 40 item true-false scale measuring lowered ability to experience social pleasure. Sample items include "I have often enjoyed long discussions with other people" and "Getting together with old friends has been one of my greatest pleasures".

Two years later, the Chapmans moved into a slightly different realm - that of body-image perception (Chapman, Chapman, & Raulin, 1978). In their continued search to measure different symptoms of schizophrenia, they used prior research on body-image aberration which pointed to the schizophrenic's reported inability to have accurate perceptions about his body. They constructed a true-false questionnaire around various reported body-image aberrations. Included in this questionnaire were items measuring experiences concerned with: (a) unclear boundaries of the body vis-a-vis the environment or other objects, (b) feelings of unreality or estrangement of parts of one's body, (c) feelings of deterioration of one's body, (d) perceptions of change in the size, relative proportions, or spatial relationships of one's body parts, and (e) changes in the appearance of the body. The original Body-Image Aberration Scale was modified to

include unusual visual, auditory and other sensory perceptions. In its revised form this scale became the Perceptual Aberration Scale comprised of 28 items from the original scale and 7 sensory aberration items. Sample items are "My hearing is sometimes so sensitive that ordinary sounds become uncomfortable" and "At times I have wondered if my body was really my own".

Based upon Meehl's work (1962), the Diagnostic and Statistical Manual of Mental Disorders magical thinking criteria for both schizophrenia and schizotypal personality disorder, as well as their own previous work with schizophrenic thought (Chapman, 1966; Chapman & Chapman, 1973), the Chapmans went on to develop a scale to measure magical thinking. Magical thinking in this context was defined as the belief that events have a causal relation with each other when cultural norms say otherwise. However, it is important to realize that this definition of magical thinking includes belief in many non-causal influences which are supported both subculturally and by the popular press. For instance, this scale assesses belief in thought transmission, psychokinetic effects, precognition, astrology, spirit influences, reincarnation, good luck charms, and the transfer of psychic energy. The Chapmans developed the Magical Ideation Scale, a 30-item true-false scale measuring the above experiences as well as a few

experiences with little or no subcultural support such as secret messages in the arrangement of objects. Sample items are "Horoscopes are right too often for it to be a coincidence", "The government refuses to tell us the truth about flying saucers", and "I have felt that there were messages for me in the way things were arranged, like in a store window".

More recently, Chapman et al (1984) assessed Meehl's (1962) cardinal traits of social aversiveness and ambivalence through the development of a scale to measure a lack of concern for prevailing social and ethical standards, a lack of self-control, and a tendency to act immediately on one's impulses. They referred to this dimension as impulsive nonconformity and developed the Nonconformity Scale, a 51-item true-false scale. Sample items are "When I start out in the evening, I seldom know what I'll end up doing" and "I break rules just for the hell of it".

The Magical Ideation Scale

Eckblad and Chapman first administered the Magical Ideation Scale and several other scales to a normal college student population then selected high magical thinkers (those with scores greater than 2 S.D. above the mean for their sex) and control subjects (those within 0.5 S.D. of the mean for their sex) for interviewing. A modified version of Spitzer and Endicott's (1977) Schedule

for Affective Disorders and Schizophrenia - Lifetime Version (SADS-L) was administered. In three of seven classes of psychotic and psychoticlike experiences, the magical thinking group significantly exceeded the control group; namely, in thought-broadcasting experiences, voice and other auditory experiences, and aberrant beliefs. In the remaining four classes, namely, passivity experiences, thought-withdrawal experiences, visual experiences and telepathic reception of thoughts, no significant differences were found between magical thinkers and the control group. Eckblad and Chapman then compared the two groups on a list of ten schizotypal experiences gleaned from "experiences that have been described as schizotypal by one or another writer" (p. 221). A number of these schizotypal experiences appear to overlap with experiences and beliefs tapped by the magical thinking scale; for example, deja vu, sense of presence of some force or energy, and out-of-body experiences. Not surprisingly, they found a significant correlation between magical thinking and this list of schizotypal experiences. Eckblad and Chapman also attempted to measure trends toward other psychopathologies; namely, labile personality, intermittent depression, obsessive compulsive disorder, phobic disorder, generalized anxiety disorder, and panic disorder. They attempted to measure trends or "subclinical manifestations" (p. 222) having recognized that in their

college population it might not be reasonable to expect SADS-L diagnoses of these disorders. They found significant correlations between magical thinking and trends toward cyclothymia, mania/hypomania and depression. They also found that, in response to a yes-no question, subjects high in magical thinking reported significantly greater difficulty in concentration than the control group. Their results were inconclusive as to whether the psychosis to which high magical thinkers were supposedly prone was schizophrenia or affective disorder. Their principle conclusion was that individuals scoring high on their magical thinking scale were psychosis-prone. On this basis they undertook a longterm followup study.

Research Involving the Magical Ideation Scale

Neither the Magical Ideation Scale nor the Nonconformity Scale was normed beyond a college student sample. The scales as they currently exist require further work with normal samples and clinical samples as well as further clarification concerning their validity and reliability.

Prior to the above research published by Eckblad and Chapman in 1983, Chapman, Chapman, and Miller (1982) carried out a study of the Magical Ideation Scale and seven other scales of psychosis-proneness. They compared the scales (both Chapman scales and others) on reliability and intercorrelations. The alpha coefficient reliability

for the Magical Ideation Scale was found to be .82 for males and .85 for females. Limited test-retest reliability at six weeks for the Magical Ideation Scale was found to be .80 for males and .82 for females. Magical Ideation and Perceptual Aberration correlated highly at .70, and, as a result, most recent research has used a combined scale referred to as Per-Mag to represent one or the other or both of these two dimensions. However, a means of interpreting a high combined score on Per-Mag has not been proffered. Additionally, consistent cutoff criteria are not used in the literature to determine deviancy on this dimension. For example, two studies (Balogh & Merritt, 1985; Merritt & Balogh, 1986) classified subjects as high Per-Mag based on scores two or more standard deviations above the mean on one or both of the scales. One study, (Mishlove & Chapman, 1985), selected scores 2.0 S.D. above the mean on either scale or 3.0 on the sum of the two z scores; another study, (Miller & Chapman, 1983), selected scores 2.0 S.D. above the mean on either scale or at least 3.1 on the sum of the two z scores; another study (Beckfield, 1985) selected subjects, a majority of whom had scored two or more S.D.'s above the mean on either or both of the two scales; and another study, (Jutai, 1989), selected subjects whose scores were between 1.5 S.D. and 2.5 S.D. above the mean on the combined Per-Mag scale. A lack of consistency in research findings would not be

surprising given this variation in cutoff criteria.

Both Magical Ideation and Perceptual Aberration were found to correlate negatively with the Physical Anhedonia Scale (Chapman, Chapman, & Miller, 1982). This finding is inconsistent with the theoretical approach taken by the Chapmans. These scales apparently measure incompatible traits in college students. In the same study, the result for a very limited university outpatient clinic sample indicated that Physical Anhedonia did not correlate significantly with the other two scales - a very different finding from the significant negative correlation found with nonclinic college students. Given the small size of the client sample, Chapman et al pointed out that the lack of correlation in that sample could be due to the fact that individuals who scored high on both Physical Anhedonia and either Magical Ideation or Perceptual Aberration might have tended more often than other people to become hospitalized. These findings are difficult to explain. One possible explanation might be that (1) individuals high on both scales are more likely to become hospitalized, (2) individuals within the average range on at least one of these measures could go on to become college students but may end up being seen in a clinic (presumably if they are high on the other scale), and (3) individuals high on one and low on the other may be healthy, well-functioning college students. Which gets

back to the question of how is the negative correlation explained by their theoretical base? Is it an indicator of good health or of psychosis-proneness?

Several studies indicate that the MMPI 2-7-8 profile, and, in a more restrictive sense, the MMPI 2-7-8-0 profile, may identify subjects at risk for psychosis (Fine, 1973; Gilberstadt & Duker, 1965; Kelley & King, 1979; Koh, Kayton & Berry, 1973; Koh & Peterson, 1974; Peterson, 1954, 1963; Schulman, 1976; Steronko & Woods, 1978). The MMPI 2-7-8 refers to the composite of three MMPI subscales; namely the 2 (Depression), 7 (Psychasthenia), and 8 (Schizophrenia) subscales. The MMPI 2-7-8-0 adds in subscale 0, Social Introversion. In the aforementioned study by Chapman, Chapman and Miller (1982), positive correlations were found between each of four of the Chapman scales (Physical Anhedonia, Perceptual Aberration, Magical Ideation, and Nonconformity) and the Schizoidia Scale, and the composite 2-7-8 and 2-7-8-0 profiles of the MMPI. This finding by Chapman, Chapman, and Miller (1982) is difficult to explain given the negative correlation between Physical Anhedonia and both the Magical Ideation and Perceptual Aberration scales. Chapman et al postulated that the MMPI composite measures and the Schizoidia Scale might identify more than one kind of psychosis proneness as measured by their scales.

Fujioka and Chapman (1984) also worked with

individuals high on the MMPI 2-7-8 profile and individuals high on Per-Mag. They found that the two scales (MMPI 2-7-8 and Per-Mag) selected different groups of hypothetically psychosis-prone students and that the two groups were similar on psychotic and psychoticlike experiences. Per-Mag subjects were found to have had more schizotypal experiences than 2-7-8 subjects (note, however, that certain of these schizotypal experiences overlap items on the Magical Ideation Scale) and male Per-Mag subjects reported more hypomanic episodes than male 2-7-8 subjects. Fujioka and Chapman concluded that both groups were psychosis-prone but that either the Per-Mag subjects were more disturbed or the two groups were at risk for different kinds of psychoses. They did not hypothesize that the Per-Mag or 2-7-8 subjects would become psychotic. They pointed out that both scales almost certainly select false positive individuals not at risk and, therefore, that only some portion of the psychosis-prone individuals would become clinically psychotic.

Another study (Balogh & Merritt, 1985) reported contradictory findings. In work with over 1000 students, Balogh and Merritt reported that they had not found a single subject included in both 2-7-8 and Per-Mag groups. They also found no overlap between 2-7-8 subjects and anhedonic subjects. Their data indicate that the composite 2-7-8 and the three Chapman scales all identify

independent subgroups of high-risk individuals.

In a study of Social Anhedonia, Mishlove & Chapman (1985) found that among subjects who scored high on the Perceptual Aberration-Magical Ideation Scale, those who were also socially anhedonic reported poorer social adjustment, as measured by the Social Adjustment Scale, than did subjects with low scores on social anhedonia. They concluded that Per-Mag was a possible potentiator of social anhedonia and that social anhedonia was a symptom of social skill impairment.

Beckfield (1985) measured the interpersonal competence of student subjects who scored deviantly high on four of Chapman's scales of schizophrenia proneness. The Per-Mag group was not significantly different from the control group (subjects with scores no more than half an SD above the mean on all scales) on either roleplaying or the selection of appropriate responses to hypothetical interpersonal situations. It should be noted that mean intelligence was marginally higher in the Per-Mag group than in the control group, the anhedonia group, the non-conforming group or the combined-risk group.

In order to identify cognitive slippage (one of Meehl's four cardinal traits), Miller & Chapman (1983) tested high-risk subjects on both structured and non-structured continued word association tasks. Three groups with subjects high on Physical Anhedonia, Per-Mag, and

Nonconformity were selected. These groups failed to differ significantly from control subjects on cognitive slippage. Only mild cognitive slippage was found in a very limited subgroup of subjects who scored high on Per-Mag and Nonconformity. This negative result tends to indicate that cognitive slippage is not measured by the Chapman scales.

Using their own definitions of handedness, Chapman and Chapman (1987a) dichotomized subjects as left-handed or nonleft-handed. There were no significant differences between supposedly psychosis prone experimental groups and control groups on handedness. However, when subjects were dichotomized as right-handed or nonright-handed, there were significant differences between Per-Mag subjects and controls and between Per-Mag-Nonconformist subjects and controls, with more right-handedness in the control group in each case. Chapman and Chapman have merely confirmed a common problem in the literature on handedness; namely, that significant results may or may not be obtained depending upon the definitions used for right- and left-handedness. It is well known that not all nonright-handedness is pathological; the great majority of nonright-handers are clinically normal and, in fact, some of the great geniuses of history have been left-handed (Porac & Coren, 1981).

Frost and Chapman (1987) used Meehl's (1964) description of "chaotic" sexual dysfunction in

schizotypes, "a mixture of polymorph-perverse sexual components - a scrambling of heterosexual, homosexual, autoerotic, voyeuristic-exhibitionistic, sado-masochistic, oral, anal and genital components" (Meehl, 1964, p. 27). Frost and Chapman attempted to show that high Per-Mag subjects exhibited more polymorphous sexuality than controls. However, they did not find any significant differences for 22 sexual fantasy items or 19 sexual behaviour items. They found no differences on three of four subgroups of sexual arousal stimuli; namely, heterosexual arousal stimuli, homosexual arousal stimuli, and "deviant" arousal stimuli. They did, however, find that Per-Mag subjects selected more "other" arousal stimuli and were significantly more comfortable than controls during the interview. "Other" arousal stimuli included such items as romantic love stories, reading about sex, hearing people talk about sex, talking about sex, dirty words, dirty jokes or stories, music, motion, and alcohol. Given that Per-Mag subjects were more comfortable than controls, given that they did not endorse any more "deviant" items than controls, and given the nature of the "other" arousal stimuli, one might certainly question Frost and Chapman's contention that this shows that the Per-Mag group is more psychosis prone than controls. It may in fact be the controls who are uncomfortable talking about sex and who endorse the

"other" stimuli less frequently that should be considered "pathological".

In a proverb interpretation task (Allen & Schuldberg, 1989) no differences were found between Per-Mag and normal control college students on degree of literal interpretation of both familiar and unfamiliar proverbs. An examination of bizarre-idiosyncratic scores in the same study showed no main effect for Per-Mag and control group differences but did find a significant Group X Familiarity interaction. Per-Mag subjects obtained significantly higher bizarre-idiosyncratic scores on unfamiliar proverbs than they did on familiar proverbs. Allen and Schuldberg (1989) concluded that the interaction between familiarity of an abstract verbal task with scoring high on either Perceptual Aberration or Magical Ideation indicated an increase in positive thought disorder for this group.

Schuldberg and London (1989) investigated the relationship between schizotypal traits and psychological differentiation by measuring degree of field dependence/independence with the Group Embedded Figures Test. They found no significant differences between the Per-Mag college students versus college controls, and no significant effects for sex or the interaction. Further, they found that high Impulsive Nonconformity Per-Mag subjects, a group selected by other researchers as most deviant, did not differ from controls on the Group

Embedded Figures Test. In addition, post hoc testing of subjects who were high on either Magical Ideation or Perceptual Aberration but not both, showed no significant group differences on field dependence/independence despite the fact that "pure" Magical Ideation subjects were expected to show the most field independence.

In an investigation of the overlap in creative and schizotypal traits in normal college-student subjects, Schuldberg et al (1988) found both differences and a lack of differences between Per-Mag subjects and control subjects. Per-Mag subjects scored significantly higher than control subjects on the Barron-Welsh Revised Art Scale (Welsh and Barron, 1963), a measure of preference for figures and a correlate of creativity (Barron, 1965; Welsh and Barron, 1963), and on the How Do You Think (Davis, 1975), a biographical and personality measure relevant to creative behaviour. Schuldberg et al suggested that the Revised Art Scale appears to measure a perceptual style associated with creativity which is particularly relevant to the Perceptual Aberration Scale. On the other hand, no significant differences were found between Per-Mag subjects and controls for other measures of creativity; namely, the Domino Creativity Scale (Domino, 1970), the Gough and Heilbrun Creative Personality Scale (Gough and Heilbrun, 1980) and the Alternate Uses test (Guilford et al, 1978). The fact that significant

differences occur for two of five measures of creativity demonstrates the multidimensional nature of the constructs under consideration. These results suggest that both "creativity" and "schizotypy" as measured by the Perceptual Aberration Scale and the Magical Ideation Scale are multifaceted constructs requiring further specification.

In a study of the relationship of personality dimensions and the psychopathological traits of psychosis proneness in college students, Muntaner et al (1988) measured personality using Eysenck and Eysenck's (1976) three major personality dimensions, Psychoticism, Extraversion, and Neuroticism, as well as Claridge and Broks' (1984) scales measuring Schizotypal and Borderline personality traits. In addition, four of the Chapman and Chapman scales, Physical Anhedonia, Social Anhedonia, Perceptual Aberration and Magical Ideation, were used as measures of psychosis proneness. This study is unusual in that it treated the Magical Ideation Scale as a separate instrument and predictor of psychosis. Muntaner et al found that measures of psychosis proneness were differentially related to personality dimensions as expressed in a three-factor structure. They found Magical Ideation and Perceptual Aberration were positively related to Schizotypal Personality, Borderline Personality and Eysenck and Eysenck's Neuroticism; and that Physical

Anhedonia and Social Anhedonia were negatively related to Extraversion. None of the four predictors of psychosis were involved in a third factor in which Borderline Personality trait was positively related to Psychoticism. This study fails to support the four Chapman and Chapman scales of Magical Ideation, Perceptual Aberration, Physical Anhedonia, and Social Anhedonia as measures of "psychosis proneness" while leaving open the possibility that these measures may in some way relate to neurosis or to personality disorder.

Physiological Studies

A limited amount of research has been carried out to study physiological correlates of the Chapman scales. Four such studies are worthy of note. In a study of eye tracking dysfunction in psychiatric patients, Van den Bosch et al (1987) used four measures of psychoticism, the P-scale (Psychoticism) from the Eysenck Personality Questionnaire (EPQ) (Eysenck & Eysenck, 1975), the Unfriendly World scale from the Differential Personality Questionnaire (DPQ) (Tellegen, 1976), the Schizophrenism Scale (Nielsen & Petersen, 1976), and the Schizoidia Scale (Golden & Meehl, 1979) and four measures of psychotic symptoms, the Magical Ideation Scale (Eckblad & Chapman, 1983), the Perceptual Aberration Scale (Chapman et al, 1978), the Physical Anhedonia Scale (Chapman, Chapman, & Raulin, 1976), and the N-Scale (Neuroticism) from the EPQ.

In comparing groups of good and poor eye tracking subjects (by selecting upper and lower thirds of subjects' mean error deviations), Van den Bosch et al found that Perceptual Aberration and number of psychotic symptoms were significantly lower for the good eye tracking psychiatric patients and higher for the poor eye tracking patients and that Magical Ideation was only marginally lower for good eye tracking and higher for poor eye tracking. When they removed older subjects and subjects with affective disorders from their samples, these differences became somewhat more pronounced. Van den Bosch et al cautioned, however, that the effects of frontal lobe dysfunction require further analyses in order to more clearly determine the specificity of eye tracking dysfunction to psychotic disturbances.

A number of investigators have suggested that a backward masking deficit constitutes a trait marker of schizophrenia. On this basis Balogh & Merritt (1985) argued that if the Chapman scales identify schizophrenia-prone individuals, then groups formed on the basis of the Chapman scales should show a backward masking deficit. Visual backward masking refers to a group of phenomena in which processing and identification of an initial target stimulus is interfered with by the presentation of a subsequent "masking" stimulus. Balogh & Merritt chose two high-risk groups as defined by the Chapman scales:

subjects scoring high on Physical Anhedonia and subjects scoring high on Per-Mag as well as Nonconformity. No significant differences in Critical Stimulus Duration were found between the anhedonics, per-mag nonconformists and controls. However, both psychosis-prone groups made significantly fewer correct identifications than controls in the masking exercise. This confirmed the occurrence of a backward masking deficit in the two high-risk groups. The choice of the per-mag nonconformist group appears very suspicious. It is, at the very least, very unusual to require this combination given that the likelihood of the two occurring in a single individual is so remote. Merritt and Balogh (1989) added two methodological refinements to their previous work (Merritt & Balogh, 1989). They manipulated a single dimension of the masking paradigm, spatial frequency, and they equated luminance values across masking conditions. In this case they found that normal and Per-Mag college students performed similarly in a high spatial frequency condition. In the low spatial frequency condition, they found that Per-Mag subjects had significantly fewer mean correct responses than controls. These findings suggest the need for a multichannel neurophysiological model of masking to explain these similarities and differences.

Jutai (1989) studied visual search patterns using college students identified as psychosis-prone by the

Chapman scales. He found that (1) Physical Anhedonia subjects showed pervasive search problems across structured and unstructured patterns and across verbal and nonverbal tasks; (2) Per-Mag subjects were deviant when scanning unstructured arrays; and, (3) Social Anhedonia subjects showed deviant search strategies for nonverbal, unstructured arrays. He concluded that his findings support the hypothesis that right hemisphere regulated attention control may be initially disturbed in the development of schizophrenic disorders. Jutai points to a similarity between his findings and those of Simons and Katkin (1985); subjects who score high on both Physical Anhedonia and Perceptual Aberration may have difficulty with visual search because of dysfunctional oculomotor controls. It would be interesting to distinguish between the performance of the high Magical Ideation versus high Perceptual Aberration subjects in Jutai's Per-Mag sample. Perhaps it was his high Perceptual Aberration subjects that show the deviancy in visual search patterns as was the case in the Simons and Katkin (1985) study.

In a study of the relationship of blood platelet monoamine oxidase (MAO) activity levels to Physical Anhedonia and Per-Mag, Yehuda et al (1987) found that high male Per-Mag subjects significantly differed from controls. They showed more high and low levels of MAO activity. High levels have been found in patients with

unipolar depression and schizoaffective disorders (Brockington & Owen, 1980; Gudeman et al, 1982; Joseph et al, 1977; Wahlund et al, 1983) and low levels have been associated with schizophrenia and psychosis (Landowski et al, 1975; Mann, 1979; Maubach et al, 1981; Murphy et al, 1974). It should be kept in mind, however, that more individuals have high or low MAO activity levels than suffer from psychopathological problems (Rice et al, 1982). Yehuda et al also found males in the Per-Mag group showed significantly higher usage of alcohol and drugs. This raises questions on two fronts. First, could the reporting, for example, of unusual perceptions on the Perceptual Aberration Scale represent alcohol or drug based experiences? And second, as highlighted by Yehuda et al, could abnormal MAO activity be accounted for by the chronic use of alcohol and drugs? The third finding in the Yehuda et al study was no relationship between MAO activity and measures of psychosis proneness for females. On the whole, further research is required concerning the psychophysiological correlates of the Chapman scales.

Studies With Psychiatric Samples

Further to the work of Van den Bosch et al (1987) and Spring et al (1989) described above, three other relevant studies to date have used psychiatric populations. George and Neufeld (1987) found significant differences between control groups and schizophrenic patients on their scores

on the Magical Ideation Scale. However, the mean scores they reported for their five groups, particularly for their control groups, were extraordinarily low: university students, 5.86; general control subjects, 6.21; psychiatric control subjects, 4.79; paranoid schizophrenics, 10.57; and nonparanoid schizophrenics, 11.07. Given that means published by Eckblad and Chapman (1983) were 8.56 for male college students and 9.69 for females, one wonders how these unusually low means for the George and Neufeld control groups might be interpreted. A second unusual finding by George and Neufeld involves the optimal cutoff score on Magical Ideation that they employed in their attempt to classify (post hoc) their subjects as schizophrenic or nonschizophrenic. The value chosen was 9.5. This value approximates the mean for college students in the original Eckblad and Chapman study. Recall that Eckblad and Chapman suggest a cutoff of 2 SD above that mean for a diagnosis of psychosis prone or schizophrenia prone - not the mean, not half the college student population.

In a study of attributional styles of delusional patients, Kaney and Bentall (1989) found that delusional psychiatric patients reported a higher degree of magical thinking, as measured by the Magical Ideation Scale, than either a depressed psychiatric control group or normal controls. They hypothesized that this may be due to either

the tendency of delusional patients to externalize unpleasant events or to falsely see coincidences as significant.

In a study of distractibility as a state/trait marker of schizophrenia, Spring et al (1989) selected college students with scores greater than 1.9 S.D. above the mean on a combined Magical Ideation, Perceptual Aberration, and Physical Anhedonia scale as one of their groups of subjects vulnerable to schizophrenia but non-psychotic. Other groups in the study included schizophrenic inpatients, recently discharged schizophrenic outpatients, outpatients in stable clinical remission, adult first-degree relatives of schizophrenic inpatients never hospitalized for a psychiatric disorder, and normal controls matched to the inpatient sample. In their non-distractor and distractor dichotic shadowing task, they found that for the three groups who were vulnerable to schizophrenia but non-psychotic (this includes the Per-Mag-Physical Anhedonia group, the relatives group and the stable outpatient group), distraction failed to affect performance. Current inpatients and recently released outpatients suffered decreased performance. When examining frequency of intrusion errors, vulnerable but non-psychotic groups made significantly more intrusion errors than normals although they made somewhat (non-significantly) fewer errors than patients in a

schizophrenic episode. So the Per-Mag-Physical Anhedonia subjects were as accurate as normals on the distraction task, but, at the same time, were more prone to errors than normals.

Conclusions

Concerning the Magical Ideation Scale

Inadequate validity and limited reliability data has been published for the Magical Ideation Scale. Eckblad and Chapman (1983) attempted to demonstrate scale validity by showing a correlation between Magical Ideation and a "modified" version of the SADS-L. In modifying the SADS-L, they added questions for "psychotic-like" symptoms; that is, milder versions of psychotic symptoms, many of which duplicate items on the Magical Ideation Scale. In addition, they correlated magical ideation with schizotypy. However, the schizotypy scale they used in their analyses, although purportedly different from the list of symptoms of magical ideation, tap many of the same, or closely related, phenomena as magical ideation. In addition, the schizotypy index assessed schizotypal responses which required raters to make some very subjective judgements. Inter-rater reliability was not obtained since the two authors discussed scores and reached a consensus. For example, to measure an item called "interpersonal strangeness" the interviewer was asked to report "observing oddness of communication or of

affective expression" (Eckblad & Chapman, 1983, p. 221). The interviewer was the first author as opposed to a blind interviewer.

Establishing validity for the Magical Ideation Scale is also problematic. Extensive longitudinal studies will be required for substantiation, and considerable clarification is required concerning what exactly is being measured and what is being predicted. It is unclear, even to Eckblad and Chapman, whether the scale is predicting schizophrenia, psychosis, affective disorder or something else.

Unfortunately, most current research tends to combine the Magical Ideation Scale with the Perceptual Aberration Scale due to the fact that they were shown to correlate at $r=.70$. Despite this correlation no theoretical or rational explanation for combining the scales has been provided. The two scales were developed from different symptom/trait bases and have no theoretical or model-based connection to each other.

Despite interesting and varied results to date studies using the Chapman scales leave some important questions unanswered. Clarification is required concerning exactly what is being measured by the scales - particularly the Magical Ideation Scale and Per-Mag. In order to both substantiate findings and to establish norms data for the scales themselves, much larger samples,

particularly from normal and psychiatric populations, must be used. The Chapmans and their associates are using larger sample sizes in their ongoing longitudinal studies. One of the most interesting interim results to date was reported by Chapman and Chapman (1987b) as well as Mishlove and Chapman (1985). Of 162 high-risk Per-Mag subjects, three had received their first clinical attention for psychosis at 25-month follow-up. One had developed a bipolar disorder, one had developed paranoia as defined by Chapman and Chapman themselves (1987b), and one had been hospitalized twice for schizophrenia. Clearly, these results raise questions concerning both what is being predicted and whether or not this sort of rate of development of psychological problems is significant. Clearly, following these subjects over a long period of time will be necessary in order to develop a sufficiently large bank of data.

A major potential problem arises from this work, however, in that Chapman and Chapman (1987b) reported significantly higher use of street drugs by female Per-Mag subjects from their original work and by both male and female Per-Mag subjects at 25-month followup. These findings raise for the second time (see discussion re Yehuda et al, 1987, above) the question of whether high scores on one or both of the Magical Ideation Scale and the Perceptual Aberration Scale may reflect drug effects.

Subjects may well be endorsing scale items that include drug-induced experiences. This would at least in part explain the reported high frequency of psychotic-like and schizotypal experiences in these groups.

In a another publication referring to the 25-month followup results, Allen, Chapman and Chapman (1987) made two key differentiations in their study of cognitive slippage and depression in Per-Mag versus control subjects. They reported that highly depressed high Per-Mag subjects had significantly higher scores on certain continued word association tasks (specifically response commonality) and on all referential communication tasks than did nondepressed high Per-Mag and control subjects. However, the paper creates some confusion between its use of "Per-Mag" subjects and its summary recommendations concerning "Perceptual Aberration" subjects. Note that it is highly depressed "Perceptual Aberration" (not Per-Mag) subjects that they recommended be identified in mass screening for high risk for the development of psychopathology. One wonders whether they may be intentionally excluding Magical Ideation subjects as non-problematic. Additionally, they found that high Per-Mag subjects were higher on <u>both</u> unusual responses (indicating poorer performance) and response commonality (indicating better performance) on a continued word association task. High Per-Mag subjects also gave more responses than

controls, but, unfortunately, Allen, Chapman and Chapman chose to discard the last response for each Per-Mag subject in an attempt to equate the groups on mean number of responses. If Per-Mag subjects are giving more responses than controls, this may in fact be reflecting some of the imaginative aspects of the magical ideation subjects. The fact that Allen, Chapman and Chapman attributed the psychosis proneness traits specifically to the Perceptual Aberration group may be their way of acknowledging that it was not Magical Ideation that contributed to poorer performance. In their second key differentiation, they report that the 3 subjects who received attention for psychosis at 25-month followup were "Perceptual Aberration" subjects (p. 352). If this is the case, it is the Perceptual Aberration Scale and not the Magical Ideation Scale in Per-Mag studies which may be a predictor of psychosis. This provides further indirect support for the hypothesis that Magical Ideation Scale does not predict psychosis.

Inconclusive results concerning the correlations of Physical Anhedonia, Magical Ideation, Perceptual Aberration, and the MMPI 2-7-8 composite scale leave open the question of the abilities of the scales to distinguish between separate or overlapping pathologies. The Chapman scales were designed to differentially predict symptoms of schizophrenia. Nevertheless, research using the scales has

failed to successfully discriminate schizophrenic symptomatology from other forms of psychopathology. Further work, most advisedly through prospective studies, is required to clarify the discrimination between taxonomic classes and amongst various diagnostic classes.

Caution must be exercised, however, in the continued use of college student samples and the resulting questions which arise concerning what is in fact being measured. For example, the Magical Ideation and/or Perceptual Aberration scales may be measuring perceptions or experiences which are alcohol or drug related. There is a great need for systematic study with both normal and psychiatric samples. Well designed studies are required with general normal populations (rather than college students) and with schizophrenic and other psychotic populations in order to further explore the state/trait aspects of the symptoms measured by the scales.

Back to Magical Thinking

The concept of magical thought in the context of the Magical Ideation Scale is one of unusual thought, and, more specifically, of non-causally-related thought. What this means, for example, is that belief in astrology is taken to constitute inappropriate thought and treated as a sign of psychopathology. We should be very wary of such a deduction, particularly given that over half of North Americans believe in astrology (Tobacyk & Milford, 1983).

Meehl's definition of magical thinking raises certain questions. Recall that Meehl defined magical thinking as the belief in events which are not causally related according to cultural norms. First is the question of who defines cultural norms. Whose norms will they be? This is clearly very subjective. Second is the question of the defining of appropriate thought by effectively narrowing the bounds of what is possible and what is not. The "semi-serious" allowance for possibilities can cover a great deal of very creative territory. Once again a definition of appropriate thought in terms of what might just be possible becomes very subjective. Hence, the items chosen as indicators of Magical Ideation may well be telling us more about what some psychologists think is appropriate and inappropriate thought rather than how common certain patterns of thought are in the general population.

The magical thinking scale developed by Eckblad and Chapman was based upon the Meehl definition of magical thinking. Many of the items on the scale describe beliefs and experiences with significant popular and/or subcultural support. Many refer to experiences reported quite commonly in the popular press. And some items hinge upon the allowing of possibilities; for example, "I have felt that I might cause something to happen just by thinking too much about it". Once again, the Meehl definition includes the semi-serious entertainment of

"possibilities", so an item such as this with its use of the word "might" taps the breadth of possibilities allowed by the individual. Just because an individual allows for possibilities does not imply a hard and fast belief nor does it imply psychopathology.

Going back to Bleuler's work (1950), it is important to note the care with which Bleuler distinguished symptoms from disease. He stated "a symptom, regardless of whether it is psychic or physical (pain, anasarca) is never a disease; neither is a symptom-complex." (p. 273). Magical thinking, as defined by Meehl, and as implemented by Eckblad and Chapman (1983), is not only absent from Bleuler's "cardinal four" symptoms, but is, after all only a characteristic of normal college students and, perhaps, in certain cases, is also associated with schizophrenia and/or schizoid personality. Bleuler clearly warned that, having identified a symptom or symptom-complex in a patient,

> "we must ask ourselves the questions: in what connection with other symptoms and anatomical findings, in what sort of course, as the result of which causes does the symptom appear? Perhaps we must also ask what fundamental disturbance is the basis for this symptom? Only the answers to these questions can provide us with the concept of the disease. Most of the symptoms employed

for the definition of the old pseudo-psychoses were as such entirely unsuited for this role. Hallucinations, for example, can be seen in all mental diseases, and even in the healthy persons." (p. 273).

In the past four years, research has, for the most part, looked at correlates between Magical Ideation and psychopathological factors. In previous work in this lab, we investigated a broader dimension; namely, a look at the relationship of magical thinking to fantasy, imagination, mental imagery and other such nonpathological, creative aspects of thought (Johnston, 1987). It was found that the Magical Ideation Scale correlated significantly with psychopathological items, but also correlated with measures of imaginal activities such as absorption, mysticism, roleplaying, belief in the paranormal, social potency, and dream activity. The psychopathological factor was characterized by measures of stress, lack of self esteem, lack of a sense of well being, and neuroticism. A number of variables loaded on both the psychopathological and imaginative factors. These included schizophrenia, hypochondriasis, physical symptom reporting, and daydreaming. What these variables may tap in common with the other imaginative factor variables is a directing of attention inwardly toward the sensory aspects of bodily processes (e.g. "psychosomatic concerns") and towards

fantasy and imaginative activities. Such an inward directedness might be expected to lead to a ruminating, imaginative orientation, and a focus on bodily sensations.

Bliss (1986) described a constellation of variables forming a profile described by auditory hallucinations, non-chronic schizophrenia, delusions, high hypnotic susceptibility, a rich fantasy life and certain dissociated states. This profile closely resembles the imaginative, inwardly-directed profile found in work by the author (Johnston, 1987) as well as Wilson and Barber's (1981, 1983) fantasy-prone personality.

Hilgard (1965, 1970, 1974, 1979) conceptualized "imaginative involvement" as a capacity which allowed for temporary absorption in pleasant experiences in which fantasy played a major role. She found that subjects who were highly hypnotizable were more likely to report extensive imaginative involvement in sensory experiences, dramatic arts, reading, and religious and creative experiences than were subjects of low hypnotic susceptibility. Johnston (1987) found a zero-order correlation of $r=.36$ between magical thinking as measured by the Magical Ideation Scale and roleplaying (Fletcher & Averill, 1984).

During their study of very highly hypnotizable subjects, Wilson & Barber (1981, 1983) discovered "fantasy-prone personalities" or "fantasizers" who they

described as characterized by a constellation of personality traits and experiences centred around a deep, profound, and long-standing involvement in fantasy and imagination. The fantasy-prone syndrome was believed to play an important role in such phenomena as out-of-body experiences, parapsychological experiences, religious experiences, hypnosis, mind-body relations and creativity. Along these lines, Johnston (1987) found that magical thinking, as measured by the Magical Ideation Scale (Eckblad & Chapman, 1983), correlated r=.61 with the Paranormal Scale (Tobacyk & Milford, 1983).

The concept of "absorption" (Tellegen & Atkinson, 1974) is closely tied to the concepts of imaginative involvement and fantasy proneness. Considerable research has documented the association between hypnotic susceptibility and imaginative involvement as characterized by absorption, concentration, pleasure and loss of awareness of external reality (As, O'Hara, & Munger, 1962; Barber & Glass, 1962; Lee-Teng, 1965; Shor, 1960; Shor, Orne, & O'Connell, 1962). This association has been confirmed by more recent studies using Tellegen's (Tellegen & Atkinson, 1974) Absorption Scale (Spanos, 1982). Johnston (1987) also obtained a zero-order correlation of r=.52 between magical thinking as measured by the Magical Ideation Scale (Eckblad & Chapman, 1983) and absorption (Tellegen, 1976).

Lynn and Rhue (1986) provided general support for the Wilson and Barber construct of fantasy proneness. They found that fantasy-prone subjects were significantly higher than non-fantasy-prone subjects on measures of hypnotizability, imagination, waking suggestibility, vividness of mental imagery, creativity and absorption. In short, the available data suggest a constellation of personality traits including fantasy proneness, hypnotic susceptibility, roleplaying, paranormal beliefs, and absorption. Johnston (1987) suggested that magical thinking fits into this same constellation of characteristics.

It is worthy of note that both Lynn and Rhue (1988) and Johnston (1987) found that certain elements of psychopathology may characterize a subset of individuals who obtain high scores on this constellation. Lynn and Rhue found that a minority of fantasizers were described as psychologically maladjusted, whereas many fantasizers were well-adjusted, high-functioning college students. Unfortunately, one of the principal measures chosen by Lynn and Dudley (1987) to show that a subset of fantasizers were more maladjusted than the general population was the Per-Mag scale. It is interesting that their scale of fantasy proneness and the Per-Mag scale were found to share approximately 30% of their variance and fantasy proneness was a better predictor of Per-Mag

than any of the subscales of the MMPI 1-6-8. Lynn and Dudley concluded that some degree of overlap exists between relatively healthy imaginative tendencies and pathological ideational processes in the fantasy-prone population. This may well be the case, but the degree to which psychopathology was indicated in their study may well have been overestimated given that the Magical Ideation Scale may for the most part measure nonpathological imaginative tendencies.

Current Investigation

Overview

The first of two studies was designed to examine the Magical Ideation Scale per se as well as to look at its relationship to the Perceptual Aberration Scale and to the Per-Mag construct. Since the internal characteristics of the Magical Ideation Scale have not been reported to date, the first part of this investigation focused on an item analysis of the scale. Both an analysis of individual items and an analysis of item factoring/clustering were carried out for the scale. Researchers have been using very different criteria to define "Per-Mag" (e.g. Beckfield, 1985; Balogh & Merritt, 1985; Jutai, 1989; Merritt & Balogh, 1986; Miller & Chapman, 1986; Mishlove & Chapman, 1985). The first study investigated the impact of using different cutoff criteria for Per-Mag by examining high Magical Ideation and Perceptual Aberration subjects

selected.

The second study compared the responses of four groups of subjects; (a) very high magical thinkers (i.e. subjects with scores greater than 2 S.D. above the mean), (b) relatively high magical thinkers (i.e. subjects with scores 0.5 to 1.5 S.D. above the mean), (c) controls (i.e. subjects with scores -0.5 to +0.5 S.D. around the mean), and (d) low magical thinkers (i.e. subjects with scores the equivalent of less than 2 S.D. below the mean). Since preliminary research (Johnston, 1987) found that magical thinking taps both an imaginal factor and a psychopathological factor, one purpose of the second study was to compare the four groups of magical thinkers on imaginal and psychopathological measures.

Lesser and Paisner (1985) found that individuals who do not believe in the existence of fate or chance exhibited both non-causal thinking and normal logical thinking. These findings demonstrated some autonomy between these two types of thought and supported a multilinear developmental model (Lesser & Paisner, 1985). These nonbelievers in fate had both an internal orientation on Rotter's Internal-External Scale and a higher degree of belief in supernatural power. The present study examined the relationship of magical thinking to both measures of causality and logical abilities. It was hypothesized that, like Lesser and

Paisner's (1985) spiritual group, high magical thinkers would perform similarly to low magical thinkers and controls on tests of logical thinking. On the other hand, high magical thinkers were expected to report a stronger internal orientation and to believe to a greater extent in supernatural powers than control subjects.(Johnston, 1987).

Very little is known about the childhood antecedents of adult magical thinking. As part of the current study, a preliminary investigation attempted to determine whether the developmental histories of high magical thinkers can be distinguished from those of non-magical thinkers. In developing a Demographic Questionnaire for Magical Thinking, the work of a number of researchers was taken into account. Lynn and Rhue (1988) found that fantasizers reported experiencing greater loneliness and isolation as children. Huff and Council (1987) found that fantasy-prone subjects reported more traumatic experiences during childhood. Many researchers (e.g., Bandura, Ross, & Ross, 1961; Freyberg, 1973; Jalongo, 1984; Klinger, 1969; Manosevitz, Prentice, & Wilson, 1973; Singer, 1973) agree that imitative play and reinforcement and exposure to an adult model is important in facilitating the expression of imagination and creativity. Wilson and Barber (1983) reported that more than one third of their fantasy-prone subjects were involved in such activities as ballet,

piano, and dramatics as children. Wilson and Barber's fantasizers also perceived themselves as having been lonely and isolated as children and reported that fantasy provided companionship and entertainment and helped them cope with isolation. A number of researchers (Hilgard, 1970; Lee-Teng, 1965; Sarbin & Lim, 1963; Shor, 1960) have reported involvement in drama and roleplaying by more high-hypnotizable than low-hypnotizable subjects. Children who are socially isolated and children who experience significant failure or frustration appear to use imagination and magic and fantasy as an adaptive and/or defensive mechanism (Fraiberg, 1968; Singer, 1973; Tower, 1983). A number of researchers (Hilgard, 1970, 1974; Nash & Lynn, 1986; Nash et al, 1984) found that hypnotic susceptibility was positively correlated with severity of punishment during childhood; and, several researchers (Lynn & Rhue, 1986, 1988; Rhue et al, 1987; Wilson & Barber, 1983) found a similar relationship for fantasy-proneness.

A Demographic Questionnaire for Magical Thinking developed for the present study was administered to further assess these background variables.

The fourth issue addressed in study two was an investigation of the test-retest reliability of: the Magical Ideation Scale, the Perceptual Aberration Scale, and the Per-Mag entity. Test-retest data is necessary to

establish the reliability of these respective measures and should prove helpful in attempting to define what we may be measuring with the Per-Mag entity.

Some evidence suggests that drug- and alcohol-related experiences are reported by subjects who respond to the Magical Ideation scale and the Perceptual Aberration scale (Chapman & Chapman, 1987b; Yehuda et al, 1987). Consequently an attempt was made to remove these effects as the fifth issue in study two.

Dependent Measures: Studies 1 and 2

Magical Ideation Scale (Appendix B)

The Magical Ideation Scale is the 30-item instrument developed by Eckblad and Chapman (1983) to measure magical thinking, one of the traits of schizotypic individuals (Meehl, 1964). Coefficient alpha reliabilities were found to be .82 for college males and .85 for females (Chapman, Chapman, & Miller, 1982) and 6-week test-retest reliabilities were .80 for males and .82 for females. This instrument was described in detail earlier. It should be noted that whereas Appendix B shows the Magical Ideation Scale, it is Appendix A, the combined version of the Magical Ideation and Perceptual Aberration Scales that is to be administered to subjects in this experiment.

Perceptual Aberration Scale (Appendix C)

The Perceptual Aberration Scale (Chapman et al, 1978) consists of 35 true-false items that identify body image

and perceptual distortions reportedly found in schizophrenics and borderline schizophrenics (Meehl, 1964). Such distortions include unclear body boundaries, feelings of estrangement and unreality, and perception of bodily change. College students deviantly high on this scale exhibit schizophrenic-like thought disorder on the Rorschach test (Edell & Chapman, 1979), demonstrate more oddness and hostility (Numbers and Chapman, 1982), report increased rates of psychotic-like experiences such as quasi-hallucinations, have higher composite scores for schizotypal features, and meet the diagnostic requirements of the Research Diagnostic Criteria (Spitzer & Endicott, 1978) for major depressive disorder or hypomania more often than control subjects whose scores were not elevated (Chapman et al, 1980). Chapman et al (1982) found a relatively high correlation between this scale and the Magical Ideation Scale ($r = 0.70$), and have argued for using these scales together to assign subjects to a single group. See previous sections for additional detail on this scale and on the use of the combined Per-Mag scale.

Demographic Questionnaire (Appendix D)

This questionnaire was designed to retrospectively identify some of the childhood antecedents of adult magical thinking. The questions were designed to tap a number of factors that have been suggested as antecedents of magical thinking. These include: loneliness and

isolation as children (Lynn & Rhue, 1988); traumatic experiences during childhood (Huff & Council, 1987); imaginative play including exposure to adult models endorsing imaginative play (for example, Freyberg, 1973; Singer, 1973); participation in artistic/creative activities such as ballet, piano, or dramatics (Wilson & Barber, 1983); social isolation or failure experiences (for example, Singer, 1973; Tower, 1983); and, receiving severe punishment (Hilgard, 1970, 1974; Lynn & Rhue, 1988; Nash & Lynn, 1986). Neutral and positive questions were interspersed among questions addressing these factors and some more traditional demographic questions covering, for example, birth order and number of siblings, parental education and childhood environment. Answers to most questions were scored on ten-point Likert scales (e.g., 0 = never to 9 = always). Questions were grouped into categories measuring: (i) happiness/unhappiness in childhood, (ii) isolation/group orientation in childhood, (iii) fantasy orientation in childhood, (iv) basic socio-economic factors, (v) adult adjustment, and (vi) spiritual adjustment.

Neuroticism (Appendix E)

The Eysenck Personality Questionnaire - Revised (EPQ-R; Eysenck, Eysenck & Barrett, 1985) is a standardized instrument used to measure three principle personality traits, neuroticism (N scale), psychoticism (P scale), and

extraversion (E scale), as well as a Lie scale. Reliabilities (alpha coefficients) of N range from .85 to .88, P range from .73 to .81, and E range from .85 to .90. The EPQ-R is the revised version of the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975) and the revised scale is comprised of 100 questions answered yes or no.

The Eysencks' scales represent an outgrowth of their highly developed theory of individual differences. The scales attempt to measure trait-like characteristics assumed to underlie their personality dimensions (Eysenck & Eysenck, 1975) as opposed to neurotic or psychotic symptomatology. In shifting from their older PEN questionnaire to the EPQ, they intentionally chose to create purely orthogonal personality dimensions. This resulted in the removal of a number of P scale items which previously tapped broader symptomatology of psychoticism and a shift away from items of a manifestly psychotic nature (Eysenck & Eysenck, 1976). Many have criticized the lack of continuity between neuroticism and psychoticism created by this theoretical model (Stone, 1980).

Researchers have found a lack of relationship of the EPQ P scale to scales purporting to measure schizotypic personality traits and a limited positive relationship to a measure of borderline personality traits (Claridge & Broks, 1984; Claridge et al, 1983; Rawlings, 1983). The P

(Psychoticism) scale tends to measure characteristics of a generally antisocial kind with males obtaining higher P scores than females (Eaves & Eysenck, 1977; Eysenck & Eysenck, 1969). Lie scale scores have been frequently observed in normal subjects to correlate negatively with P scale scores - the explanation being that the L scale partly measures traits that are the opposite of EPQ P, namely conventional, socially conforming behaviour (Eysenck & Eysenck, 1975).

Several authors contend that the EPQ N (Neuroticism) scale is the best overall measure of psychotic symptoms since it reflects increased emotional instability (Claridge & Broks, 1984; Stone, 1980). High N scores are said to be associated with a wide range of psychopathology including, notably, early psychosis (Claridge, 1967). Certain researchers feel that the association between schizotypy and the N scale is well established (Claridge & Broks, 1984; Muntaner & Garcia-Sevilla, 1985).

The Neuroticism (N) scale was found to be a major contributor to the psychopathological profile obtained in earlier research on the correlates of magical thinking (Johnston, 1987).

Based on these considerations concerning the relative meaning of the N scale and the P scale, the Neuroticism scale was chosen for inclusion in the present study.

Belief in Paranormal (Appendix F)

The Paranormal Scale was developed by Tobacyk and Milford (1983) as a measure of belief in the paranormal based upon seven independent dimensions of this belief; namely, Traditional Religious Beliefs, Psi Belief, Witchcraft, Superstition, Spiritualism, Extraordinary Life Forms, and Precognition. In Tobacyk and Milford's (1983) study, the Paranormal Scale was given to 424 subjects. The scale was factor analytically derived and the reliability of the scale was high (four week test-retest of .89). Tobacyk and Milford (1983) reported good construct validity and discriminant validity of the subscales.

Questions on the 25-item scale are in the form of a five-point rating scale. The points on this rating scale range from 1 ("I strongly disagree"), through 3 ("I am undecided or don't know"), to 5 ("I strongly agree") with that item. Subjects' absolute scores are used to analyze the results (with scoring reversed for two items, numbers 11 and 18). The highest possible score would be 125, which would represent an extreme belief in paranormal phenomena.

Roleplaying (Appendix G)

Fletcher and Averill's (1984) Roleplaying Scale is a standardized instrument used to measure roleplaying defined as "the correct imitation of behaviours characteristic of people in contexts". Items on this 32-item scale are rated on a 4-point scale ranging from 1 =

disagree to 4 = agree. Items include measures of ability to imitate, fantasy involvement, memory and attention, ability to fake, ability to play unusual roles, and story telling ability. The coefficient alpha reliability of the roleplaying scale was .84 and the test-retest reliability at two-month followup was .80. Scores on the Roleplaying Scale correlated significantly with measures of acting ability such as performance in improvisations and peer ratings of acting ability. They also correlated with acting experience, measures of self-monitoring, a measure of individual differences in nonverbal expressiveness, an active performance style and extraversion as measured by the E scale of the EPQ (and not with the N scale of the EPQ). Roleplaying was found to be a major contributor to the imaginative profile found in previous research (Johnston, 1987).

Mysticism (Appendix H)

Hood's Mysticism Scale, the M scale, measures reported mystical experience according to Stace's (1960) conceptual categories of mysticism. Stace's conceptualization of mysticism attempts to be cross-cultural, ahistorical, and unbiased by religious ideology. It has been suggested (Hood, 1975) that the M scale may also measure a more inclusive phenomenon - the capacity for intense experience.

Items on the scale are both positively and negatively

expressed to avoid problems of response set. The Mysticism Scale consists of 32 items each answered on a 5-point scale ranging from +2 = "This description is definitely true of my own experience or experiences" to -2 = "This description is definitely not true of my own experience or experiences". The scale has been found to correlate with measures of openness to experience, absorption, and intrinsic religious orientation (Hood, 1975; Spanos & Moretti, 1988). It has been found in previous research (Johnston, 1987) that mysticism loaded on an imaginative cluster of traits associated with magical thinking.

Internal/External Orientation (Appendix I)

Rotter's Internal/External Scale is a validated instrument which measures subjects' beliefs about the nature of the world vis-a-vis internal or external control (Rotter, 1966). The scale measures subjects' expectancies about how reinforcement is controlled. Findings indicate that subjects have developed generalized expectancies in learning situations which are fairly consistent from individual to individual (Cohen, 1960; Feather, 1959; Rotter, 1954, 1960, 1966; Rotter, Liverant & Crowne, 1961; Seeman, 1959; Wyckoff & Sidowski, 1955). Subjects see reward, reinforcement or success in learning situations as being either dependent upon their own behaviour or controlled by external forces such as luck or chance. Individuals who strongly believe that they can control

their own destiny (i.e. an internal orientation) are described as being (a) more likely than those with an external orientation to perceive information from their environment as useful for future behaviour; (b) actively involved in improving their environmental condition; (c) placing greater value on skill or achievement reinforcements; (d) generally more concerned with their ability; and (e) resistant to subtle attempts to influence them (Crowne & Liverant, 1963; Efran, 1963; Franklin, 1963; Getter, 1962; Gore, 1962; Gore & Rotter, 1963; James, Woodruff, & Werner, 1965; Phares, 1965; Rotter, 1966; Rotter & Mulry, 1965; Seeman, 1963; Straits & Sechrest, 1963; Strickland, 1962)

For the purposes of the present study, questions were given to subjects in the form of a 10-point Likert Scale, ranging from extreme internality at 0 to extreme externality at 9, where extreme externality represents a feeling of helplessness and of being ruled by external forces, and extreme internality represents a belief in personal control over external events. For each question, two qualitative statements were presented to subjects, each representing one extreme. The tests were scored by adding scaled scores from each question. The highest possible score was 230, representing extreme externality. This modification to Rotter's Internal-External Scale was developed by Lesser and Paisner (1985).

Self-Esteem (Appendix J)

The Rosenberg (1965) Self-Esteem scale was developed as a measure of self-esteem on a unidimensional continuum. It was developed with the intent that it be easy to administer and that it could be completed in two to three minutes. The final ten-item true-false scale has a wealth of background research supporting its validity (Rosenberg, 1965). The 10-item scale, through the use of "contrived" items, yields a seven-point scale.

Attempts have been made to clarify the nature of the relationship between low self-esteem and illness. Studies indicate relationships between self-esteem and both psychological illness (Ingham et al, 1986) and physical illness (Antonucci & Jackson, 1983). For example, Oxman et al (1988) found that self-esteem differentiated between somatization and paranoid patients. Somatizing patients were found to be preoccupied with an uncertain self-image while paranoid subjects exhibited an artificially positive, grandiose self-image (Oxman et al, 1988).

In a study of adaptors and innovators, innovators were more likely than adaptors to have high self-esteem (Goldsmith & Matherly, 1987). A study by Keller and Holland (1983) found that innovators had high self-esteem and a low need for clarity. An innovative, creative, imaginative orientation would appear to be consistent with high magical thinking.

Self-esteem correlated negatively with suicidal ideation (de Man, Balkou, & Iglesias, 1987). A negative correlation was found between self-esteem and learned helplessness (Quinless & Nelson, 1988). Elliott, Rosenberg and Wagner (1984) found that high self-esteem and a decreased tendency to fantasize correlated with fewer experiences of momentary identity loss in children and adolescents. In an examination of the motivational bases of authoritarianism, a strong negative correlation was found between self-esteem and dogmatism in college students (Goldsmith & Goldsmith, 1982). Rosenberg's self-esteem as well as a measure of empathic fantasy were found to be negatively related to rigidity, intolerance of ambiguity and dogmatism among undergraduate business students (Goldsmith, 1984). Self-esteem has been shown to act as a moderator variable in a positive relationship between hostility and self-disclosure anxiety (Pittman, Price-Bonham, & McKenry, 1983).

In a study of male offenders with drug and alcohol problems, subjects with a positive self-image showed lower recidivism following a group therapy program as opposed to routine institutional care, while subjects with low self-esteem did more poorly in group therapy (Annis & Chan, 1983). Many studies support a positive relationship between delinquent activity and poor self-esteem (McCarthy & Hoge, 1984; Richman, Brown & Clark, 1984). Abusive

husbands were found to have significantly lower self-esteem than nonviolent husbands (Goldstein & Rosenbaum 1985).

Johnston (1987) found that lack of self-esteem loaded highly on a psychopathological cluster in a study of high magical thinking.

Differential Personality Questionnaire (Absorption, Stress, and Well-Being Subscales) (Appendix K)

Tellegen's Differential Personality Questionnaire (DPQ; Tellegen, 1976) is a 300-item binary choice scale (primarily true-false) from which normalized scores can be obtained on 11 substantive scales and 6 validity scales. The 11 scales represent distinct and major personality dimensions, namely: Well-Being, Stress, Unfriendly World (or psychoticism), Aggression, Social Closeness, Social Potency, Hard Work, Impulsiveness, Danger Seeking, Authoritarianism, and Absorption. The 11 scales have internal consistencies ranging between .80 and .92 and have one-week test-retest reliabilities of at least .90. Absorption involves primarily a capacity for episodes of absorbed and self-altering attention that are sustained by imaginative and enactive representations. The Stress scale measures the full range of a stress reactive syndrome including, for example, such complaints as fatigue and emotional over-reactivity to minor events. The Well-Being scale measures contentment, optimism and enjoyment of life

including enthusiasm and interest in a variety of things. The coefficient alpha reliability of Absorption is .89, of Stress is .90, and of Well-Being is .91.

The concept of "absorption" (Tellegen & Atkinson, 1974) is closely tied to the concepts of imaginative involvement and fantasy proneness. Considerable research has documented the association between hypnotic susceptibility and imaginative involvement as characterized by absorption, concentration, pleasure and loss of awareness of external reality (As, O'Hara, & Munger, 1962; Barber & Glass, 1962; Lee-Teng, 1965; Shor, 1960; Shor, Orne, & O'Connell, 1962). This association has been confirmed in studies using Tellegen's (Tellegen & Atkinson, 1974) Absorption Scale (Spanos, 1982). Although some recent studies suggest that the correlation between absorption and hypnotic susceptibility may be an artifact of subjects' expectations (Council & Kirsch, 1986), this hypothesis remains tentative and controversial (de Groot, Gwynn, & Spanos, 1988).

It was found in previous research (Johnston, 1987) that Absorption is one of the principle indicators of an imaginative cluster of traits in high magical thinkers whereas both Stress and lack of Well-Being are principle indicators of the more psychopathological cluster of traits.

Permutation Task (Appendix L)

This task, developed by Piaget and Inhelder (1951), was used to measure level of development of logical operations. Subjects are required to find all possible orders of four letters taken once each. Piaget's (1926, 1929, 1960; Piaget & Inhelder, 1951) three stage developmental model is assumed: namely, from an initial absence of a system, to the discovery of partial systems during the period of concrete operations, to the discovery of a complete, intentional, operative system during formal operations.

In this study, subjects were given a page with instructions and the letters "ABCD" at the top (see Appendix L), asking them to write down all possible arrangements of the four letters. Results were analyzed by using subjects' absolute scores.

Syllogisms Task (Appendix Q)

This task involves the use of a subset of syllogisms developed by Polzella et al (1975) and used as a measure of logical reasoning. These syllogisms can be used in two ways: first, with conclusions provided (as in Appendix Q) in which case subjects are asked whether the conclusions are valid or invalid: and, second, without a conclusion, in which case the "therefore" prompt is provided and subjects are asked to provide a conclusion.. The simpler form as shown in Appendix Q was used since it was less

time consuming and provided an adequate measure for the purposes of this study.

Beck Depression Inventory (Appendix O)

The Beck Depression Inventory (Beck, 1978) is a standardized instrument used extensively both clinically and in research to measure degree of depression. The instrument also has subscales measuring psychological and psychosomatic factors.

Minnesota Multiphasic Personality Inventory (MMPI-2) (Appendix P)

The MMPI-2 is a standardized and normed instrument used to survey multiple aspects of personality and psychopathology.

MMPI 2-7-8 Profile (Appendix P)

The MMPI 2-7-8 refers to the composite of three MMPI subscales; namely the 2 (Depression), 7 (Psychasthenia), and 8 (Schizophrenia) subscales. Elevated 2 (D) scores reflect depressed mood, low self-esteem and feelings of inadequacy. High 7 (Pt) scorers are tense, anxious, ruminative, preoccupied, obsessional, phobic, rigid. High 8 (Sc) scorers show unconventional or schizoid life style. They are withdrawn, shy, feel inadequate, tense, confused, and moody.

Several studies indicate that the MMPI 2-7-8 profile may identify subjects at risk for psychosis (Fine, 1973; Gilberstadt & Duker, 1965; Kelley & King, 1979; Koh,

Kayton & Berry, 1973; Koh & Peterson, 1974; Peterson, 1963; Schulman, 1976; Steronko & Woods, 1978). Some other writers have suggested that the 2-7-8 profile in college students indicates severe neurosis, not necessarily psychosis (Greene, 1980). Haier et al. (1979) found that 2-7-8 profiles did not identify college students with schizophrenia or schizo-affective disorder, but received a variety of diagnoses within the category of affective disorders.

Previous work in this lab (Johnston, 1987) found a correlation of 0.58 between the Magical Ideation Scale and the 8 (Sc) Schizophrenia subscale of the MMPI.

Family Environment Scale (FES) (Appendix R)

The Family Environment Scale was developed by Moos and Moos (1981) to measure the social-environmental characteristics of families. The FES is comprised of ten subscales which assess different aspects of three broad underlying sets of dimensions.

The Cohesion, Expressiveness and Conflict subscales comprise the Relationship dimensions. Cohesion measures the degree of commitment, help, and support family members provide for one another. Expressiveness assesses the extent to which family members are encouraged to act openly and to express their feelings directly. Conflict evaluates the amount of openly expressed anger, aggression, and conflict among family members.

Five subscales comprise the Personal Growth dimensions: Independence, Achievement Orientation, Intellectual-Cultural Orientation, Active-Recreational Orientation, and Moral-Religious Emphasis. Independence assesses the extent to which family members are assertive, are self-sufficient, and make their own decisions. Achievement Orientation evaluates the extent to which activities (such as school or work) are cast into an achievement-oriented or competitive framework. Intellectual-Cultural Orientation measures the degree of interest in political, social, intellectual and cultural activities. Active-Recreational Orientation refers to the extent of participation in social and recreational activities. Moral-Religious Emphasis measures the degree of emphasis on ethical and religious issues and values.

System Maintenance dimensions are measured by the Organization and Control subscales. Organization evaluates the degree of importance of clear organization and structure in planning family activities and responsibilities. Control assesses the extent to which set rules and procedures are used to run family life.

Moos and Moos (1981) have published normative data for normal and distressed families. The subscales can be used individually or as part of the broader dimensions. Internal consistencies for the subscales varied from moderate (alpha = .61) to substantial (alpha = .78). Test-

retest at 8 weeks varied from .68 to .86. Mean 4-month profile stability was .78 and mean 12-month profile stability was .71. The FES has three forms: the Real Form (Form R), which measures people's perceptions of their conjugal or nuclear family environments; the Ideal Form (Form I), which measures people's conceptions of ideal family environments; and the Expectations Form (Form E), which measures people's expectations about family settings (such as a couple's expectations of what their family life will be like after the birth of a child).

The FES has been used to investigate normal families (Lee & Rohbock, 1979; Karnes & D'Ilio, 1989; Kazak et al, 1989; Reinhart, 1977) and in the assessment and treatment of a variety of individuals and families in crisis or in treatment. Examples of the latter include: drug rehabilitation patients and their families (Panio, 1977); delinquent, runaway, or stressed adolescents (Kleinman et al, 1989; Malin, 1979; Steinbock, 1978); families with an alcoholic or gambling-addicted member (Ciarrocchi & Hohmann, 1989; Filstead, 1979); families with a depressed member (Wetzel, 1977, 1978; Wetzel & Redmond, 1980); families with a disabled child or adolescent (Dyson et al, 1989; Thompson et al, 1989); and families of bulimics and anorexics (Bulik, Sullivan, & Rorty, 1989; Scalf-McIver & Thompson, 1989; Sheppy et al, 1988; Shisslak, McKeon, & Crago, 1990; Stern et al, 1989).

The most consistent finding is that distressed families are seen as having less cohesion and expressiveness and more conflict (Dinning & Berk, 1989; Eastman, Archer, & Bell, 1990; Lange, 1978; Scoresby & Christensen, 1976; White, 1978; Young et al, 1979). The FES is also used extensively in the study and prediction of treatment outcome (Abbott, 1976; Auslander et al, 1990; Bader, 1976; Druckman, 1979; Geffen & Lange, 1978; Moos, Finney & Gamble, 1981; Rassmussen, 1980; Tal et al, 1990).

Given the extensive use of the FES for both normal and distressed families, it was felt that it would prove useful in investigating background factors in adult magical thinking. Form R of the FES (Appendix R) was used in Study 2.

Study 1

Method: Study 1

Subjects

A total of 2398 undergraduate university students (ages 18 to 45 years) enroled in Introductory Psychology courses at Carleton University were recruited. All subjects were offered experimental credit for their participation.

Procedure

Subjects were administered a combined version of the Magical Ideation Scale and the Perceptual Aberration Scale as per Appendix A (Note that the individual scales have been included as references - the Magical Ideation Scale in Appendix B and the Perceptual Aberration Scale in Appendix C). Potential subjects were told that the investigator was carrying out research involving certain thoughts, beliefs, feelings and perceptions, in undergraduate students. These students were informed that they might be asked to participate in further research.

Subjects responded to the sixty-five true-false items on the combined scale by circling the appropriate response. This task took on average ten to fifteen minutes to complete.

Results: Study 1

Factor Analysis of Magical Ideation Scale

First a factor analysis of items on the Magical

Ideation Scale was carried out in order to identify factor components of the scale. Data for all 2398 subjects was analyzed. Only 13 of 435 item-item correlations were correlated at .30 or higher. This lack of correlation between items serves as a contraindicator for the existence of factors in the scale. Using the principal components analysis method implemented in the SPSS routines (Nie et al, 1975), Figure 1 plots the eigenvalues of the first 30 principal factors. There is a well-defined general magical ideation factor accounting for 20% of the variance in the scale items. Although the second through sixth factors have eigenvalues greater than one, their eigenvalues (1.5, 1.2, 1.1, 1.1, 1.0) are part of the "scree" on this plot and are continuous with the following eigenvalues (0.96, 0.93, 0.92, 0.91, 0.86, 0.84, etc). Thus only one general factor was found.

Item Analysis

Next an analysis of the contributions of individual items was carried out by removing each item one at a time to determine the impact on Magical Ideation scores (see Table 1). Overall item reliability was .97 with corrected item-total correlations ranging from .60 to .83.

The Per-Mag Entity

The impact of some of the different cutoff criteria used by researchers was further investigated. For four different definitions of high Per-Mag as outlined below,

Figure 1
Eigenvalues Of First 30 Principal Factors

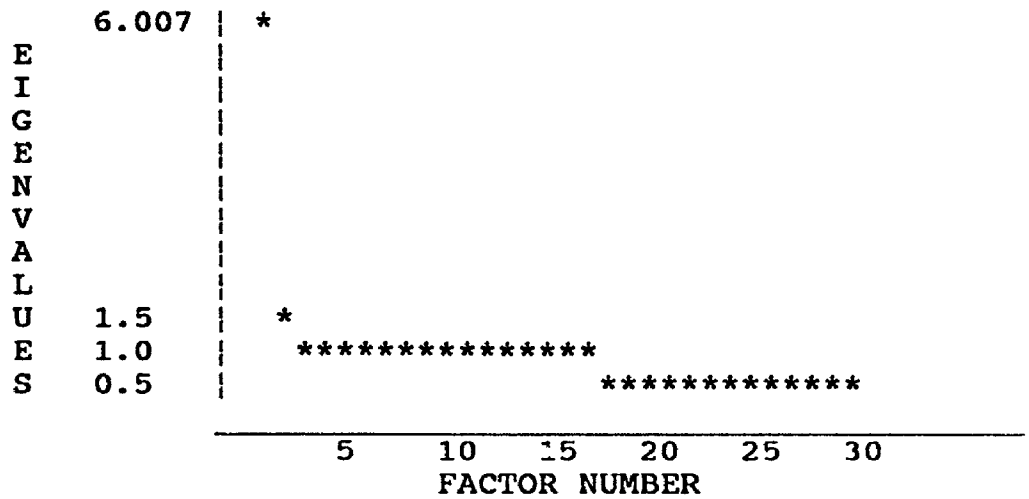


Table 1
Item-Total Statistics For Magical Ideation Scale

ITEM	CORRECTED ITEM-TOTAL CORRELATION	SQUARED MULTIPLE CORRELATION	ALPHA IF ITEM DELETED
1	.6212	.5854	.9756
2	.6560	.7124	.9754
3	.6470	.7210	.9754
4	.6049	.5912	.9757
5	.6395	.6534	.9755
6	.6636	.7464	.9754
7	.6329	.6786	.9755
8	.7181	.7825	.9751
9	.7220	.7546	.9751
10	.6128	.4789	.9759
11	.8026	.7753	.9747
12	.7460	.6726	.9749
13	.6967	.6042	.9752
14	.8336	.8352	.9745
15	.7804	.7287	.9748
16	.7703	.6776	.9748
17	.8310	.7861	.9745
18	.7938	.7369	.9747
19	.8227	.7642	.9745
20	.8243	.7820	.9745
21	.8175	.7547	.9745
22	.7973	.7935	.9747
23	.7912	.8041	.9747
24	.7889	.7680	.9747
25	.7962	.7960	.9747
26	.8019	.8131	.9746
27	.8237	.8534	.9745
28	.8005	.8246	.9746
29	.8102	.8367	.9746
30	.8253	.8524	.9745

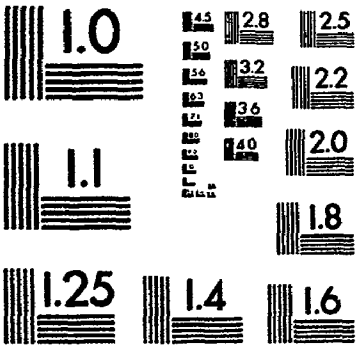
high Per-Mag subjects were classified as either high on Magical Ideation, high on Perceptual Aberration, high on both, or high on neither scale.

First Eckblad and Chapman's (1983) raw cutoff scores were used to define "high" Magical Ideation. It was determined that this criterion equated to 5.6% of the top scores being selected. Using this percentage, a cutoff score for Perceptual Aberration was selected to give the closest possible percentage cutoff (5.2% of top scores for Perceptual Aberration were classified as "high"). Per-Mag scores were calculated as the sum of Magical Ideation and Perceptual Aberration scores. Then an approximately equivalent percentage of Per-Mag scores (5.1% of top Per-Mag scores) were classified as "high". Using this first set of cutoff scores, it was determined that 63% of these high Per-Mag subjects were high on <u>both</u> Magical Ideation and Perceptual Aberration, 16% of these high Per-Mag subjects were high <u>only</u> on Magical Ideation, 17% of these high Per-Mag subjects were high <u>only</u> on Perceptual Aberration, and 4% of these high Per-Mag subjects were high on <u>neither</u> Magical Ideation nor Perceptual Aberration.

In the second case, both Magical Ideation and Perceptual Aberration cutoffs were set at 2 S.D. above the mean for all subjects, and the Per-Mag cutoff was set at 1.5 S.D. above the mean for the combined score as per, for

2

PM-1 3½"x4" PHOTOGRAPHIC MICROCOPY TARGET
NBS 1010a ANSI/ISO #2 EQUIVALENT



example, Jutai (1989). In this case, it was found that only 22.5% of these high Per-Mag subjects were high on both Magical Ideation and Perceptual Aberration, 10% of these high Per-Mag subjects were high only on Magical Ideation, 7.5% of these high Per-Mag subjects were high only on Perceptual Aberration, and 60% were high on neither Magical Ideation nor Perceptual Aberration.

In the third case, high Per-Mag subjects were defined as subjects for whom the sum of z-scores was greater than 3.0. Eckblad and Chapman's (1983) raw cutoff scores for Magical Ideation transformed to equivalent percentages were used (as in the first case) to determine high scores for Magical Ideation and Perceptual Aberration. Results for the third case were as follows: 91% of high Per-Mags were high on both Magical Ideation and Perceptual Aberration, 7% were high only on Magical Ideation, 2% were high only on Perceptual Aberration, and none were high on neither Magical Ideation nor Perceptual Aberration.

In the fourth case, high Per-Mag subjects were again defined as subjects for whom the sum of z-scores was greater than 3.0. High scores on Magical Ideation and Perceptual Aberration were defined as greater than 2 S.D. above the mean (as in the second case). Results for the fourth case were identical to the third case: 91% of high Per-Mags were high on both Magical Ideation and Perceptual Aberration, 7% were high only on Magical Ideation, 2% were

high only on Perceptual Aberration, and none were high on neither Magical Ideation nor Perceptual Aberration.

Magical Ideation Distribution

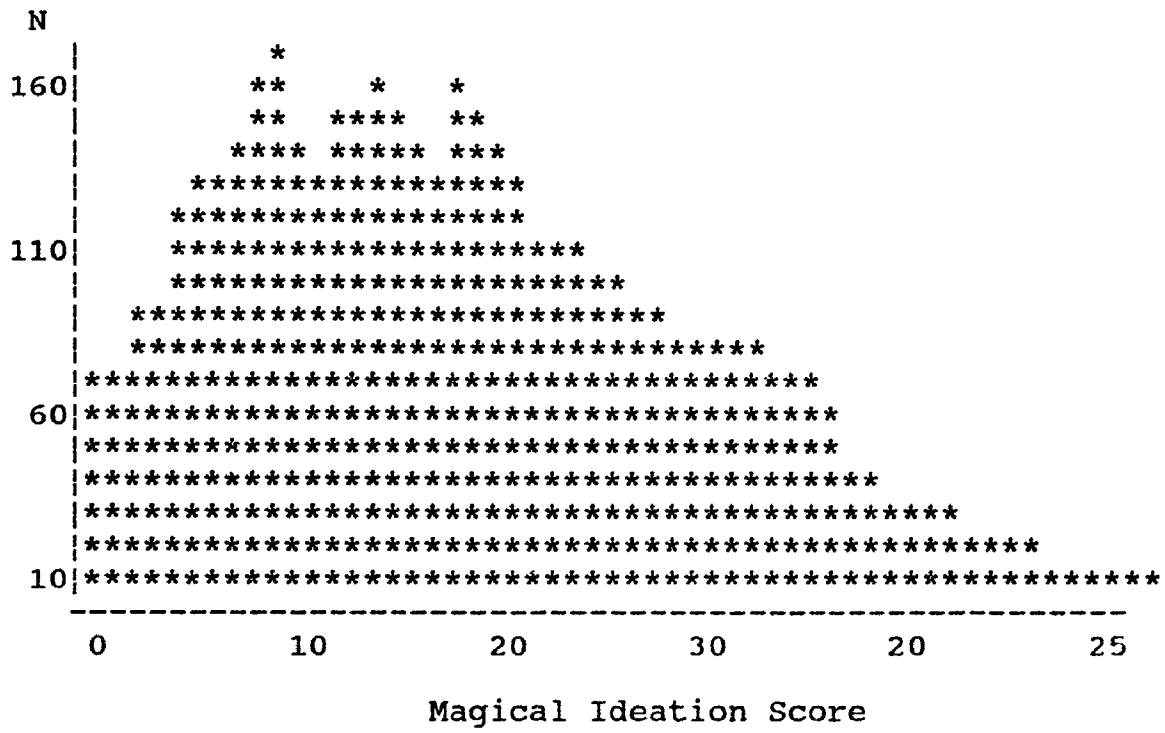
Magical Ideation scores for the 2398 subjects had a mean of 9.22, standard deviation of 5.89, skewness of .525, and kurtosis of -.405. The distribution was skewed toward lower scores as may be seen in Figure 2.

Perceptual Aberration scores for the 2398 subjects in Study 1 had a mean of 6.02, a standard deviation of 5.58, skewness of 1.47, and kurtosis of 2.47.

Per-Mag scores had a mean of 15.25, a standard deviation of 10.50, skewness of 0.91, and kurtosis of 0.72.

Examination of the distribution of Magical Ideation scores indicates that the distribution obtained in Study 1 is very similar to that obtained by Eckblad and Chapman (1983). Like the data presented by Eckblad and Chapman (1983), the distribution is skewed (see Figure 2). Study 1 (n=2398) obtained mean scores of 8.58 for males (n=1085) and 9.78 for females (n=1229) compared to their reported means of 8.56 for males (n=682) and 9.69 for females (n=830). Study 1 obtained standard deviation scores of 5.61 for males and 6.07 for females compared to their standard deviations of 5.24 for males and 5.93 for females. No significant differences in Magical Ideation scores were found across the two studies for males,

Figure 2
Frequency Distribution For Magical Ideation Scores



t (1765) = 0.08, $p > .9$, or for females, t (2057) = 0.34, $p > .7$ (refer to Table 2). As was the case in Eckblad and Chapman's research, females scored significantly higher than males, $t(2312 = -4.91$, $p < .001$ (see Table 2).

Discussion: Study 1

Results indicate that the Magical Ideation scale is unidimensional. The scale exhibits a strong item reliability coefficient alpha value of .97; correlations of items to totals with the item removed show values ranging from good (.60) to very good (.83) indicating that items on the scale tend to be measuring strongly related beliefs and experiences.

Difficulties arise in attempting to compute cutoffs for the Per-Mag entity. Cutoffs for its two components are not well defined. Both raw cutoffs and cutoffs based on percentages and the statistical characteristics of their distribution have been used in previous research. A lack of consistency in defining Per-Mag both theoretically and computationally adds to the confusion. By using a number of possible cutoff values for each of Magical Ideation, Perceptual Aberration, and Per-Mag, it was shown in Study 1 that one may obtain Per-Mag entities that differ widely in the extent to which they represent subjects high on both scales. Not only is the theoretical basis for a Per-Mag entity lacking; the quantitative measures used lack definition and value. It appears that using a sum of

Table 2
Tests for Differences

MAGICAL IDEATION	NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR
Current Study:				
males	1085	8.58	5.61	.17
females	1229	9.78	6.07	.17
Eckblad and Chapman:				
males	682	8.56	5.24	
females	1229	9.69	5.93	

A) Test For Differences Between Males Across Studies

t Value	Degrees of Freedom	2-Tail Prob.
0.08	1765	> .9

B) Test For Differences Between Females Across Studies

t Value	Degrees of Freedom	2-Tail Prob.
0.34	2057	> .7

C) Test For Sex Differences in Current Study

F-VALUE	2-TAIL PROBABILITY
1.17	.008

POOLED VARIANCE ESTIMATE			SEPARATE VARIANCE ESTIMATE		
t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
-4.91	2312	.000	-4.93	2306.93	.000

z-scores greater than 3.0 gives a pool in which most high Per-Mag scorers (91%) were high on both scales. The use of this criterion could provide at least a quantitatively meaningful entity.

The distribution obtained for the Magical Ideation scale replicates that of Eckblad and Chapman as do means and standard deviations.

Study 2

Purpose: Study 2

This study addressed five issues: first, the question of magical thinking as it relates to imagery and to psychopathology; second, the relationship of magical thinking to causal beliefs and logical abilities; third, a preliminary look at the background origins of magical thinking in adults; fourth, test-retest reliability of the Magical Ideation Scale and the Perceptual Aberration Scale; and, fifth, removal of alcohol and drug effects from these scales.

Method: Study 2

Subjects

From the sample of 2398 subjects for Study 1, random samples of four levels of magical thinkers were selected. "High" magical thinkers were selected using the cutoff scores established by Eckblad and Chapman (1983) and represent scores approximately 2 S.D. above the mean. "High-normal" magical thinkers were selected from amongst

subjects 1 S.D. above the mean, plus or minus .5 SD. The "control" group was selected from subjects having Magical Ideation scores within 0.5 standard deviation of the mean (i.e. up to 0.5 S.D. either above or below the mean) as per selections of control populations by Eckblad and Chapman (1983) and most subsequent researchers (for example, Balogh & Merritt, 1985; Beckfield, 1985; Merritt & Balogh, 1986; Mishlove & Chapman, 1985; Schuldberg et al, 1988; Yehuda et al, 1987). The fourth group was "low" magical thinkers and was selected from amongst subjects having scores less than 2 S.D. below the mean. When subjects were asked to participate in the study, they were told the experimenter was studying cognitive patterns in university students and they would be required to fill out a variety of questionnaires about various aspects of personality, beliefs, and thought patterns. Fifty-five subjects agreed to participate in each of the four groups.

Procedure

A total of 216 subjects completed both questionnaire packages: 55 highs, 54 high-normals, 55 controls, and 52 lows. These subjects were selected from the 2398 subjects who had been given the Magical Ideation and Perceptual Aberration scales in Study 1. Questionnaires were arranged into two separate packages and subjects completed each package in a separate session. On average, the first session was 1.5 hours long and the second was 1.0 hours.

Most subjects scheduled and completed both sessions within a 24-hour period. A very few subjects completed both sessions within longer time periods up to two weeks. During each questionnaire session, subjects were encouraged to take breaks to get a coffee or snack as required.

The first package contained the following questionnaires: the re-administration of the combined Magical Ideation and Perceptual Aberration scales, the Demographic Questionnaire For Magical Thinking, Neuroticism, Belief in Paranormal, Roleplaying, Mysticism, Internal/External Orientation, Self-Esteem, the Differential Personality Questionnaire, Permutation Task, Beck Depression Inventory, and the Family Environment Scale.

At the beginning of the second questionnaire package another administration of the combined Magical Ideation and Perceptual Aberration scales was preceded by special instructions attempting to remove drug and alcohol effects. These instructions were as follows:

> On the following two pages you will find a questionnaire which you have already answered in Questionnaire Package 1.
>
> We would like you to answer this questionnaire again <u>but</u> this time we would like you to <u>exclude</u> alcohol or drug based

experiences. The statements describe a variety of perceptions, events and beliefs. If the particular perception, event or belief only applies as a result of drinking alcohol or doing drugs, you are not to report it.

This time we want you to report only perceptions, events, and beliefs NOT related to alcohol or drug based experiences. Please answer the next 2-page questionnaire with this in mind.

Following the non-alcohol and -drug administration of the Magical Ideation and Perceptual Aberration questionnaires, the second package also included the Syllogisms Task and the MMPI.

Results: Study 2

Imaginal and Psychopathological Factors

Factor analysis and factor loadings.

A factor analysis was carried out to determine loadings for both the four measures of imaginal propensities, namely absorption, mysticism, roleplaying and paranormal beliefs and the measures of psychopathology, namely stress, lack of self esteem, lack of sense of well being, neuroticism and the MMPI-2 (all subscales of the MMPI-2 with the exception of subscale 5, Masculinity-Femininity). Over half of the entries in the correlation matrix for these nineteen variables showed

correlations between variables of .30 or greater (see Table 3) thereby verifying the appropriateness of a factor analysis. Analysis using the principal components analysis algorithm in SPSS (Nie et al, 1975) showed a possible four factors with eigenvalues greater than 1.0 (see Figure 3). Further examination showed that the fourth factor, with an eigenvalue of 1.01, appears from the scree plot to be part of the scree rather than a distinct factor. Examination of the factor loadings after varimax rotation confirmed this by indicating that the fourth factor represents a single variable, the Mysticism measure. The remaining three factors were found to represent first a psychopathology factor, second an imaginative factor and third a secondary psychopathology factor comprised of three of the psychopathology variables from the MMPI-2; namely Hypochondriasis, Conversion Hysteria, and Paranoia. Since the fourth factor was spurious, a factor analysis was carried out requesting a three factor solution. The result was the rotated factor matrix as shown in Table 4. Only correlations greater than .30 are reported.

Stress, neuroticism, lack of self-esteem and lack of well-being all loaded on the psychopathology factor as predicted. Absorption, roleplaying and paranormal beliefs loaded on the imaginative factor as predicted. Mysticism, now forced to no longer load into its own factor, loaded, albeit weakly, on the imaginative factor. Both Magical

Table 3 (A)
Zero-Order Correlations of Imagery and Psychopathology Variables

	Magical Ideation	Role-Playing	Paranorm Beliefs	Mysti-cism	Absorp-tion
Magical Ideation	1.00				
Role-playing	.59 ***	1.00			
Paranorm Beliefs	.57 ***	.49 ***	1.00		
Mysti-cism	.22 ***	.15 *	.17 **	1.00	
Absorp-tion	.69 ***	.73 ***	.55 ***	.22 ***	1.00
Neuroti-cism	.43 ***	.27 ***	.31 ***	.07	.47 ***
Lack Self Esteem	.19 **	.17 **	.15 *	.01	.28 ***
Stress	.40 ***	.27 ***	.26 ***	.11	.48 ***
Well-Being	.01	.14 *	-.04	-.06	.05
MMPI 1 HS	.42 ***	.32 ***	.38 ***	.07	.42 ***
MMPI 2 D	.15 *	-.01	.17 **	.03	.07
MMPI 3 HY	.21 ***	.21 ***	.31 ***	.06	.17 **
MMPI 4 PD	.39 ***	.36 ***	.30 ***	.13 *	.43 ***
MMPI 6 PA	.44 ***	.41 ***	.31 ***	.16 **	.45 ***
MMPI 7 PT	.46 ***	.37 ***	.30 ***	.11	.51 ***
MMPI 8 SC	.53 ***	.42 ***	.35 ***	.15 *	.59 ***
MMPI 9 MA	.50 ***	.57 ***	.32 ***	.15 *	.63 ***
MMPI 0 SI	.02	-.16 *	-.00	-.05	.03
PERCEPTUAL ABBERATION	.75 ***	.51 ***	.38 ***	.28 ***	.65 ***

Note. Correlations were based on n between 213 and 216.
*** 1-tailed significance less than or equal to .001
** 1-tailed significance less than or equal to .01
* 1-tailed significance less than or equal to .05

Table 3 (B)
Zero-Order Correlations of Imagery and Psychopathology Variables

	Neuroticism	Lack Self Esteem	Stress	Well-Being	MMPI 1 HS
Neuroticism	1.00				
Lack Self Esteem	.54 ***	1.00			
Stress	.37 ***	.56 ***	1.00		
Well-Being	-.38 ***	-.47 ***	-.42 ***	1.00	
MMPI 1 HS	.57 ***	.35 ***	.54 ***	-.27 ***	1.00
MMPI 2 D	.54 ***	.52 ***	.49 ***	-.58 ***	.55 ***
MMPI 3 HY	.18 **	.19 **	.07	-.10	.59 ***
MMPI 4 PD	.49 ***	.49 ***	.51 ***	-.39 ***	.48 ***
MMPI 6 PA	.53 ***	.43 ***	.52 ***	-.25 ***	.57 ***
MMPI 7 PT	.77 ***	.64 ***	.82 ***	-.40 ***	.65 ***
MMPI 8 SC	.67 ***	.55 ***	.70 ***	-.32 ***	.68 ***
MMPI 9 MA	.34 ***	.22 ***	.39 ***	.13 *	.37 ***
MMPI 0 SI	.48 ***	.45 ***	.51 ***	-.52 ***	.35 ***
PERCEPTUAL ABBERATION	.40 ***	.18 **	.37 ***	.04	.48 ***

Note. Correlations were based on n between 213 and 216.
*** 1-tailed significance less than or equal to .001
** 1-tailed significance less than or equal to .01
* 1-tailed significance less than or equal to .05

Table 3 (C)
Zero-Order Correlations of Imagery and Psychopathology Variables

	MMPI 2 D	MMPI 3 HY	MMPI 4 PD	MMPI 6 PA	MMPI 7 PT
MMPI 2 D	1.00				
MMPI 3 HY	.41 ***	1.00			
MMPI 4 PD	.37 ***	.30 ***	1.00		
MMPI 6 PA	.47 ***	.46 ***	.61 ***	1.00	
MMPI 7 PT	.59 ***	.18 **	.62 ***	.65 ***	1.00
MMPI 8 SC	.46 ***	.23 ***	.68 ***	.64 ***	.89 ***
MMPI 9 MA	-.12 *	.10	.51 ***	.35 ***	.45 ***
MMPI 0 SI	.57 ***	-.12 *	.23 ***	.20 ***	.59 ***
PERCEPTUAL ABBERATION	.13 *	.25 ***	.35 ***	.43 ***	.44 ***

	MMPI 8 SC	MMPI 9 MA	MMPI 0 SI	PERCEPTUAL ABBERATION
MMPI 8 SC	1.00			
MMPI 9 MA	.57 ***	1.00		
MMPI 0 SI	.49 ***	-.12 *	1.00	
PERCEPTUAL ABBERATION	.58 ***	.47 ***	.00	1.00

Note. Correlations were based on n between 213 and 216.
*** 1-tailed significance less than or equal to .001
** 1-tailed significance less than or equal to .01
* 1-tailed significance less than or equal to .05

Figure 3
Eigenvalues For Imaginal/Psychopathological Variables

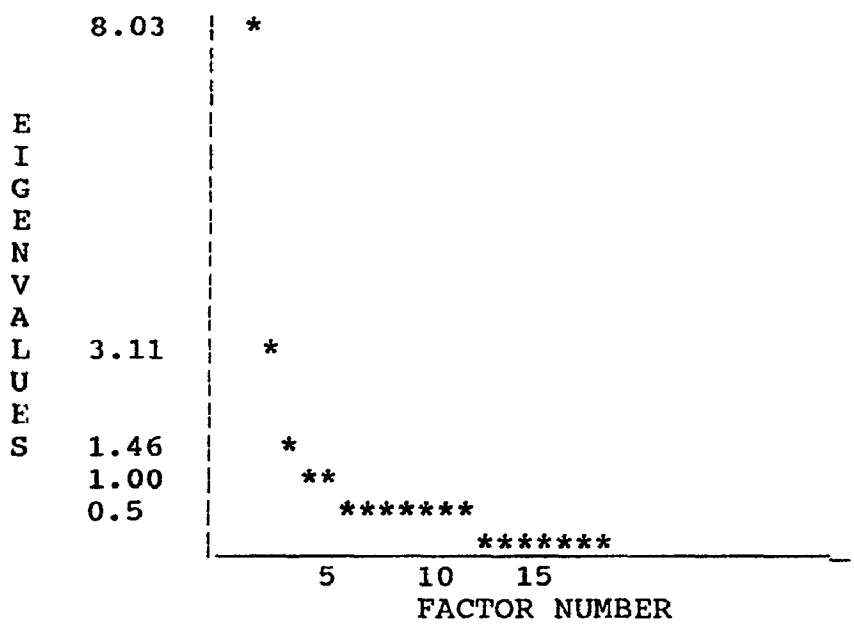


Table 4
Factor Loadings For Imaginal And Psychopathology Variables

Variable	Factor 1	Factor 2	Factor 3
MMPI - Psychasthenia	.84	.43	-
MMPI - Social Introversion	.82	-	-
Stress	.81	.37	-
Neuroticism	.77	.37	-
Lack of Self-Esteem	.72	-	-
MMPI - Schizophrenia	.71	.56	-
MMPI - Depression	.71	-	.53
Well-Being	-.69	-	-
MMPI - Psychopathic Deviate	.53	.43	-
Absorption	-	.87	-
Roleplaying	-	.81	-
Magical Ideation	-	.80	-
MMPI - Mania/Hypomania	-	.79	-
Perceptual Aberration	-	.76	-
Paranormal Beliefs	-	.58	.34
[Mysticism	-	.29]	-
MMPI - Hypochondriasis	-	-	.93
MMPI - Conversion Hysteria	.49	.38	.57
MMPI - Paranoia	.47	.44	.47

Note. Only correlations of .30 or greater are reported.

Ideation and Perceptual Aberration loaded on the imaginative factor only. Most MMPI subscale variables loaded on one or the other of the psychopathology factors, the first or third factors; but subscale 9 (Mania/Hypomania) loaded on the second factor only, the imaginative factor. Subscale 3 (Hypochondriasis), subscale 1 (Conversion Hysteria), and subscale 6 (Paranoia) formed their own psychopathology factor, the third factor.

Several measures of psychopathology were in fact crossover variables loading more heavily on the first factor or the third factor, the psychopathology factors, but with a substantial imaginative component at the same time (see Table 4). MMPI subscale 8, Schizophrenia, was the measure of psychopathology with the greatest imagery component.

Regression analyses.

A regression analysis was carried out on the Schizophrenia variable, adding in the imagery variables as predictors of the imagery component of Schizophrenia. When the Magical Ideation variable was added in last, the R Square change (.00) was not significant ($p = .796$) (see Table 5, part a). Using the same procedure but adding the Perceptual Aberration variable in last, the R Square change (.04) was significant ($p = .000$). In other words, Magical Ideation did not explain a significant amount of the variance in Schizophrenia subscale scores beyond that

Table 5
Predicting Schizophrenia Scores Using Imagery Variables

(a) ALL IMAGERY VARIABLES

MAGICAL IDEATION LAST

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.35	115.00	.000
2. Roleplaying	.00	.09	.765
3. Paranormal Beliefs	.00	.37	.544
4. MMPI-Mania/Hypomania	.07	24.59	.000
5. Perceptual Aberration	.05	21.46	.000
6. Mysticism	.00	.49	.486
7. Magical Ideation	.00	.07	.796

PERCEPTUAL ABERRATION LAST

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.35	115.00	.000
2. Roleplaying	.00	.09	.765
3. Paranormal Beliefs	.00	.37	.544
4. MMPI-Mania/Hypomania	.07	24.59	.000
5. Mysticism	.00	.01	.904
6. Magical Ideation	.02	7.24	.008
7. Perceptual Aberration	.04	14.15	.000

(b) FOUR BASIC IMAGERY VARIABLES

MAGICAL IDEATION LAST

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.35	115.00	.000
2. Roleplaying	.00	.09	.765
3. Paranormal Beliefs	.00	.37	.544
4. Mysticism	.00	.03	.860
5. Magical Ideation	.03	9.54	.002

PERCEPTUAL ABERRATION LAST

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.35	115.00	.000
2. Roleplaying	.00	.09	.765
3. Paranormal Beliefs	.00	.37	.544
4. Mysticism	.00	.03	.860
5. Perceptual Aberration	.07	23.44	.000

explained by all of the other imagery variables whereas Perceptual Aberration did. One might argue that although the MMPI Mania/Hypomania subscale score loaded on the imagery factor, it is in fact a measure of psychopathology on the MMPI. Therefore one might argue that its use as an imagery variable predictor of psychopathology was inappropriate. Furthermore, one might argue that using Perceptual Aberration as a predictor before Magical Ideation might be inappropriate since the two variables correlate so highly.

Hence a regression analysis was carried out to predict Schizophrenia subscale scores using the four basic imagery variables (Absorption, Roleplaying, Paranormal Beliefs and Mysticism) and adding Magical Ideation last (see Table 5, part b). In this case, Magical Ideation contributed significantly ($p = .002$) to the R Square change (.03). However, the variance accounted for by Magical Ideation was negligible compared to the preceding imagery variables (3% versus 35%). A similar regression analysis was performed to predict Schizophrenia subscale scores using the same four basic imagery variables but adding Perceptual Aberration in last. Perceptual Aberration once again contributed significantly ($p = .000$) to the R Square change (.07). Although variance accounted for by Perceptual Aberration was low relative to other variables (7% versus 35%), it was over twice as great as

that accounted for by Magical Ideation (7% versus 3%).

In an attempt to clarify shared variance between Mania/Hypomania and the imagery variables, a regression analysis was carried out to predict Mania/Hypomania using all of the other imagery variables. As is evident from the results in Table 6, the remaining imagery variables account for 44% of the variance in Mania/Hypomania.

All imagery variables were used in an attempt to predict the other crossover variables (conversion hysteria, psychopathic deviate, paranoia, psychasthenia, neuroticism, and stress) by adding Magical Ideation in last. When all imagery variables were forced into the equation first, there were no crossover variables for which Magical Ideation added significantly to variance explained (see Table 7 and Table 8). Regression analyses were carried out for all crossover variables using only the four basic imagery variables (see Table 9 and Table 10). When Mania/Hypomania and Perceptual Aberration were eliminated from the analysis, Magical Ideation contributed significantly to variance accounted for in three crossover variables. However, in each case, the variance accounted for by Magical Ideation was negligible compared to variance accounted for by the other basic imagery variables (paranoia, 2% versus 22%; psychasthenia, 2% versus 27%; and neuroticism, 2% versus 26%).

These same regression analyses were carried out

Table 6
Predicting Mania/Hypomania Scores Using Imagery Variables

MAGICAL IDEATION LAST

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.40	144.02	.000
2. Roleplaying	.02	8.41	.004
3. Paranormal Beliefs	.00	1.29	.258
4. Perceptual Aberration	.00	1.47	.227
5. Mysticism	.00	.00	.982
6. Magical Ideation	.00	1.38	.242

Table 7
Regressions On First Four Crossover Variables Using All Imagery Variables As Predictors And Adding Magical Ideation Last

PREDICTING SCHIZOPHRENIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.35	115.00	.000
2. Roleplaying	.00	.09	.765
3. Paranormal Beliefs	.00	.37	.544
4. MMPI-Mania/Hypomania	.07	24.59	.000
5. Perceptual Aberration	.05	21.46	.000
6. Mysticism	.00	.49	.486
7. Magical Ideation	.00	.07	.796

PREDICTING CONVERSION HYSTERIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.03	6.20	.014
2. Roleplaying	.02	3.57	.060
3. Paranormal Beliefs	.06	14.14	.000
4. MMPI-Mania/Hypomania	.00	.09	.759
5. Perceptual Aberration	.03	6.92	.009
6. Mysticism	.00	.10	.756
7. Magical Ideation	.00	.89	.346

PREDICTING PSYCHOPATHIC DEVIATE SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.18	47.33	.000
2. Roleplaying	.00	1.23	.269
3. Paranormal Beliefs	.00	1.08	.300
4. MMPI-Mania/Hypomania	.09	26.48	.000
5. Perceptual Aberration	.00	.93	.336
6. Mysticism	.00	.16	.693
7. Magical Ideation	.00	.71	.400

PREDICTING PARANOIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.21	55.34	.000
2. Roleplaying	.01	3.10	.080
3. Paranormal Beliefs	.00	.82	.367
4. MMPI-Mania/Hypomania	.00	1.30	.256
5. Perceptual Aberration	.03	7.70	.006
6. Mysticism	.00	.26	.610
7. Magical Ideation	.00	1.05	.308

Table 8
Regressions On Last Three Crossover Variables Using All Imagery Variables As Predictors And Adding Magical Ideation Last

PREDICTING PSYCHASTHENIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.27	76.67	.000
2. Roleplaying	.00	.00	.961
3. Paranormal Beliefs	.00	.19	.668
4. MMPI-Mania/Hypomania	.03	7.90	.005
5. Perceptual Aberration	.01	4.39	.037
6. Mysticism	.00	.37	.545
7. Magical Ideation	.01	1.95	.165

PREDICTING NEUROTICISM SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.23	63.32	.000
2. Roleplaying	.01	4.09	.045
3. Paranormal Beliefs	.01	2.05	.154
4. MMPI-Mania/Hypomania	.01	1.89	.171
5. Perceptual Aberration	.01	3.26	.073
6. Mysticism	.00	1.31	.253
7. Magical Ideation	.01	2.38	.124

PREDICTING STRESS SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.24	67.45	.000
2. Roleplaying	.02	4.28	.040
3. Paranormal Beliefs	.00	.02	.896
4. MMPI-Mania/Hypomania	.02	4.71	.031
5. Perceptual Aberration	.00	.90	.344
6. Mysticism	.00	.14	.710
7. Magical Ideation	.00	1.35	.246

Table 9
Regressions On First Four Crossover Variables Using Basic Imagery Variables As Predictors And Adding Magical Ideation Last

PREDICTING SCHIZOPHRENIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.35	115.00	.000
2. Roleplaying	.00	.09	.765
3. Paranormal Beliefs	.00	.37	.544
4. Mysticism	.00	.03	.860
5. Magical Ideation	.03	9.54	.002

PREDICTING CONVERSION HYSTERIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.03	6.20	.014
2. Roleplaying	.02	3.57	.060
3. Paranormal Beliefs	.06	14.14	.000
4. Mysticism	.00	.02	.882
5. Magical Ideation	.00	.37	.544

PREDICTING PSYCHOPATHIC DEVIATE SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.18	47.33	.000
2. Roleplaying	.00	1.23	.269
3. Paranormal Beliefs	.00	1.08	.300
4. Mysticism	.00	.35	.555
5. Magical Ideation	.01	2.79	.096

PREDICTING PARANOIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.21	55.34	.000
2. Roleplaying	.01	3.10	.080
3. Paranormal Beliefs	.00	.82	.367
4. Mysticism	.00	.98	.323
5. Magical Ideation	.02	5.79	.017

Table 10
Regressions On Last Three Crossover Variables Using Basic Imagery Variables As Predictors And Adding Magical Ideation Last

PREDICTING PSYCHASTHENIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.27	76.67	.000
2. Roleplaying	.00	.00	.961
3. Paranormal Beliefs	.00	.19	.668
4. Mysticism	.00	.04	.852
5. Magical Ideation	.02	6.90	.009

PREDICTING NEUROTICISM SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.23	63.32	.000
2. Roleplaying	.01	4.09	.045
3. Paranormal Beliefs	.01	2.05	.154
4. Mysticism	.00	.60	.441
5. Magical Ideation	.02	6.41	.012

PREDICTING STRESS SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.24	67.45	.000
2. Roleplaying	.02	4.28	.040
3. Paranormal Beliefs	.00	.02	.896
4. Mysticism	.00	.03	.865
5. Magical Ideation	.01	3.05	.082

adding Per-Mag scores in last as predictors of the crossover variables (see Table 11 and Table 12). Contributions to variance explained were significant for the same variables as Magical Ideation and the amount of variance accounted for was only marginally greater than for Magical Ideation alone.

Group differences.

A one-way multivariate analysis of variance was carried out to determine whether the four Magical Ideation groups differed significantly on any of the imagery or psychopathology variables (see Table 13, part A). This MANOVA showed significant group differences for all imagery variables and most psychopathology variables. The three variables for which no significant group differences were found were: Well-Being, which loads (negatively) on the psychopathology factor; and MMPI Depression and MMPI Social Introversion both of which load on the psychopathology factor.

Post-hoc tests of differences between group means were carried out and are reported with means in Table 14.

Investigation of the group mean differences show quite consistent patterns (refer to Table 15). For all four distinct imagery variables (Absorption, Roleplaying, Mania/Hypomania and Perceptual Aberration) as well as for the one imagery variable which was a cross-over variable with a psychopathology component (Paranormal Beliefs)

Table 11
Regressions On First Four Crossover Variables Using Basic Imagery Variables As Predictors And Adding Per-Mag Last

PREDICTING SCHIZOPHRENIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.35	115.00	.000
2. Roleplaying	.00	.09	.765
3. Paranormal Beliefs	.00	.37	.544
4. Mysticism	.00	.03	.860
5. Per-Mag	.06	20.82	.000

PREDICTING CONVERSION HYSTERIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.03	6.20	.014
2. Roleplaying	.02	3.57	.060
3. Paranormal Beliefs	.06	14.14	.000
4. Mysticism	.00	.02	.882
5. Per-Mag	.01	3.44	.065

PREDICTING PSYCHOPATHIC DEVIATE SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.18	47.33	.000
2. Roleplaying	.00	1.23	.269
3. Paranormal Beliefs	.00	1.08	.300
4. Mysticism	.00	.35	.555
5. Per-Mag	.01	2.68	.103

PREDICTING PARANOIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.21	55.34	.000
2. Roleplaying	.01	3.10	.080
3. Paranormal Beliefs	.00	.82	.367
4. Mysticism	.00	.98	.323
5. Per-Mag	.03	8.59	.004

Table 12
Regressions On Last Three Crossover Variables Using Basic Imagery Variables As Predictors And Adding Per-Mag Last

PREDICTING PSYCHASTHENIA SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.27	76.67	.000
2. Roleplaying	.00	.00	.961
3. Paranormal Beliefs	.00	.19	.668
4. Mysticism	.00	.04	.852
5. Per-Mag	.03	8.04	.005

PREDICTING NEUROTICISM SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.23	63.32	.000
2. Roleplaying	.01	4.09	.045
3. Paranormal Beliefs	.01	2.05	.154
4. Mysticism	.00	.60	.441
5. Per-Mag	.02	6.87	.009

PREDICTING STRESS SUBSCALE SCORES

Step and Variable	R Square Change	F Change	Significance of F Change
1. Absorption	.24	67.45	.000
2. Roleplaying	.02	4.28	.040
3. Paranormal Beliefs	.00	.02	.896
4. Mysticism	.00	.03	.865
5. Per-Mag	.01	2.70	.102

Table 13
MANOVAs For Group Differences

A) On Imagery And Psychopathology Variables

MULTIVARIATE TESTS OF SIGNIFICANCE

Test Name	Value	Approx.F	Hypoth.DF	Error DF	Sig.of F
Pillais	.88	4.45	54.00	582.00	.000
Hotellings	2.10	7.42	54.00	572.00	.000
Wilks	.28	5.74	54.00	572.00	.000

UNIVARIATE F-TESTS WITH (3,209) DF

VARIABLE	UNIVARIATE F TEST	SIGNIF. OF F
Roleplaying	35.65	.000
Paranormal Beliefs	30.07	.000
Mysticism	5.18	.002
Absorption	56.98	.000
Neuroticism	15.07	.000
Lack of Self-Esteem	3.13	.027
Stress	13.51	.000
Well-Being	.61	.612
Hypochondriasis	12.10	.000
Depression	1.37	.251
Conversion Hysteria	3.95	.009
Psychopathic Deviate	12.61	.000
Paranoia	16.41	.000
Psychasthenia	19.15	.000
Schizophrenia	24.24	.000
Mania/hypomania	23.57	.000
Social Introversion	.62	.600
Perceptual Aberration	72.58	.000

B) On Psychopathology Variables Only With Imagery Variables Used As Covariates:

MULTIVARIATE TESTS OF SIGNIFICANCE

Test Name	Value	Approx.F	Hypoth.DF	Error DF	Sig.of F
Pillais	.22	1.19	39.00	585.00	.202
Hotellings	.24	1.19	39.00	575.00	.202
Wilks	.79	1.19	39.00	572.26	.202

Table 14
Group Means and Standard Deviations

VARIABLE	GROUP LOW M	LOW SD	CONTROL M	CONTROL SD	HIGH-NORM M	HIGH-NORM SD	HIGH M	HIGH SD
Roleplaying	66.00 a	14.04	75.85 b	12.10	82.63 c	12.77	93.19 d	16.36
Paranormal Beliefs	56.23 a	13.72	66.09 b	11.91	76.02 c	17.44	81.04 c	14.54
Mysticism	89.62 ab	6.33	88.41 a	9.26	92.87 bc	9.23	94.13 c	9.26
Absorption	11.06 a	6.15	17.50 b	5.80	21.74 c	6.39	26.42 d	6.69
Neuroticism	9.96 a	4.93	11.82 a	4.65	15.50 b	5.70	15.47 b	5.33
Lack of Self-Esteem	1.12 a	1.54	1.44 abc	1.51	1.83 bd	1.50	1.91 cd	1.47
Stress	9.81 a	5.94	11.57 a	6.91	15.78 b	7.40	17.00 b	6.58
Well-Being	17.87abc	5.69	19.13ade	5.00	18.15bdf	5.19	18.08cef	5.28
Hypochondriasis	5.06 a	3.36	6.54 a	4.07	8.85 b	4.55	9.81 b	5.74
Depression	18.19abc	4.69	18.52ade	5.23	19.70bdf	5.58	19.98cef	6.13
Conversion Hysteria	19.00 a	4.83	21.17 bc	4.23	22.02 cd	5.41	21.83 bd	5.61
Psychopathic Deviate	16.15 a	4.12	17.13 a	4.26	19.98 b	5.31	21.57 b	6.46
Paranoia	8.83 a	3.23	10.44 b	2.54	12.54 c	4.08	13.13 c	4.08
Psychasthenia	12.62 a	6.23	14.48 a	7.38	20.83 b	8.95	22.43 b	8.83
Schizophrenia	11.77 a	6.28	16.52 b	7.97	23.26 c	10.43	25.68 c	11.73
Mania/Hypomania	17.21 a	5.32	20.93 b	4.52	23.30 c	4.12	24.49 c	5.14
Social Introversion	26.21abc	7.99	24.85ade	8.47	27.09bdf	9.43	25.49cef	9.76
Perceptual Aberration	1.92 a	2.60	5.37 b	4.60	9.94 c	5.16	15.81 d	7.09

Note. Means sharing a common subscript fail to differ significantly at alpha = .05

Table 15
Summary Of Sequencing of Group Means

VARIABLE	FACTOR LOADED ON	SEQUENCE OF MEANS (lowest to highest)
Roleplaying	Imagery	low,control,high-norm,high
Paranormal Beliefs	Psypathol	low,control,high-norm,high
Mysticism	Imagery	control,low,high-norm,high
Absorption	Imagery	low,control,high-norm,high
Neuroticism	Psypathol	low,control,high,high-norm
Lack of Self-Esteem	Psypathol	low,control,high-norm,high
Stress	P Crossovr	low,control,high-norm,high
Well-Being	Psypathol	no differences
Hypochondriasis	P Crossovr	low,control,high-norm,high
Depression	Psypathol	no differences
Conversion Hysteria	Psypathol	low,control,high,high-norm
Psychopathic Deviate	P Crossovr	low,control,high-norm,high
Paranoia	P Crossovr	low,control,high-norm,high
Psychasthenia	P Crossovr	low,control,high-norm,high
Schizophrenia	P Crossovr	low,control,high-norm,high
Mania/Hypomania	Imagery	low,control,high-norm,high
Social Introversion	Psypathol	no differences
Perceptual Aberratn	Imagery	low,control,high-norm,high

Note. Actual group means are in Table 14.
Imagery = Imagery factor; Psypathol = Psychopathology factor; P Crossover = Psychopathology factor with significant crossover to imagery factor.

group means were lowest for the "low" group and were rank ordered up to highest for the "high" group. For Mysticism which did not load distinctly on any factor but which had its highest loading on the imagery factor, group means were ranked, from lowest to highest: 'controls', 'lows', 'high-normals' and 'highs'.

For the imagery variables there was, for the rost part, a monotonic relationship between magical thinking levels and corresponding imagery scores. However, the relationships for psychopathology variables were more complex. Sometimes there was no relationship between degree of magical thinking and psychopathology and sometimes degree of magical thinking was ordered, but not necessarily in keeping with the psychopathology hypothesis of Eckblad and Chapman. For the four variables which loaded distinctly into the major psychopathology factor, three did <u>not</u> have significant group mean differences (Well-Being, Depression, and Social Introversion) and the fourth (Lack of Self-Esteem) was rank ordered lowest to highest for 'low' through 'high' groups. For the one variable which loaded distinctly on the minor psychopathology factor, Hypochondriasis, group means were rank ordered, lowest to highest, for 'lows', 'controls', 'highs', then 'high-normals', very nearly rank ordered.

For the seven variables which loaded most heavily on the psychopathology factors but which were crossover

variables in that they clearly showed an imagery component as well, six out of seven once again had group means rank ordered from lowest to highest for 'low' through 'high' groups (Psychasthenia, Stress, Schizophrenia, Psychopathic Deviate, Conversion Hysteria, Paranoia) and the other variable, Neuroticism, had group means ranked lowest to highest for 'lows', then 'controls', then 'highs', and highest for 'high-normals'.

Given that most psychopathology measures included some imagery component, a question remained concerning whether or not there would be differences in psychopathology scores across the four levels of magical thinking if these imagery effects were controlled. A post hoc MANCOVA was carried out to determine Magical Ideation group differences on the psychopathology variables using the four basic imagery variables as covariates (see Table 13, part B). This analysis indicated that there were <u>not</u> significant multivariate differences by level of magical thinking. In other words, once basic imagery variables were controlled, levels of magical ideation were no longer significantly related to measures of psychopathology.

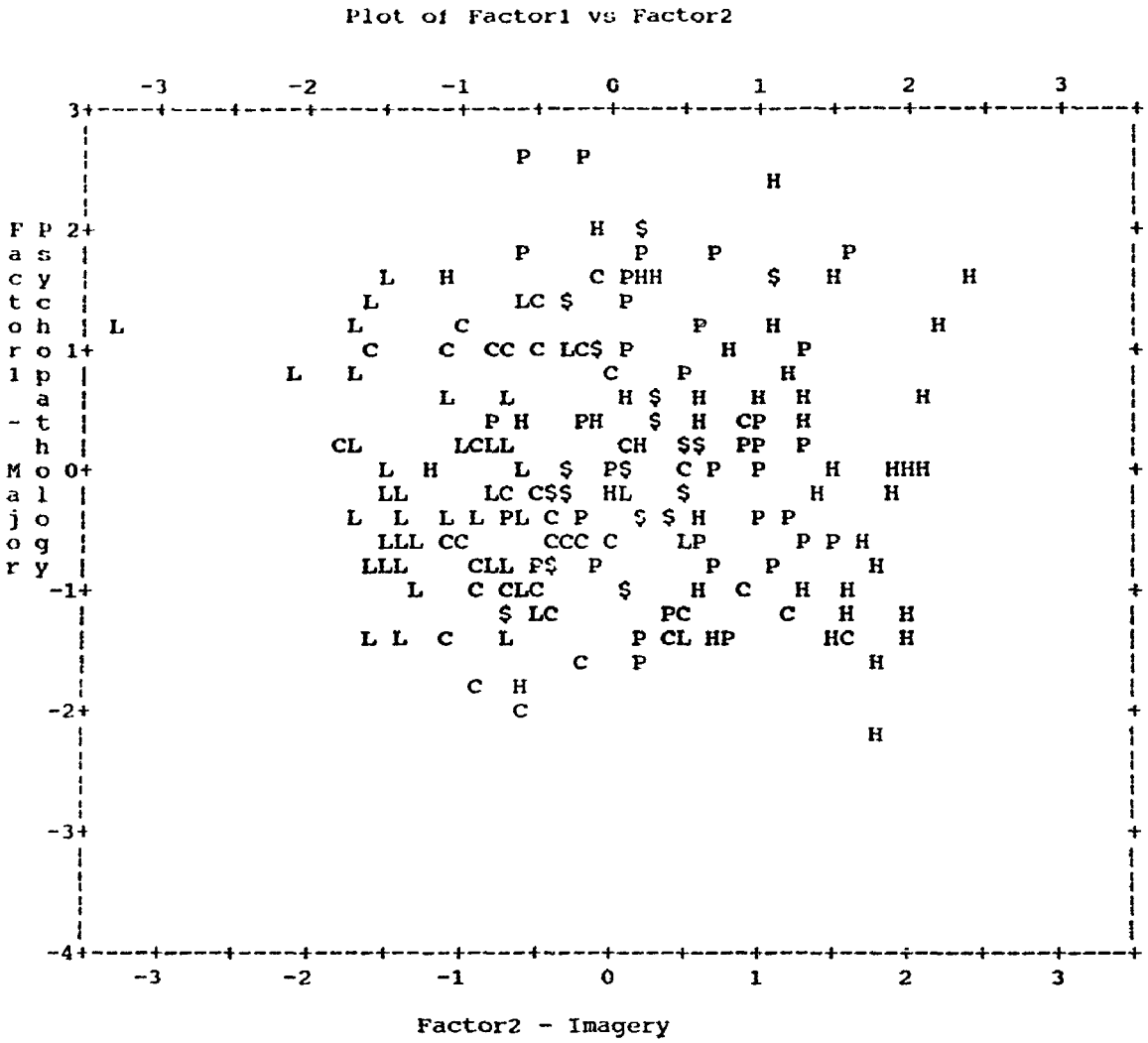
<u>Factor scores</u>.

For each subject, factor scores were calculated for the imaginal factor and the two psychopathological factors. These three factor scores per subject were computed after excluding Magical Ideation scores. Plots of

factor scores by factor scores (refer to Figures 4, 5, and 6) re-confirmed the orthogonality of the factors. A plot of the major psychopathology factor score by magical ideation showed no apparent relationship between the two (see Figure 7). The same sort of lack of relationship appeared in a plot of the minor psychopathology factor by magical ideation (see Figure 8). But a plot of magical thinking by the imaginal factor (Figure 9) showed a positive linear relationship between the two; this is not surprising and confirms that magical thinking loads into that factor.

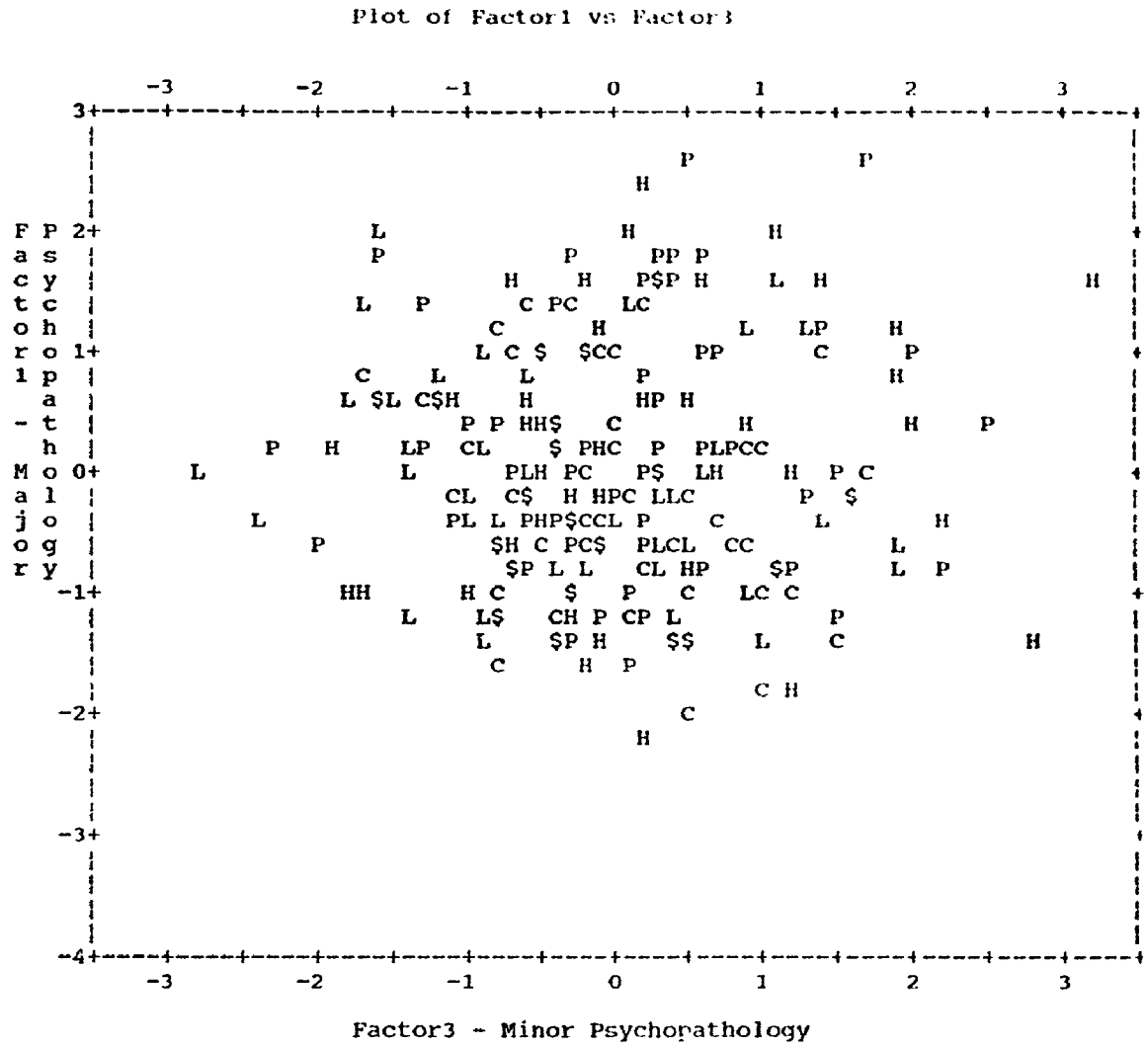
A oneway multivariate analysis of variance that included Magical Ideation as the independent variable was conducted on the factor scores. Significant multivariate differences and significant univariate differences were obtained for the major psychopathology factor score and the imaginal factor score (refer to Table 16). Group means for the major psychopathology factor scores were lowest for the 'control' group, next lowest for the 'low' group, with the 'high' group next and with 'high-normals' highest (see Table 17). Further analysis using least squares differences (LSD) showed that 'controls' had significantly lower psychopathology factor scores than 'highs' and 'high-normals' and that 'high-normals' had significantly higher psychopathology factor scores than 'controls' and 'lows'.

Figure 4
Plot of Major Psychopathology Factor Score By Imagery Factor Score



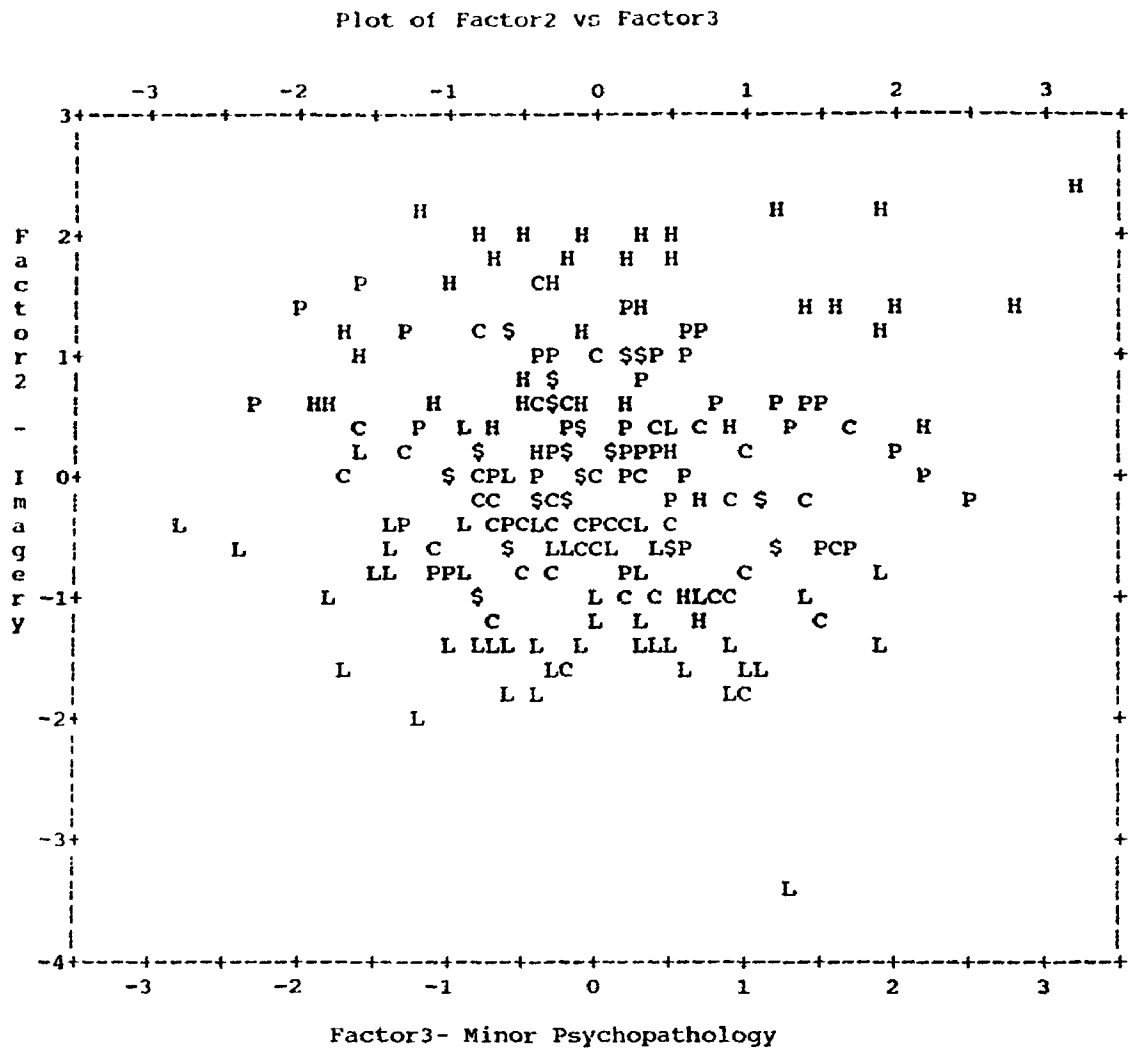
Note. 213 cases plotted. L: lows: C: controls;
P: relatively highs; H: highs; $: multiple occurence

Figure 5
Plot of Major Psychopathology Factor Score By Minor Psychopathology Factor Score



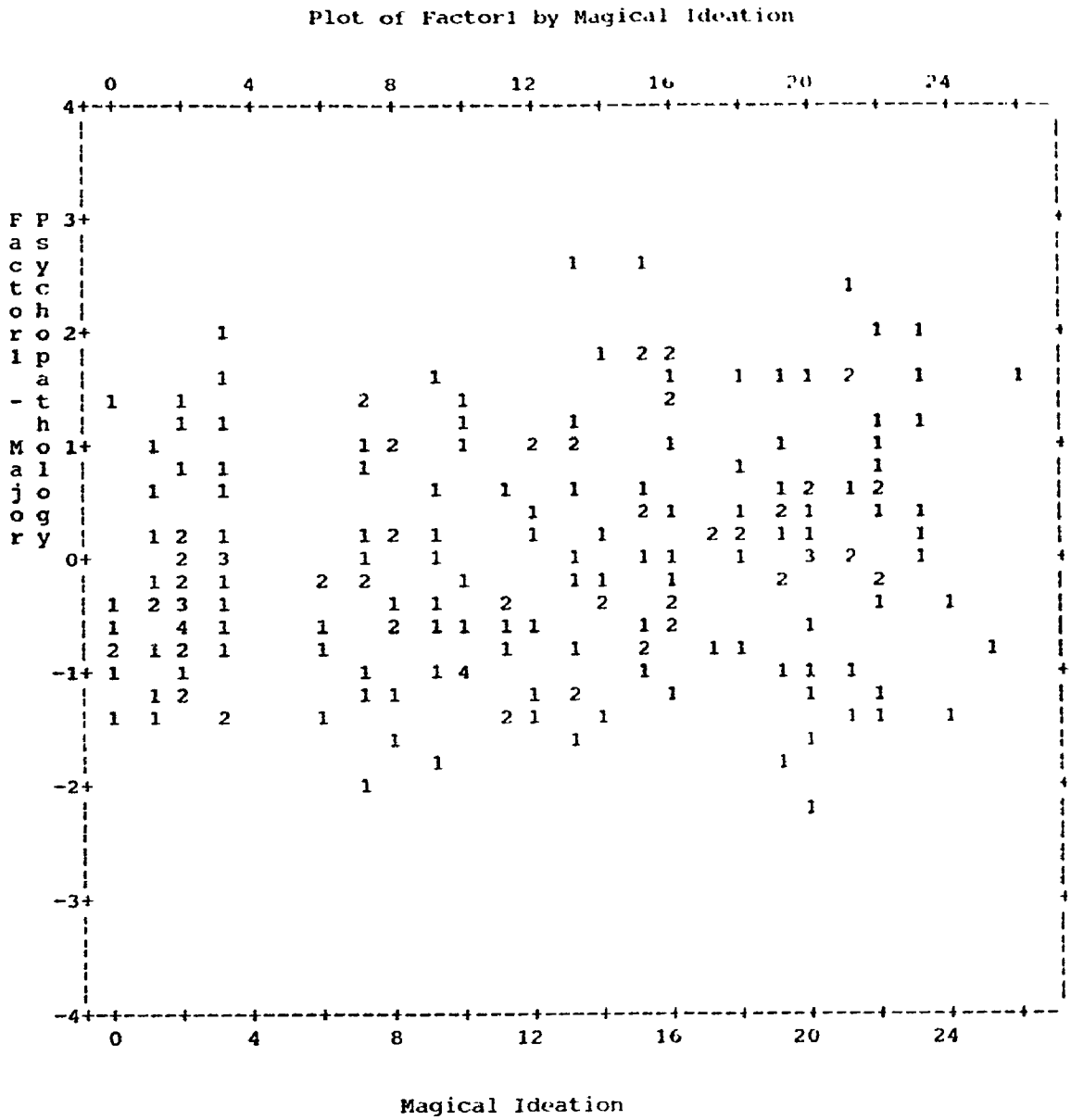
Note. 213 cases plotted. L: lows: C: controls;
P: relatively highs; H: highs; $: multiple occurence

Figure 6
Plot of Imagery Factor Score By Minor Psychopathology Factor Score



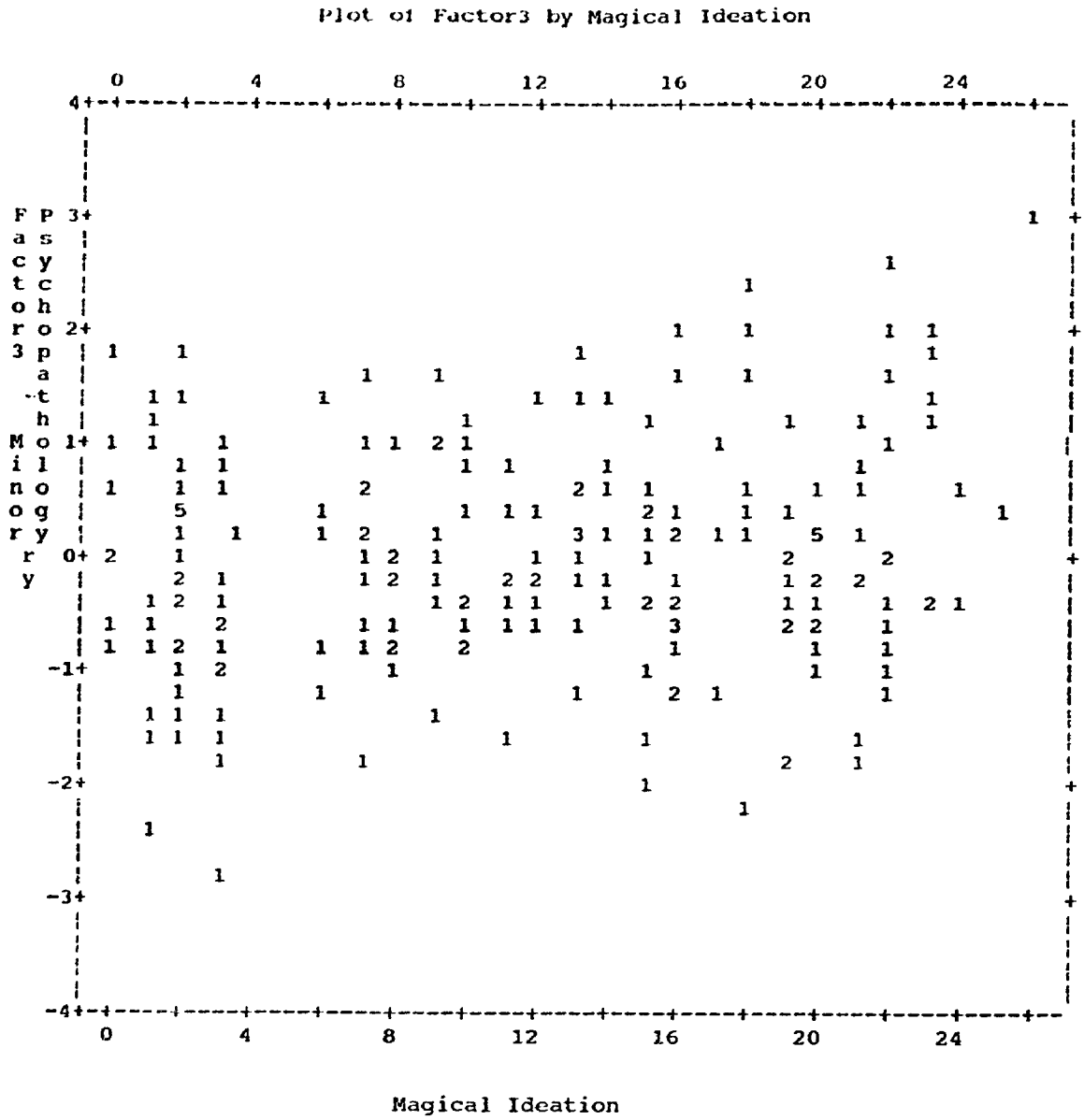
Note. 213 cases plotted. L: lows: C: controls;
P: relatively highs; H: highs; $: multiple occurence

Figure 7
Plot of Major Psychopathology Factor Score By Magical Ideation Score



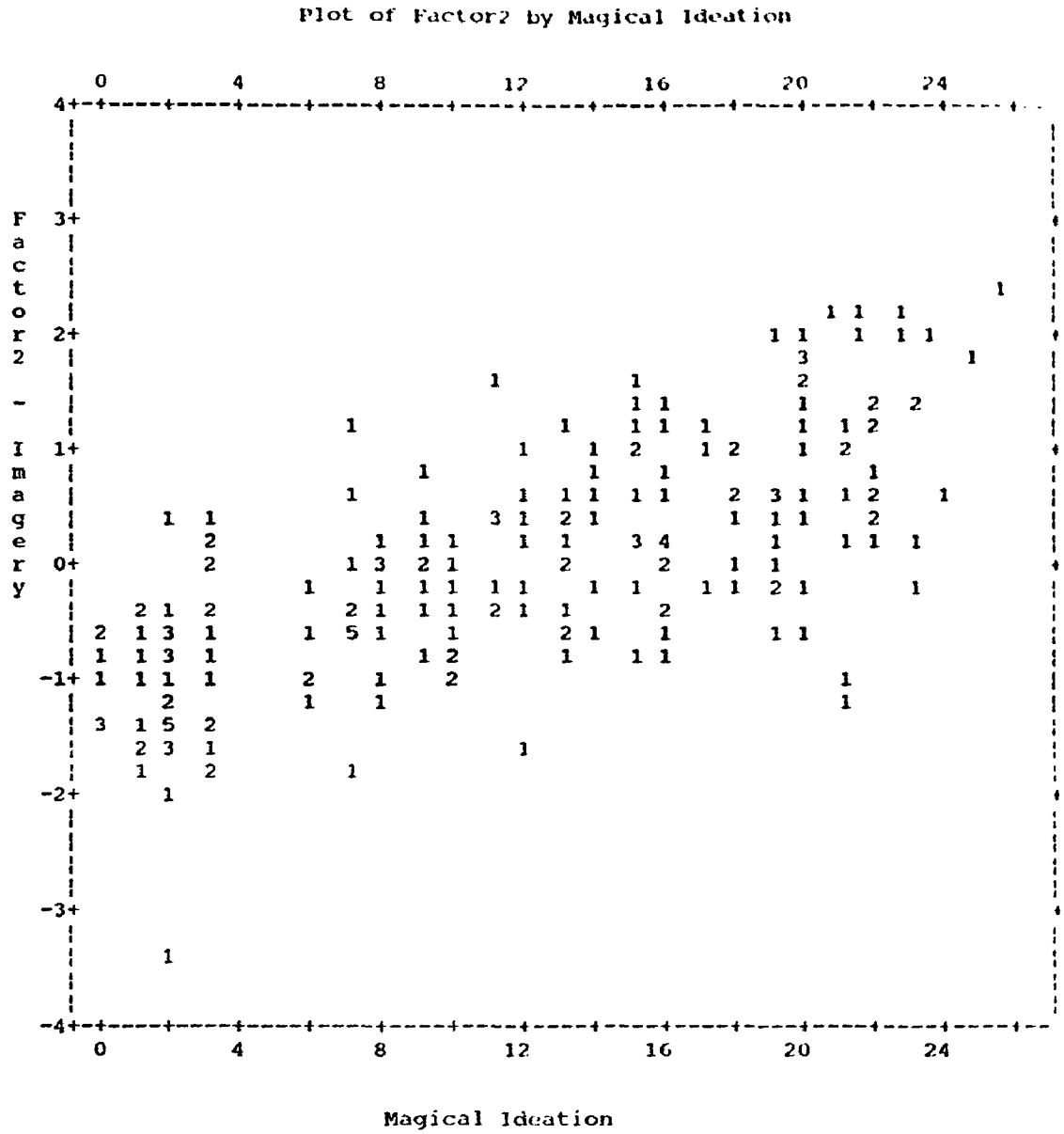
Note. 213 cases plotted.

Figure 8
Plot of Minor Psychopathology Factor Score By Magical Ideation Score



Note. 213 cases plotted.

Figure 9
Plot of Imagery Factor Score By Magical Ideation Score



Note. 213 cases plotted.

Table 16
MANOVA For Group Differences On the Three Factor Scores

MULTIVARIATE TESTS OF SIGNIFICANCE

Test Name	Value	Approx.F	Hypoth.DF	Error DF	Sig.of F
Pillais	.55	15.65	9.00	627.00	.000
Hotellings	1.18	26.87	9.00	617.00	.000
Wilks	.54	21.29	9.00	503.00	.000

UNIVARIATE F-TESTS WITH (3,209) DF

VARIABLE	UNIVARIATE F TEST	SIGNIF. OF F
Psychopathology (factor 1)	2.90	.036
Imagery (factor 2)	66.44	.000
Psychopathology (factor 3)	1.71	.167

Table 17
Group Differences For Major Psychopathology Factor Scores And Imagery Factor Scores

FACTOR TOTAL SCORE	GROUP LOW M	LOW SD	CONTROL M	CONTROL SD	HIGH-NORM M	HIGH-NORM SD	HIGH M	HIGH SD
Major Psychopathology	-.18 ab	.85	-.21 a	.93	.22 c	1.06	.18 bc	1.08
Imagery	-.99 a	.70	-.27 b	.66	.33 c	.62	.91 d	.89

Note. Means sharing a common subscript fail to differ significantly at alpha=.05

Group means were rank ordered lowest to highest for 'lows' to 'highs' for the imaginal factor scores, as was expected. LSD analysis indicated significant differences between all groups at each level (refer to Table 17).

A discriminant function analysis was also carried out to predict level of Magical Ideation based upon factor scores for the two major factors. The discriminant function was able to correctly predict group membership 51.6% of the time with correct group membership predicted 73% of the time for 'lows', 39% of the time for 'controls', 37% of the time for 'high-normals', and 59% of the time for 'highs' (see Table 18). The imaginal factor score on its own predicted group membership as well as the two major factor scores together. Using the two major factor scores plus the third psychopathology factor score only increased correct predictions from 51.6% to 55.9%.

Depression

Next, depression in magical thinkers was examined more closely. Degree of relationship between scores on the Beck Depression Inventory (BDI) and level of Magical Ideation was examined. First, BDI scores were categorized as per Burns (1980). An analysis of variance (ANOVA) across the four levels of magical thinking indicated significant differences for categories of depression as measured by the BDI (see Table 19, part A). Group means were lowest for 'lows' and were rank ordered for

Table 18
Predicting Magical Ideation Level With Factor Scores

Major Psychopathology and Imaginal Factor Scores

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP LOW	CONTROL	HIGH-NORM	HIGH
LOW	52	38 (73%)	9 (17%)	5 (10%)	0 (0%)
CONTROL	54	16 (30%)	21 (39%)	13 (24%)	4 (7%)
HIGH-NORMAL	54	4 (7%)	12 (22%)	20 (37%)	18 (33%)
HIGH	53	3 (6%)	3 (6%)	16 (30%)	31 (59%)

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 51.64%

Major Psychopathology Factor Score Alone

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP LOW	CONTROL	HIGH-NORM	HIGH
LOW	52	0 (0%)	35 (67%)	17 (33%)	0 (0%)
CONTROL	54	0 (0%)	34 (63%)	20 (37%)	0 (0%)
HIGH-NORMAL	54	0 (0%)	26 (48%)	28 (52%)	0 (0%)
HIGH	53	0 (0%)	21 (40%)	32 (60%)	0 (0%)

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 29.11%

Imaginal Factor Score Alone

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP LOW	CONTROL	HIGH-NORM	HIGH
LOW	52	37 (71%)	9 (17%)	6 (12%)	0 (0%)
CONTROL	54	15 (28%)	22 (41%)	13 (24%)	4 (7%)
HIGH-NORMAL	54	4 (7%)	12 (22%)	20 (37%)	18 (33%)
HIGH	53	2 (4%)	7 (13%)	13 (25%)	31 (59%)

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 51.64%

Imaginal and Major and Minor Psychopathology Factor Scores

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP LOW	CONTROL	HIGH-NORM	HIGH
LOW	52	39 (75%)	11 (21%)	2 (4%)	0 (0%)
CONTROL	54	12 (22%)	28 (52%)	9 (17%)	5 (9%)
HIGH-NORMAL	54	4 (7%)	11 (20%)	22 (41%)	17 (32%)
HIGH	53	2 (4%)	7 (13%)	14 (26%)	30 (57%)

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 55.87%

'controls', 'high-normals' and 'highs' (refer to Table 20). Further investigation of group differences showed that 'lows' were significantly lower on BDI category scores than both 'high-normals' and 'highs', and that 'highs' were significantly higher than both 'lows' and 'controls'.

A post hoc analysis of variance using the four basic imagery variables as covariates showed no differences on BDI scores for level of Magical Ideation (see Table 19, part B).

MMPI 2-7-8 Profile

Presence or absence of an MMPI 2-7-8 profile was examined next in relation to degree of Magical Ideation. Once again a one way ANOVA indicated significant group differences (see Table 21, part A). There were no instances of MMPI 2-7-8 profiles found in any of the 'low' or 'control' groups. Further analysis using LSD (refer to Table 20) confirmed that the 'high' and 'high-normal' groups had significantly higher incidences of 2-7-8 profiles than did 'lows' and 'controls'.

A post hoc analysis of 2-7-8 profiles using the four basic imagery variables as covariates showed no group differences for level of Magical Ideation (see Table 21, part B).

Logic and Causality

Pearson zero-order correlations for Paranormal

Table 19
ANOVA For Group Differences On the Beck Depression Inventory (BDI)

A) MAIN EFFECT ONLY

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
MAIN EFFECTS	17.35	3	5.78	7.62	.000
LEVEL OF MAG.ID.	17.35	3	5.78	7.62	.000
EXPLAINED	17.35	3	5.78	7.62	.000
RESIDUAL	160.14	211	.76		
TOTAL	177.49	214	.83		

B) WITH BASIC IMAGERY VARIABLES AS COVARIATES

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
COVARIATES	20.50	4	5.13	6.91	.000
Roleplaying	.02	1	.02	.02	.883
Paranormal Bl[illegible]	1.74	1	1.74	2.34	.128
Mysticism	1.63	1	1.63	2.20	.140
Absorption	4.80	1	4.80	6.47	.012
MAIN EFFECTS	3.34	3	1.11	1.50	.216
LEVEL OF MAG.ID.	3.34	3	1.11	1.50	.216
EXPLAINED	23.84	7	3.41	4.59	.000
RESIDUAL	153.65	207	.74		
TOTAL	177.49	214	.83		

Table 20
Group Differences For Categories of Depression (BDI) And MMPI 2-7-8

TOTAL	GROUP							
	LOW		CONTROL		HIGH-NORM		HIGH	
	M	SD	M	SD	M	SD	M	SD
BDI (Beck Depression Inventory) category	.10 a	.30	.31 ab	.69	.61 bc	.92	.84 c	1.26
MMPI 2-7-8 profile	.00 a	.00	.00 a	.00	.09 b	.29	.13 b	.34

Note. Means sharing a common subscript fail to differ significantly at alpha=.05

Table 21
ANOVA For Group Differences On the MMPI 2-7-8

A) MAIN EFFECT ONLY

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
MAIN EFFECTS	.68	3	.23	4.52	.004
LEVEL OF MAG.ID.	.68	3	.23	4.52	.004
EXPLAINED	.68	3	.23	4.52	.004
RESIDUAL	10.65	211	.05		
TOTAL	11.33	214	.05		

B) WITH BASIC IMAGERY VARIABLES AS COVARIATES

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
COVARIATES	.78	4	.19	3.87	.005
Roleplaying	.08	1	.08	1.51	.220
Paranormal Blfs	.25	1	.25	5.02	.026
Mysticism	.04	1	.04	.86	.355
Absorption	.00	1	.00	.08	.773
MAIN EFFECTS	.17	3	.06	1.15	.329
LEVEL OF MAG.ID.	.17	3	.06	1.15	.329
EXPLAINED	.95	7	.14	2.70	.011
RESIDUAL	10.38	207	.05		
TOTAL	11.33	214	.05		

Beliefs and Magical Ideation showed a high correlation ($r=.565$, $p=.000$); whereas the Rotter's modified Internal-External measure (high is "external" orientation) was not meaningfully related to Magical Ideation ($r=.171$, $p=.006$) (see Table 22). Since $n = 216$, correlations that are small were statistically significant. Therefore only correlations of .30 or greater were considered psychologically meaningful. Paranormal Beliefs were not meaningfully correlated with Internal-External orientation ($r=.196$, $p=.002$).

An analysis of Magical Ideation group differences was carried out for each of the four logic and causality measures using a multivariate analysis of variance (refer to Table 23). This MANOVA indicated significant multivariate differences between groups and significant univariate differences between groups for both Paranormal Beliefs and for logical ability as measured by the Syllogisms Task. Thus no group differences were found for the Rotter's Internal/External measure of causality nor for logical ability as measured by the Permutations Task.

Further analysis of the group differences were explored (refer to Table 24). Mean scores for Paranormal Beliefs were rank ordered from highest for the 'high' group to lowest for the 'low' group. LSD analysis showed that 'highs' were significantly higher than all groups in endorsing paranormal beliefs; 'high-normals' were

Table 22
Zero-Order Correlations Of Logic And Causality Variables

	PARANORMAL BELIEFS	INTERNAL-EXTERNAL ORIENTATION	LOGIC (Permutations)	LOGIC (Syllogisms)
MAGICAL IDEATION				
PARANORMAL BELIEFS				
INTERNAL-EXTERNAL	.20 (df=211) (p=.002)			
LOGIC (Permutations)	-.06 (df=216) (p=.186)	-.04 (df=211) (p=.273)		
LOGIC (Syllogisms)	-.22 (df=213) (p=.001)	-.12 (df=208) (p=.049)	.27 (df=213) (p=.000)	
MAGICAL IDEATION	.57 (df=216) (p=.000)	.17 (df=211) (p=.006)	-.05 (df=216) (p=.213)	-.14 (df=213) (p=.024)

Table 23
MANOVA For Group Differences On Logic And Causality Variables

MULTIVARIATE TESTS OF SIGNIFICANCE

Test Name	Value	Approx.F	Hypoth.DF	Error DF	Sig.of F
Pillais	.34	6.45	12.00	609.00	.000
Hotellings	.469	7.80	12.00	599.00	.000
Wilks	.673	7.16	12.00	532.00	.000

UNIVARIATE F-TESTS WITH (3,209) DF

VARIABLE	UNIVARIATE F TEST	SIGNIF. OF F
Paranormal Beliefs	28.62	.000
Internal/External Orientation	2.18	.091
Logic (Permutation Task)	.88	.452
Logic (Syllogisms Task)	3.55	.015

Table 24
Group Differences For Paranormal Beliefs And Logical Abilities (Syllogisms Task)

	GROUP							
	LOW		CONTROL		HIGH-NORM		HIGH	
	M	SD	M	SD	M	SD	M	SD
Paranormal Beliefs	56.24	13.72	66.04	12.06	76.02 a	17.44	80.56 a	14.52
Logic (syllogisms)	5.96	1.79	4.94 ab	1.84	5.26 bc	1.71	5.15 ac	1.66

Note. Means sharing a common subscript fail to differ significantly at alpha=.05

significantly higher than both 'controls' and 'lows' in paranormal beliefs; and, 'lows' were significantly lower than all groups on paranormal beliefs.

Mean scores for logical abilities as measured by the syllogisms task were highest for the 'lows', and lowest for 'controls'. The LSD indicated that 'lows' were significantly higher than all other groups for this measure of logic.

Background Factors For Magical Thinking

An analysis was carried out to determine whether categories of items on the Demographic Questionnaire for Magical Thinking were answered differentially between groups of magical thinkers (refer to Table 25). Multivariate differences were found between groups as well as univariate differences for five measures: happiness in childhood, group orientation in childhood, fantasy in childhood, level of adult adjustment, and level of spiritual adjustment. Further analysis using LSD between groups (see Table 26) indicated the following significant group differences: (1) both 'highs' and 'high-normals' reported a happier childhood than 'low' and 'control' groups; (2) 'highs' reported a higher level of group orientation in childhood (ie preference for groups in play and activities over being alone) than 'low' and 'control' groups; (3) 'high-normals' reported greater group orientation than 'controls'; (4) 'highs' were higher in

Table 25
MANOVA For Group Differences On Demographic Questionnaire For Magical Thinking Variables

MULTIVARIATE TESTS OF SIGNIFICANCE

Test Name	Value	Approx.F	Hypoth.DF	Error DF	Sig.of F
Pillais	.36	3.39	24.00	600.00	.000
Hotellings	.481	3.94	24.00	590.00	.000
Wilks	.662	3.67	24.00	574.00	.000

UNIVARIATE F-TESTS WITH (3,209) DF

VARIABLE	UNIVARIATE F TEST	SIGNIF. OF F
Happiness in Childhood	3.70	.013*
Group Orientation vs Being Alone	5.02	.002*
Fantasy	15.28	.000*
Mother's Education	.20	.893
Father's Education	1.96	.120
Adult Adjustment	4.43	.005*
Spiritual Adjustment	3.81	.011*
Number of Friends	.28	.842

Note. * indicates significant group differences.

Table 26
Group Means and Standard Deviations For Demographic Questionnaire Variables

VARIABLES	GROUP							
	LOW		CONTROL		HIGH-NORM		HIGH	
	M	SD	M	SD	M	SD	M	SD
Happiness in childhood	27.65 a	11.36	26.89 a	10.65	32.74 b	14.66	34.44 b	13.89
Group orientation in childhood	28.98 ab	5.42	28.24 a	5.37	31.34 bc	7.15	32.73 c	7.37
Fantasy in childhood	17.73	5.31	20.28 a	6.13	22.19 a	8.08	25.31	5.89
Adult adjustment	16.41 a	5.89	18.02 abc	5.92	20.34 bd	5.53	20.02 cd	7.05
Spiritual adjustment	2.67 a	2.71	3.19 abc	2.35	3.83 bd	2.60	4.11 cd	2.66

Note. Means sharing a common subscript fail to differ significantly at alpha=.05

fantasy orientation in childhood than all other groups; (5) 'lows' were lower in fantasy orientation than all other groups; and (6) 'lows' reported a significantly lower level of both adult adjustment and spiritual adjustment than both 'high-normal' and 'high' groups.

An analysis was carried out to determine whether subscales of the Family Environment Scale (Moos, 1986) were answered differently by subjects in the different Magical Ideation groups. Multivariate differences were found between groups as well as univariate differences for three of ten measure: cohesion, conflict, and achievement orientation (see Table 27). Within the FES, both cohesion and conflict represent relationship dimensions whereas achievement orientation represents a personal growth dimension. Cohesion, within the context of the FES, represents the degree of commitment, help, and support family members provide for one another. Conflict measures the amount of openly expressed anger, aggression, and conflict among family members. Achievement orientation measures the extent to which activities (such as school and work) are cast into an achievement-oriented or competitive framework. Further analysis of group differences (refer to Table 28) indicated that: 'highs' reported significantly lower cohesion in the family environment than did 'controls' and 'lows'; 'lows' reported significantly lower conflict in the family than

Table 27
MANOVA For Group Differences On Family Environment Scale (FES) Variables

MULTIVARIATE TESTS OF SIGNIFICANCE

Test Name	Value	Approx.F	Hypoth.DF	Error DF	Sig.of F
Pillais	.22	1.56	30.00	615.00	.031
Hotellings	.23	1.58	30.00	605.00	.028
Wilks	.80	1.57	30.00	596.52	.029

UNIVARIATE F-TESTS WITH (3,209) DF

VARIABLE	UNIVARIATE F TEST	SIGNIF. OF F
Cohesion	2.96	.033*
Expressiveness	1.95	.122
Conflict	3.74	.012*
Independence	.72	.540
Achievement Orientation	2.67	.049*
Intellectual-Cultural Orient.	2.40	.069
Active-Recreational Orientation	1.65	.179
Moral-Religious Emphasis	.35	.788
Organization	1.64	.180
Control	.69	.558

Note. * indicates significant group differences.

Table 28
Group Means and Standard Deviations For Family Environment Scale Variables

VARIABLES	GROUP							
	LOW		CONTROL		HIGH-NORM		HIGH	
	M	SD	M	SD	M	SD	M	SD
Cohesion	6.81	ab 2.07	6.76	ac 2.04	6.07	bcd 2.66	5.62	d 2.92
Conflict	2.79	a 2.15	3.62	abc 2.55	4.24	bd 2.43	4.05	cd 2.55
Achievement orientation	5.33	a 1.98	6.15	bc 1.74	5.69	acd 2.04	6.24	bd 1.82

Note. Means sharing a common subscript fail to differ significantly at alpha=.05

either 'highs' or 'high-normals'; and, 'lows' reported significantly lower achievement orientation than 'controls' and 'highs'.

A discriminant analysis was carried out using the five background measures and the three FES measures with group differences in an attempt to predict group membership. These eight variables correctly predicted group membership in 41.2% of cases (see Table 29).

Test-Retest Reliability

Test-retest correlations were computed for Magical Ideation and Perceptual Aberration.

Overall Magical Ideation test-retest reliability for 212 subjects for retest periods ranging from 1 to 141 weeks had a correlation coefficient of r = .66 (refer to Table 30). A more detailed examination of shorter periods within this timeframe showed consistency in test-retest coefficients across time periods. Examination of original 'high' magical thinkers shows that only 49% of original 'highs' were 'high' on retest, 38% of original 'highs' were 'high-normal' on retest, 11% of original 'highs' were 'control' or 'normal' on retest, and 2% of original 'highs' were 'low' on retest (refer to Table 31). Breaking down the overall test-retest data by sex, the test-retest correlation for females (n=114) was r=.59, whereas the test-retest correlation for males (n=98) was r=.83 (Table 16).

Table 29
Predicting Level Of Magical Ideation Using Five Demographic Questionnaire Measures and Three FES Measures

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP LOW	CONTROL	HIGH-NORM	HIGH
LOW	51	30	10	5	6
		58.8%	19.6%	9.8%	11.8%
CONTROL	53	18	16	8	11
		34.0%	30.2%	15.1%	20.8%
HIGH-NORMAL	52	9	13	10	20
		17.3%	25.0%	19.2%	38.5%
HIGH	55	5	4	15	31
		9.1%	7.3%	27.3%	56.4%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 41.23%

Note. The five Demographic Questionnaire measures used were: (1) Happiness In Childhood, (2) Group Orientation In Childhood, (3) Fantasy In Childhood, (4) Adult Adjustment, and (5) Spiritual Adjustment. The three Family Environment Scale measures used were: (1) Cohesion, (2) Conflict, and (3) Achievement Orientation.

Table 30
Test-Retest Reliability For 1 to 141 Weeks

	MALE	FEMALE	OVERALL
Magical Ideation	.83 (n=98)	.59 (n=114)	.66 (n=212)
Perceptual Aberration	.37 (n=98)	.16 (n=114)	.23 (n=212)
Per-Mag	.85 (n=95)	.91 (n=105)	.89 (n=200)

Table 31
Levels Of Magical Ideation At Retest

Count Row % Col % Tot %	LOW	(BETWEEN LOW & CONTROL)	CONTROL	HIGH -NORMAL	(BETWEEN HIGH-NORM & HIGH)	HIGH
			NEW CLASS			
OLD CLASS						
LOW	48	1	3			
	92.3	1.9	5.8			
	88.9	7.7	6.3			
	22.2	.5	1.4			
CONTROL	6	10	28	9		2
	10.9	18.2	50.9	16.4		3.6
	11.1	76.9	58.3	17.0		5.9
	2.8	4.6	13.0	4.2		.9
HIGH-NORMAL		1	11	31	6	5
		1.9	20.4	57.4	11.1	9.3
		7.7	22.9	58.5	42.9	14.7
		.5	5.1	14.4	2.8	2.3
HIGH		1	6	13	8	27
		1.8	10.9	23.6	14.5	49.1
		7.7	12.5	24.5	57.1	79.4
		.5	2.8	6.0	3.7	12.5

A test-retest correlation for Perceptual Aberration of only r=.23 was obtained for the 212 subjects (refer to Table 16). A breakdown by sex shows a correlation of .16 for females (n=114) and .37 for males (n-98).

Due to the summative quality of the Per-Mag entity, its test-retest correlation for 200 subjects was .89, the sum of a modest test-retest reliability and a poor test-retest reliability. Given the questions raised by the test-retest reliability of each of the Magical Ideation scale and the Perceptual Aberration scale, and given that the Per-Mag entity is merely the sum of two scales with no theoretical or subjective meaning, one should use this entity with caution. It appears to be reliable but nonetheless it is not particularly good at predicting psychopathology.

Removing Alcohol and Drug Effects

A second re-administration of the combined Magical Ideation and Perceptual Aberration scales was included with special instructions attempting to remove alcohol and drug effects. An analysis of variance was performed for Magical Ideation scores on the repeated measure, non-alcohol and -drug condition (see Table 32). Significant differences were found between groups (p=.000) and significant differences were found within subjects for the non-alcohol and -drug condition (p=.028). Group means decreased for the non-alcohol and -drug condition for the

'high', 'high-normal', and 'control' groups (refer to Table 33). An analysis of variance was performed using Perceptual Aberration scores as the repeated measure across the non-alcohol and -drug condition (refer to Table 32). Significant between subjects effects were found for level of Magical Ideation (p=.000). Significant within subjects effects were found for the regular versus non-alcohol and -drug (NAD) condition (p=.000). Additionally, an interaction effect for level of magical thinking X NAD was established (p=.003). Further examination of this effect showed that although group means decreased for all four levels of magical thinking when subjects were instructed not to include alcohol and drug induced experiences, decreases in Perceptual Aberration scores were largest for higher levels of Magical Ideation (see Table 34).

Three questions on the Demographic Questionnaire asked about alcohol consumption, smoking marijuana and use of other drugs "including stimulants (eg cocaine, amphetamine), depressants (eg barbiturates, Quaaludes), and hallucinogens (eg LSD, hallucinogenic mushroom)". In examining individual responses to these questions, no group differences were found for either alcohol consumption or smoking marijuana (see Table 35). Group differences were significant for use of other drugs (refer to Table 36). Group means were lowest for the 'control'

Table 32
Analysis of Variance For Each of Magical Ideation and Perceptual Aberration Across a Repeated Measure (Non-Alcohol and -Drug) Condition

MAGICAL IDEATION ACROSS NON-ALCOHOL AND -DRUG CONDITION

Source of Variation	SS	DF	MS	F	Sig of F
Tests of Between-Subjects Effects:					
WITHIN CELLS	23019.29	212	108.58		
LEVEL OF MAG.ID.	15523.37	3	5174.46	47.66	.000
Tests of Within-Subjects Effects:					
WITHIN CELLS	454.37	212	2.14		
NON-ALC-DRUG COND	10.43	1	10.43	4.87	.028
LEVEL X NON-ALC-DRUG	9.92	3	3.31	1.54	.204

PERCEPTUAL ABERRATION ACROSS NON-ALCOHOL AND -DRUG CONDITION

Source of Variation	SS	DF	MS	F	Sig of F
Tests of Between-Subjects Effects:					
WITHIN CELLS	30747.72	212	145.04		
LEVEL OF MAG.ID.	7920.39	3	2640.13	18.20	.000
Tests of Within-Subjects Effects:					
WITHIN CELLS	795.06	212	3.75		
NON-ALC-DRUG COND	64.36	1	64.36	17.16	.000
LEVEL X NON-ALC-DRUG	55.33	3	18.44	4.92	.003

Table 33
Changes In Magical Ideation Group Means For The Non-Alcohol And Drug (NAD) Condition

	MAGICAL IDEATION SCORES				
	"BEFORE" CONDITION (no special instructions)		"AFTER" CONDITION (instructed not to include alc/drug experiences)		MEAN GROUP DIFFER-ENCES
	M	SD	M	SD	
LOW	1.75	1.58	1.85	1.49	-.10
CONTROL	9.98	12.91	9.84	12.96	.14
HIGH-NORMAL	14.80	4.09	14.11	4.79	.69
HIGH	18.20	5.22	17.69	5.42	.51

Table 34
Changes In Perceptual Aberration Group Means For The Non-Alcohol And Drug (NAD) Condition

	PERCEPTUAL ABERRATION SCORES				
	"BEFORE" CONDITION (no special instructions)		"AFTER" CONDITION (instructed not to include alc/drug experiences)		MEAN GROUP DIFFER-ENCES
	M	SD	M	SD	
LOW	1.14	2.14	1.12	1.50	.02
CONTROL	5.96	13.51	5.62	13.43	.34
HIGH-NORMAL	8.80	6.27	7.98	6.38	.82
HIGH	13.96	7.98	12.06	8.52	1.90

Table 35
Tests For Group Differences On Drug and Alcohol Questions on Demographic Questionnaire

UNIVARIATE F-TESTS
ON THREE QUESTIONS ABOUT ALCOHOL AND DRUGS

VARIABLE	UNIVARIATE F TEST	SIGNIF. OF F
Alcohol Consumption	.16	.921
Smoking Marijuana	.88	.453
Use Of Other Drugs	3.29	.022*

Note. * indicates significant group differences. "Other drugs" were described as "including stimulants (eg cocaine, amphetamine), depressants (eg barbiturates, Quaaludes), and hallucinogens (eg LSD, hallucinogenic mushroom)".

Table 36
Group Differences For "Other Drug Use" (From Question 33 On Demographic Questionnaire)

TOTAL	GROUP							
	LOW		CONTROL		HIGH-NORM		HIGH	
	M	SD	M	SD	M	SD	M	SD
Other drug use	.12 ab	.51	.11 a	.42	.41 bc	.88	.47 c	1.09

Note. Means sharing a common subscript fail to differ significantly at alpha=.05

group, marginally higher for the 'low' group, then higher for 'high-normals' and highest for 'highs'. An LSD analysis showed that high magical thinkers use more of these drugs than both 'control' and 'low' magical thinkers and that 'high-normals' are significantly higher than 'controls'.

Discussion: Study 2

Imaginal and Psychopathological Factors

Investigation of the psychopathology and imagery factors indicate two major differences between current findings and previous findings (Johnston, 1987). The findings of Study 2 indicated that Magical Ideation did not load on the psychopathology factor; it only loaded on the imagery factor.

Use of the MMPI-2 subscales provided additional information. Three MMPI subscales (Social Introversion, Depression and Hypochondriasis) and two other measures of psychopathology (Lack of Self-Esteem and Lack of Well-Being) loaded only on psychopathology factors. These measures do not appear to have an imaginal component as do "crossover" measures of psychopathology (Psychasthenia, Stress, Neuroticism, Schizophrenia, Psychopathic Deviate, Conversion Hysteria and Paranoia). Examination of these crossover measures suggests that they share an inner-oriented, imaginative, ruminative component. For instance, Schizophrenia was the measure with the highest crossover

loading on the imagery factor. If other imagery variables are used to explain the imagery component in Schizophrenia and Magical Ideation is added in last, it does not significantly contribute to the explanation of variance in Schizophrenia. Even when Perceptual Aberration and Mania/Hypomania are removed, Magical Ideation contributes only a negligible amount to variance explained. In other words, Magical Ideation correlates significantly with Schizophrenia because Schizophrenia includes a "normal imagery" component and magical thinking is a component of "normal imagery".

It is of particular interest that three of the five strictly psychopathology measures were independent of group differences in magical thinking. This means that this portion of the psychopathology factor (Lack of Well-Being, MMPI-Depression, and MMPI-Social Introversion) is present for all levels of magical thinking and that high, high-normal, normal, and low magical thinkers are equally likely to exhibit these characteristics.

For most measures that differed as a function of magical thinking, group means were primarily ranked according to level of Magical Ideation; that is, lowest for 'lows' through highest for 'highs'. And for two of three exceptions to this rule (Neuroticism and Hypochondriasis) the 'high-normal' group had the highest mean scores, higher than the 'high' magical thinking

group.

Factor scores for the major psychopathology factor showed this same ordering of mean factor scores with 'high-normals' highest on this measure. Rankings of group mean factor scores for the imaginal factor, on the other hand, were predictably rank ordered as per Magical Ideation scores. So 'high-normals' showed higher psychopathology factor scores than other groups and 'highs' showed higher imagery factor scores than other groups.

For psychopathology factor scores and for certain measures of psychopathology, it was the relatively high magical thinkers, not the high magical thinkers who showed the highest levels of psychopathology.

Despite the fact that several measures of psychopathology exhibited monotonic increases as a function of level of magical thinking, the present findings do <u>not</u> suggest that magical thinking predisposes toward psychopathology. When the basic and nonpathological imagery variables of absorption, mysticism, roleplaying and paranormal beliefs were statistically controlled, the relationship between each of the psychopathology variables and levels of magical thinking was reduced to nonsignificance. These findings suggest that magical thinking reflects variation in a normal propensity toward ruminative, inner-directed imaginative thought. They

further suggest that some indexes of psychopathology, such as the schizophrenia subscale on the MMPI, to a substantial degree tap normal imaginal proclivities rather than psychopathology.

Depression

The finding that higher levels of depression as measured by the Beck Depression Inventory were found in subjects with successively higher levels of magical thinking confirms a similar finding by Eckblad and Chapman (1983). However, when the effects of the basic imagery variables were controlled, group differences for the Beck Depression Inventory were reduced to nonsignificance. Furthermore, no group differences were found for MMPI-2 Depression.

MMPI 2-7-8

Both 'high' and 'high-normal' groups were associated with occurrences of MMPI 2-7-8 profiles whereas 'low' and 'control' groups were not. No Magical Ideation group differences were discernable for subscale 2, Depression, but group differences occurred in subscales 7, Psychasthenia and 8, Schizophrenia. As was discussed previously (see Table 4), these two measures load most heavily on the psychopathology factor but each has an imaginal element. It is this imaginal element that 'high' and 'high-normal' magical thinkers share in common with the 2-7-8 profile, not necessarily a predisposition to

psychopathology. Once again, controlling for the effects of the basic imagery variables reduced group differences to nonsignificance.

Logic and Causality

The second portion of Study 2, which explored the relationship between Magical Ideation and measures of logic and causality, obtained some unexpected results. Levels of Paranormal Beliefs correlated, as predicted, with levels of Magical Ideation. However, Internal/External scores did not correlate with Magical Ideation. The failure to find group differences for internal/external orientation disconfirmed the hypothesis that high magical thinkers have a more internal orientation.

No significant differences were found between 'high' magical thinkers and 'controls' on measures of logical abilities. Nevertheless, it was interesting to find that 'controls' had the lowest mean on the validity of outcomes for syllogisms index, and that 'low' magical thinkers were significantly better at this task than all other groups. The hypothesis that high magical thinking is not related to a weakness in logical abilities was supported.

Background Factors for Magical Thinking

The third issue addressed in Study 2 was a preliminary attempt to identify background factors which may predict high magical thinking in adulthood. An

interesting picture begins to emerge. High magical thinkers reported that they came from homes in which there was a high level of conflict and a low level of family cohesion. A child in such circumstances might develop a rich fantasy life which in turn promotes a high level of spiritual beliefs. At the same time the child may re-orient herself from family as a source of help and support to friends thus developing a higher level of group-orientation. The fact that high magical thinkers reported having been happier than normal or low magical thinkers in their childhood is somewhat surprising as is their reported higher level of adult adjustment. Perhaps an inward imaginative orientation facilitates a sense of positive coping which, in turn, results in a sense of personal happiness. The higher level of achievement orientation attributed by high magical thinkers to their families of origin may also contribute to a sense of happiness through achievement and a sense of well-being.

Validity and Alcohol and Drug Effects

In part, the lack of validity and definition for these measures may be explained by the attempt to remove alcohol and drug effects. When these effects were removed, there were significant decreases in mean Magical Ideation scores for 'high', 'high-normal' and 'control' groups. Similarly, when these effects were removed from Perceptual Aberration scores, means decreased for all groups.

However, decreases were largest for high magical thinkers through smallest for low magical thinkers. These findings suggest that alcohol and/or drug experiences may contribute to elevated Magical Ideation and Perceptual Aberration scores. As supporting evidence for this hypothesis, mean differences for the use of drugs question were rank ordered the same as Magical Ideation groups, lowest for 'lows' through highest for 'highs'.

Test-Retest Reliability

Test-retest reliability for the Magical Ideation scale was not very high ($r = .66$). Furthermore, at least a few of the original 'high' magical thinkers did not merely shift somewhat downward into the 'high-normal' category but shifted all over the scale including into the 'low' category. These findings tend to contradict the notion of a schizotypal individual with propensities toward schizophrenia who would presumably have a high pre-psychosis score which either stays high or shifts upward as the predicted psychosis nears.

The reliabilities for these scales may have been adversely affected by the overabundance of high scorers in this sample. The initial categorization selection criteria created a sample with a disproportionately high number of high magical thinkers. Only 18.6% of subjects shifted categories at retest in a direction inconsistent with regression toward the mean. On the one hand, the selection

criteria may partially explain lower reliability due to regression toward the mean. At the same time, however, it is the high magical thinkers, those supposedly predisposed to psychosis, that are the subjects of most interest.

Test-retest reliability for the Perceptual Aberration scale was very low (r=.23). The Perceptual Aberration scale is clearly an unreliable measure. Most subjects scoring high on Perceptual Aberration now will not be high in a few weeks' time.

General Discussion

The combined results of these two studies provide both some useful conclusions and raise some interesting questions.

The Magical Ideation Scale

The Magical Ideation scale is used most frequently as part of Per-Mag, an entity based on the hypothesis that, because Magical Ideation and Perceptual Aberration correlate at r = .7, therefore they may form some sort of undefined dimension (Eckblad and Chapman, 1983). The conceptual base for the Per-Mag entity appears to be that people with odd beliefs and unusual perceptual experiences are relatively likely to become psychotic.

Examination of the Magical Ideation scale shows that perhaps it has been well constructed with coefficient alpha values from .60 to .83, but scale reliability is only fair (.66) on test-retest. Test-retest also indicates

a broad downward shift for original 'high' magical thinkers which may be due to regression toward the mean, but which raises some questions about identifying high magical thinkers as predisposed to psychosis. The reliability and utility of the Magical Ideation scale are hence in some question.

Even worse, however, is the reliability of the Perceptual Aberration scale. With a test-retest reliability of only .23, this is a very unreliable measure.

Although the Per-Mag entity has good test-retest reliability (primarily due to its summative quality), it does not appear to predict psychopathology much better than other imagery measures. Although the reliability of Per-Mag may be good, its validity remains in question.

Preliminary attempts to identify drug and/or alcohol effects has shown that there appears to be a drug and/or alcohol effect elevating scores on both the Magical Ideation scale and the Perceptual Aberration scale, confirming doubts and concerns raised elsewhere (Chapman & Chapman, 1987b; Yehuda et al, 1987). This finding further amplifies the question of what is in fact being measured here. Perhaps Magical Ideation and Perceptual Aberration are in part measures of current and/or recent drug-induced experiences which may in turn in part explain the reported high frequency of psychotic-like and schizotypal

experiences.

Magical Thinking In Adults

These studies begin to shed light on some potential background factors as precursors to magical thinking in adults. Some children raised in families high in conflict and low in cohesion may be predisposed to coping with that environment by creating a rich, inner mental life and by being more group oriented with peers. They may use magical thinking and fantasy as coping mechanisms and/or as a source of pleasure and happiness. It is the reported higher degree of happiness in childhood that is perhaps most surprising. Further research will be required to validate and expand upon the reported positive self-images (of greater happiness in childhood and of higher levels of adult adjustment). It may be that retaining magical thinking and an imaginative, fantasy orientation provide a direct source of happiness and comfort. Or these imaginative propensities, perhaps combined with an achievement orientation, may serve as coping mechanisms diverting from more negative life experiences or perhaps casting these experiences in a more positive light. It should be noted that family background information was gathered through retrospective report and is thus susceptible to reporting error. Longitudinal studies would be useful to substantiate and further clarify these preliminary findings.

Study 2 tends to substantiate the normalcy of high magical thinkers vis-a vis logical abilities. Continued beliefs in non-causal possibilities through magical thinking did not deter these individuals from developing appropriate logical capabilities. In fact, high magical thinkers did very well on logic tasks in Study 2; it was the 'control' group that had the lowest mean group score on the Syllogisms Task. Further examination of logic and causality issues has shown that Magical Ideation and Paranormal Beliefs, both measures of non-causal beliefs, are highly correlated ($r=.565$, $p=.000$). On the other hand, Rotter's modified Internal/External measure was found to be uncorrelated with Magical Ideation. This is perhaps not surprising given the preliminary findings of the Demographic Questionnaire; namely that high magical thinkers reported <u>both</u> an inward, imaginative orientation in childhood and a high group orientation. It may be this balancing of inner and outer orientation that uniquely describes high magical thinkers as opposed to the anticipated high inner orientation alone.

And what of the questions about magical thinking as psychopathology versus magical thinking as a healthy imaginative quality? Study 2 found that Magical Ideation loaded <u>only</u> on the imaginal factor and was not a crossover measure on the psychopathological factors.

The current study also clarified that, although many

psychopathology measures have an imaginal component, Magical Ideation may not necessarily play a significant part in explaining the variance of these measures. The schizophrenia subscale of the MMPI had the greatest imaginal component. However, when imaginal measures were used to explain the variance in schizophrenia, Magical Ideation, when added last, accounted for only trivial amounts of the remaining variance.

It was also found that level of Magical Ideation was unrelated to most "purely" psychopathological measures. In most cases, when a psychopathology measure was a "crossover" variable, means on the crossover psychopathology measures were rank ordered from lowest for Magical Ideation 'lows' to highest for Magical Ideation 'highs'. For the remainder of these variables, rank ordering changed in that the 'high-normal' group had the highest scores on psychopathology. When the effects of imagery variables were removed from psychopathology variables, there were no significant multivariate differences across levels of magical thinking.

Significant group differences were found for both major psychopathology factor scores and imagery factor scores. The rank ordering of significant group differences is noteworthy for psychopathology factor scores: 'controls' had the lowest psychopathology factor scores, 'lows' were next, 'highs' were next, and the 'high-normal'

group had the highest scores. This is an unusual pattern. Once again it is the 'high-normal' group which ranks highest on a psychopathology measure - this time for psychopathology factor scores. Perhaps it is relatively high scorers, as opposed to high scorers, who should be examined more closely for the link between the imaginative component of psychopathology and magical thinking. Perhaps Eckblad and Chapman should be following this group as potentially psychosis prone.

And finally, for imaginal factor scores, group differences were rank ordered, as predicted according to their Magical Ideation scores. So high Magical Ideation is an indicator of a highly imaginative orientation.

Conclusions and Implications

The present studies raise questions about the usefulness of the Magical Ideation scale, the Perceptual Aberration scale and the Per-Mag entity as indexes of psychopathology. In the case of the Perceptual Aberration scale, its reliability is so poor that its use should be discontinued. Although the Per-Mag entity shows good reliability, its validity as a predictor of psychosis is questionable. In addition, both the Magical Ideation and Perceptual Aberration scales appear to be contaminated by drug and/or alcohol effects.

The two major factors generally reconfirm previous research (Johnston, 1987). However, the hypothesis that

magical thinking in fact taps at least two sets of characteristics has been disconfirmed. It _is_ part of the factor characterized by absorption, roleplaying and active imagination. However, it _is_ _not_ part of the psychopathological factor.

As predicted, a number of measures loaded on both the psychopathology factor and the imaginative factor. What variables such as schizophrenia and other crossover variables may have in common with imaginal variables is an inward directedness and an emphasis on fantasizing. Items on the schizophrenia subscale clearly point to inward orientation. For example, "I dream frequently about things best kept to myself", and "I would rather sit and daydream than do anything else". This common directing of attention inwardly is exhibited in an emphasis on the sensory, in imaginative activities and in fantasy. A ruminating, imaginative orientation results.

The Magical Ideation scale appears to be one measure of an imaginative propensity. Certain psychopathological characteristics or tendencies appear to be comprised of some non-imaginal psychopathological components as well as some imaginative tendencies. There is no evidence from this research that high magical thinkers as measured by the Magical Ideation scale show more evidence of psychopathology than others. Rather, the evidence points to a shared imaginal component between certain measures of

psychopathology and magical thinking as measured by the Magical Ideation scale. The Magical Ideation Scale appears to predict an imaginative, creative, intuitive sort of person, but there is little in the present findings to suggest that it predicts psychosis.

This research supports the hypothesis that magical thinking is a normal, healthy imaginative propensity in adults as it is in children. It happens that this imaginative orientation is used by DSM-III-R as one of the criteria for schizotypal personality or for schizophrenia. Hopefully, most practitioners would only consider magical thinking in some extreme form as such a criterion. Given the high endorsement in our culture of certain beliefs such as astrology that are tapped by this scale, it is questionable that magical thinking be used as such a criterion at all. The use of the Magical Ideation scale as a screen for individuals predisposed to psychosis or, more generally, to psychopathology is inappropriate. This scale taps a whole host of beliefs with a high level of subcultural support. The scale as a whole tends to measure an imaginative propensity. However, those with the highest magical thinking scores <u>did</u> <u>not</u> attain the highest scores on the psychopathology factor. Instead, it was the relatively high scorers who had the highest scores on this factor score - <u>not</u> high magical thinkers. The author concurs with Persons' (1986) suggestion that phenomena

such as magical thinking would best be investigated as symptoms rather than as antecedents of schizophrenia. Furthermore, the very subjective nature of psychologists' definitions, such as the "cultural norms" assumed in the definition of magical thinking, create grave doubts about what symptom we are in fact trying to measure.

References

Abbott, D. (1976). The effects of open forum family counseling on perceived family environment and on behavior change of the child (Doctoral dissertation, Brigham Young University, 1975). Dissertation Abstracts International, 36, 8335A.

Allen, J. J., Chapman, L. J., & Chapman, J. P. (1987). Cognitive slippage and depression in hypothetically psychosis-prone college students. Journal of Nervous and Mental Disease, 175, 347-353.

Allen, J., & Schuldberg, D. (1989). Positive thought disorder in a hypothetically psychosis-prone population. Journal of Abnormal Psychology, 98, 491-494.

American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (3rd ed.-revised). Washington, DC: Author.

Annis, H. M., & Chan, D. (1983). The differential treatment model: Empirical evidence from a personality typology of adult offenders. Criminal Justice and Behavior, 10, 159-173.

Antonucci, T. C., & Jackson, J. S. (1983). Physical health and self-esteem. Family and Community Health, 6, 1-9.

As, A., O'Hara, J., & Munger, M. (1962). The measurement of subjective experiences presumably related to hypnotic susceptibility. Scandinavian Journal of Psychology, 66, 142-150.

Asnarow, R. F., Nuechterlein, K. H., & Marder, S. R. (1983). Span of apprehension performance, neuropsychological functioning, and indices of psychosis-proneness. The Journal of Nervous and Mental Disease, 171, 662-669.

Auslander, W. F., Anderson, B. J., Bubb, J., Jung, K.C. et al (1990). Risk factors to health in diabetic children: A prospective study from diagnosis. Health and Social Work, 15, 133-142.

Bader, E. (1976). Redecisions in family therapy: A study of change in an intensive family therapy workshop (Doctoral dissertation, California School of Professional Psychology, 1976). Dissertation Abstracts International, 37, 2491B.

Balogh, D. W., & Merritt, R. D. (1985). Susceptibility to type A backward pattern masking among hypothetically

psychosis-prone college students. Journal of Abnormal Psychology, 94, 377-383.

Bandura, A., Ross, D., & Ross, S. (1961). Transmission of aggression through imitation of aggressive models. Journal of Abnormal and Social Psychology, 63, 575-582.

Barber, T. X., & Glass, L. (1962). Significant factors in hypnotic behaviour. Journal of Abnormal and Social Psychology, 64, 222-228.

Barron, F. (1965). The psychology of creativity. In T.M. Newcomb (Ed.), New directions in psychology, II (pp. 3-134). New York: Holt, Rinehart & Winston.

Beck, A. T. (1978). Beck Depression Inventory (BDI). New York: The Psychological Corporation.

Beckfield, D. F. (1985). Interpersonal competence among college men hypothesized to be at risk for schizophrenia. Journal of Abnormal Psychology, 94, 397-404.

Bleuler, E. (1950). Dementia Praecox or the group of schizophrenias. New York: International Universities Press.

Bliss, E. L. (1986). Multiple Personality, Allied Disorders & Hypnosis. Oxford: Oxford University Press.

Brecher, M., & Begleiter, H. (1983). Event-related brain potentials to high incentive stimuli in unmedicated schizophrenics. Biological Psychiatry, 18, 661-674.

Brockington, I. F., & Owen, F. (1980). Raised monoamine oxidase in acute psychosis. British Journal of Psychiatry, 136, 312-313.

Brown, L. R., & Thouless, R. M. (1965). Animistic thought in civilized adults. Journal of Genetic Psychology, 107, 33-42.

Brunnquell, D. J. (1982). Magical thinking as a developmental and clinical phenomenon (Doctoral dissertation, University of Minnesota, 1981). Dissertation Abstracts International, 42(10-B), 4183.

Bulik, C. M., Sullivan, P. F., & Rorty, M. (1989). Childhood sexual abuse in women with bulimia. Journal of Clinical Psychiatry, 50, 460-464.

Burns, D. D. (1980). Feeling good: The new mood therapy. New York: Signet.

Chapman, J. (1966). The early symptoms of schizophrenia. British Journal of Psychiatry, 112, 225-251.

Chapman, L. J., & Chapman, J. P. (1973). Disordered thought in schizophrenia. New York: Appleton-Century-Crofts.

Chapman, L. J., & Chapman, J. P. (1987a). Handedness of hypothetically psychosis prone subjects. Journal of Abnormal Psychology, 96, 89-93.

Chapman, L. J., & Chapman, J. P. (1987b). The search for symptoms predictive of schizophrenia. Schizophrenia Bulletin, 13, 497-503.

Chapman, L. J., Chapman, J. P., & Daut, R. L. (1976). Schizophrenic disability to disattend from strong aspects of meaning. Journal of Abnormal Psychology, 85, 35-40.

Chapman, L. J., Chapman, J. P., & Miller, G. A. (1964). A theory of verbal behaviour in Schizophrenia. In B. A. Maher (Ed.), Progress in experimental personality research (Vol. 1). New York: Academic Press.

Chapman, L. J., Chapman, J. P., & Miller, E. N. (1982). Reliabilities and intercorrelations of eight measures of

proneness to psychosis. Journal of Consulting and Clinical Psychology, 50, 187-195.

Chapman, L. J., Chapman, J. P., Numbers, J. S., Edell, W. S., Carpenter, B. N., & Beckfield, D. F. (1984). Impulsive nonconformity as a trait contributing to the prediction of psychoticlike and schizotypal symptoms. Journal of Nervous and Mental Diseases, 172, 681-691.

Chapman, L. J., Chapman, J. P., & Raulin, M. L. (1976). Scales for physical and social anhedonia. Journal of Abnormal Psychology, 85, 374-382.

Chapman, L. J., Chapman, J. P., & Raulin, M. L. (1978). Body-image aberration in schizophrenia. Journal of Abnormal Psychology, 87, 399-407.

Chapman, L. J., Chapman, J. P., Raulin, M. L., & Edell, W. S. (1978). Schizotypy and thought disorder as a high risk approach to schizophrenia. In G. Serban (Ed.), Cognitive defects in the development of mental illness. New York: Brunner-Mazel.

Chapman, L. J., Edell, W. S., & Chapman, J. P. (1980). Physical anhedonia, perceptual aberration, and psychosis proneness. Schizophrenia Bulletin, 6, 639-653.

Ciarrocchi, J., & Hohmann, A. A. (1989). The family environment of married male pathological gamblers, alcoholics, and dually addicted gamblers. Special Issue: Gambling and the family. Journal of Gambling Behavior, 5, 283-291.

Claridge, G. S. (1967). Personality and arousal. Oxford: Permagon.

Claridge, G., & Broks, P. (1984). Schizotypy and hemisphere function-I. Theoretical considerations and the measurement of schizotypy. Personality and Individual Differences, 5, 633-649.

Claridge, G., & Hewitt, J. K. (1987). A biometrical study of schizotypy in a normal population. Personality and Individual Differences, 8, 303-312.

Claridge, G. S., Robinson, D. L., & Birchall, P. M. A. (1983). Characteristics of schizophrenics' and neurotics' relatives. Personality and Individual Differences, 4, 651-664.

Cohen, J. (1960). Chance, skill and luck. Baltimore: Penguin Books.

Council, J. R., Kirsch, I., & Hafner, L. (1986). Expectancy versus absorption in the prediction of hypnotic responding. Journal of Personality and Social Psychology, 50, 182-189.

Crowne, D. P., & Liverant, S. (1963). Conformity under varying conditions of personal commitment. Journal of Abnormal and Social Psychology, 66, 547-555.

Davis, G. A. (1975). In frumious pursuit of the creative person. Journal of Creative Behaviour, 9, 75-87.

Dinning, W. D., & Berk, L. A. (1989). The Children of Alcoholics Screening Test: Relationship to sex, family environment, and social adjustment in adolescents. Journal of Clinical Psychology, 45, 335-339.

Domino, G. (1970). Identification of potentially creative persons from the Adjective Check List. Journal of Consulting and Clinical Psychology, 35, 48-51.

Druckman, J. A. (1979). A family oriented policy and treatment program for juvenile status offenders. Journal of Marriage and the Family, 41, 627-636.

Dyson, L., Edgar, E., & Crnic, K. (1989). Psychological predictors of adjustment by siblings of developmentally disabled children. Special Issue: Research on families. American Journal on Mental Retardation, 94, 292-302.

Eastman, E., Archer, R. P., & Ball, J. D. (1990). Psychosocial and life stress characteristics of Navy families: Family Environment Scale and Life Experiences Scale findings. Military Psychology, 2, 113-127.

Eaves, L. J., & Eysenck, H. J. (1977). A genotype-environmental model for psychoticism. Advanced Behavioral Research and Therapy, 1, 5-26.

Eckblad, M., & Chapman, L. J. (1983). Magical ideation as an indicator of schizotypy. Journal of Consulting and Clinical Psychology, 51, 215-225.

Edell, W. S., & Chapman, L. J. (1979). Anhedonia, perceptual aberration and the Rorschach. Journal of Consulting and Clinical Psychology, 47, 377-384.

Efran, J. S. (1963). Some personality determinants of memory for success and failure. Unpublished doctoral dissertation. Ohio State University.

Elliott, G. C., Rosenberg, M., & Wagner, M. (1984). Transient depersonalization in youth. Social Psychology Quarterly, 47, 115-129.

Eysenck, H. J., & Eysenck, S. B. G. (1975). Manual of the Eysenck Personality Questionnaire. London: Hodder & Stoughton.

Eysenck, H. J., & Eysenck, S. B. G. (1976). Psychoticism as a Dimension of Personality. London: Hodder & Stoughton.

Eysenck, S. B. G., & Eysenck, H. J. (1969). Scores on three personality variables as a function of age, sex and social class. British Journal of Social and Clinical Psychology, 8, 69-76.

Eysenck, S. B. G., Eysenck, H. J., & Barrett. P. (1985). A Revised Version of the Psychoticism Scale. Journal of Personality and Individual Differences, 6, 21-29.

Feather, N. T. (1959). Subjective probability and decision under uncertainty. Psychological Review, 66, 150-164.

Fenigstein, A., Scheier, M. F., & Buss, A. H. (1975). Public and private self-consciousness: Assessment and theory. Journal of Consulting and Clinical Psychology, 43,

522-527.

Filstead, W. (1979). Comparing the family environments of alcoholic and "normal' families. Unpublished manuscript, Northwestern University, Chicago.

Fine, H. K. (1973). Studying schizophrenics outside the psychiatric setting. Journal of Youth and Adolescence, 2, 291-301.

Flavell, J. H. (1963). The developmental psychology of Jean Piaget. Princeton: Van Nostrand.

Fletcher, K. E., & Averill, J. R. (1984). A scale for the measurement of role-playing ability. Journal of Research in Personality, 18, 131-149.

Fraiberg, S. (1968). The magic years. New York: Scribner's.

Franklin, R. D. (1963). Youth's expectancies about internal versus external control of reinforcement related to N variables. Unpublished doctoral dissertation. Purdue University.

Frazer, J. (1959). The new golden bough. New York: Criterion.

Freyberg, J. (1973). Increasing the imaginative play of urban disadvantaged kindergarten children through systematic training. In J. L. Singer (Ed.), Child's world of make-believe. New York: Academic Press.

Frost, L. A. & Chapman, L. J. (1987). Polymorphous sexuality as an indicator of psychosis proneness. Journal of Abnormal Psychology, 96, 299-304.

Fujioka, T. A. T., & Chapman, L. J. (1984). Comparison of the 2-7-8 MMPI profile and the perceptual aberration-magical ideation scale in identifying hypothetically psychosis-prone college students. Journal of Consulting and Clinical Psychology, 52, 458-467.

Geffen, M., & Lange, M. (1978). The effectiveness of psychotherapy with children: A comparison of symptom improvement and changes in the family. Unpublished manuscript, Catholic University, Nijmegen, The Netherlands.

George, L. & Neufeld, R. W. J. (1987). Magical Ideation and schizophrenia. Journal of Consulting and Clinical Psychology, 55, 778-779.

Getter. H. (1962). Variables affecting the value of the reinforcement in verbal conditioning. Unpublished doctoral dissertation. Ohio State University.

Gilberstadt, H., & Duker, J. (1965). A handbook for clinical and actuarial MMPI interpretation. Philadelphia, PA: Saunders

Golden, R. R., & Meehl, P. E. (1979). Detection of the schizoid taxon with MMPI indicators. Journal of Abnormal Psychology, 88, 217-233.

Goldsmith, J. B. & McFall, R. M. (1975). Development and evaluation of an interpersonal skill-training program of psychiatric inpatients. Journal of Abnormal Psychology, 84, 51-58.

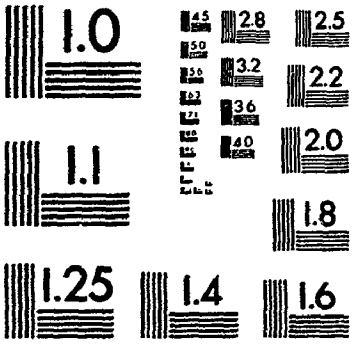
Goldsmith, R. E. (1984). Some personality correlates of open processing. Journal of Psychology, 116, 59-66.

Goldsmith, R. E., & Goldsmith, E. B. (1982). Dogmatism and self-esteem: Further evidence. Psychological Reports, 51, 289-290.

Goldsmith, R. E., & Matherly, T. A. (1987). Adaption-Innovation and self-esteem. Journal of Social

3

PM-1 3½"x4" PHOTOGRAPHIC MICROCOPY TARGET
NBS 1010a ANSI/ISO #2 EQUIVALENT



Psychology, 127, 351-352.

Goldstein, D., & Rosenbaum, A. (1985). An evaluation of the self-esteem of maritally violent men. Family Relations Journal of Applied Family and Child Studies, 34, 425-428.

Gore, P. M. (1962). Individual differences in the prediction of subject compliance to experimenter bias. Unpublished doctoral dissertation. Ohio State University.

Gore, P. M., & Rotter, J. B. (1963). A personality correlate of social action. Journal of Personality, 31, 58-64.

Gough, H. G., & Heilbrun, A. B. (1980). The Adjective Check List manual. Palo Alto, CA: Consulting Psychologists Press.

Greene, R. L. (1980). The MMPI: an interpretive manual. New York: Grune & Stratton.

Gudeman, J. E., Schatzberg, A. F., Samson, J. A., Orsulak, P. J., Cole, J. O., and Schildkraut, J. J. (1982). Toward a biochemical classification of depressive disorders: VI. Platelet MAO activity and clinical symptoms in depressed patients. American Journal of Psychiatry, 139, 630-633.

Guilford, J. P., Christensen, P. R., Merrifield, P. R., & Wilson, R. C. (1978). Alternate uses: Manual of instructions and interpretations. Orange, CA: Sheridan Psychological Services.

Haberman, M. C., Chapman, L. J., Numbers, J. S., & McFall, R. M. (1979). Relation of social competence to scores on two scales of psychosis proneness. Journal of Abnormal Psychology, 88, 675-677.

Haier, R. J., Rieder, R. O., Khouri, P. J., & Buchsbaum, M. S. (1979). Extreme MMPI scores and the Research Diagnostic Criteria. Archives of General Psychiatry, 39, 528-534.

Hewitt, J. K., & Claridge, G. (1989). The factor structure of schizotypy in a normal population. Personality and Individual Differences, 10, 323-329.

Hilgard, J. R. (1965). Personality and hypnotizability: Inferences from case studies. In E. R. Hilgard, Hypnotic susceptibility. New York: Harcourt, Brace & World.

Hilgard, J. R. (1970). Personality and hypnosis: A study of imaginative involvement. Chicago: University of Chicago Press.

Hilgard, J. R. (1974). Imaginative involvement: Some characteristics of the highly hypnotizable and the nonhypnotizable. International Journal of Clinical and Experimental Hypnosis, 22, 138-156.

Hilgard, J. R. (1979). Imaginative and sensory-affective involvements: In everyday life and hypnosis. In E. Fromm & R. Shor (Eds.), Hypnosis: Developments in research and new perspectives. New York: Aldine.

Hood, R. W., Jr. (1975). The construction and preliminary validation of a measure of reported mystical experience. Journal for the Scientific Study of Religion, 14, 29-41.

Huff, K. & Council, J. (1987, August). Fantasy proneness and psychological coping. Paper presented at the meeting of the American Psychological Association, New York.

Ingham, J. G., Kreitman, N. B., Miller, P. M., Sasidharan, S. P. et al (1986). Self-esteem, vulnerability and psychiatric disorder in the community. British Journal of Psychiatry, 148, 373-385.

Jalongo, M. (1984). Imaginary companions in children's lives and literature. Childhood Education, 8, 166-171.

James, W. H., Woodruff, A. B., & Werner, W. (1965). Effect of internal and external control upon changes in smoking behavior. Journal of Consulting Psychology, 29, 184-186.

Johnston, L. A. (1987, June). Magical thinking: an indicator of wellness and illness. Paper presented at the annual conference of the Canadian Psychological Association, Vancouver, Canada.

Joseph, M. H., Owen, F., Baker, H. F., & Bourne, R. C. (1977). Platelet serotonin concentration and monoamine oxidase activity in unmedicated chronic schizophrenic and schizoaffective patients. Psychological Medicine, 7, 159-162.

Josiassen, R. C., Shagass, C., Roemer, R. A., & Straumanis, J. J. (1985). Attention-related effects on somatosensory evoked potentials in college students at high risk for psychopathology. Journal of Abnormal Psychology, 94, 507-518.

Jutai, J. W. (1989). Spatial attention in hypothetically psychosis-prone college students. Psychiatry Research, 27, 207-215.

Kahana, B. (1970). Stages of the dream concept among Hasidic

children. Journal of Genetic Psychology, 116, 3-9.

Kaney, S., & Bentall, R. P. (1989). Persecutory delusions and attributional style. British Journal of Medical Psychology, 62, 191-198.

Karnes, F. A., & D'Ilio, V. R. (1989). Student leaders' and their parents' perceptions of the home environment. Gifted Child Quarterly, 33, 165-168.

Kazak, A. E., McCannell, K., Adkins, E., Himmelberg, P. et al (1989). Perception of normality in families: Four samples. Journal of Family Psychology, 2, 277-291.

Keller, R. T., & Holland, W. E. (1983). Communicators and innovators in research and development organizations. Academy of Management Journal, 26, 742-749.

Kelley, C. K., & King, G. D. (1979). Behavioral correlates of the 2-7-8 MMPI profile type in students at a university health center. Journal of Consulting and Clinical Psychology, 47, 679-685.

Kirkpatrick, B., & Buchanan, R. W. (1990). Anhedonia and the deficit syndrome of schizophrenia. Psychiatry Research, 31, 25-30.

Kleinman, S. L., Handal, P. J., & Enos, D. (1989). Relationship between perceived family climate and adolescent adjustment. Journal of Clinical Child Psychology, 18, 351-359.

Klett, C. J., & Lorr, M. (1966). Validity of the Acute Psychotic Types. In M. Lorr (Ed.), Explorations in Typing Psychotics (1st ed.). Oxford: Permagon Press.

Klinger, E. (1969). Development of imaginative behaviors: Implications of play for a theory of fantasy. Psychological Bulletin, 72, 277-298.

Koh, S. D., Kayton, L., & Berry, R. (1973). Mnemonic organization in young nonpsychotic schizophrenics. Journal of Abnormal Psychology, 81, 299-310.

Koh, S. D., & Peterson, R. A. (1974). Perceptual memory for numerousness in "nonpsychotic schizophrenics." Journal of Abnormal Psychology, 83, 215-226.

Koutsourais, H. (1984). Inhibiting magical thought through stories. Child Study Journal, 14, 227-236.

Landowski, r., Lysiak, W., & Angielski, S. (1975). Monoamine

oxidase activity in blood platelets from patients with cyclophrenic depressive syndromes. Biochemical Medicine, 14, 347-354.

Lange, M. (1978). Some characteristics of the validity of Dutch translations of the FES and WES. Unpublished manuscript, Catholic University, Nijmegen, The Netherlands.

Lee, A., & Rohbock, C. (1979). Perceptions of home environment in multigenerational families. Unpublished master's thesis, Brigham Young University, Provo, Utah.

Lee-Teng, E. (1965). Trance-susceptibility, induction susceptibility, and acquiescence as factors in hypnotic performance. Journal of Abnormal Psychology, 7, 383-389.

Lennox, R. D., & Wolfe, R. N. (1984). Revision of the self-monitoring scale. Journal of Personality and Social Psychology, 46, 6, 1349-1364.

Lesser, R., & Paisner, M. (1985). Magical thinking in formal operational adults. Human Development, 28, 57-70.

Looft, W., & Bartz, W. (1969). Animism revived.

Psychological Bulletin, 71, 1-19.

Lorr, M., Klett, C.J., & McNair, D.M. (1963). Syndromes of Psychosis. New York: MacMillan.

Lynn, S. J., & Dudley, K. (1987). Magical Ideation: A construct validation study. Unpublished manuscript, Ohio University.

Lynn, S. J., & Rhue, J. W. (1986). The fantasy prone person: Hypnosis, imagination, and creativity. Journal of Personality and Social Psychology, 51, 404-408.

Lynn, S. J., & Rhue, J. W. (1988). Fantasy proneness: Hypnosis, developmental antecedents, and psychopathology. American Psychologist, 43, 35-44.

Malin, N. (1979). Pathways to child placement: Parental perceptions of adolescent children in residential treatment (Doctoral dissertation, University of California at Los Angeles, 1978). Dissertation Abstracts International, 39, 6360A.

de Man, A. F., Balkou, S., & Iglesias, R. I. (1987). Social support and suicidal ideation in French-Canadians. Canadian Journal of Behavioural Science, 19, 342-346.

Mann, J. (1979). Altered platelet monoamine oxidase activity in affective disorders. Psychological Medicine, 9, 729-736.

Manosevitz, M., Prentice, N., & Wilson, F. (1973). Individual and family correlates of imaginary companions in preschool children. Developmental Psychology, 8, 72-79.

Maubach, H., Diebold, K., Friedl, W., & Propping, P. (1981). Platelet MAO activity in patients with affective psychosis and their first-degree relatives. Pharmacopsychiatry, 14, 87-89.

McCarthy, J. D., & Hoge, D. R. (1984). The dynamics of self-esteem and delinquency. American Journal of Sociology, 90, 396-410.

McGhee, P. E., & Johnson, S.F. (1975). The role of fantasy and reality cues in children's appreciation of incongruity humor. Merrill-Palmer Quarterly, 21, 19-30.

Meehl, P. E. (1962). Schizotaxia, schizotypy, schizophrenia. American Psychologist, 17, 827-837.

Meehl, P. E. (1964). Manual for use with checklist of schizotypic signs. Unpublished manuscript, University of Minnesota.

Merritt, R. D., & Balogh, D. W. (1986). Methodological and interpretive constraints resulting from the use of the per-mag classification in high-risk information-processing research. The Journal of Nervous and Mental Disease, 174, 42-43.

Merritt, R. D., & Balogh, D. W. (1989). Backward masking spatial frequency effects among hypothetical schizotypal individuals. Schizophrenia Bulletin, 15, 573-583.

Miller, E. N., & Chapman, L. J. (1983). Continued word association in hypothetically psychosis-prone college students. Journal of Abnormal Psychology, 92, 468-478.

Minuchin, S., & Fishman, H. C. (1981). Family therapy techniques. Cambridge: Harvard University Press.

Mishlove, M. & Chapman, L. J. (1985). Social anhedonia in the prediction of psychosis proneness. Journal of Abnormal Psychology, 94, 384-396.

Mood, A. M. (1954). On the asymptotic efficiency of certain

nonparametric two-sample tests. Annals of Mathematical Statistics, 25, 514-522.

Moos, R., Finney, J., & Gamble, W. (1981). The process of recovery from alcoholism: II. Comparing spouses of alcoholic patients and spouses of matched community controls. Unpublished manuscript, Stanford University, Social Ecology Laboratory, and Veterans Administration Medical Center, Palo Alto, CA.

Moos, R. H., & Moos, B. S. (1981). Family Environment Scale Manual. Palo Alto, CA: Consulting Psychologists Press.

Morrison, P., & Gardner, H. (1978). Dragons and dinosaurs: The child's capacity to differentiate fantasy from reality. Child Development, 49, 642-648.

Muntaner, C., & Garcia-Sevilla, L. (1985). Factorial structure of the Eysenck Personality Questionnaire in relation to other psychosis proneness scales. Paper presented at the Second Conference of the International Society for Individual Differences, St. Felin, Spain.

Muntaner, C., Garcia-Sevilla, L., Fernandez, A., & Torrubia, R. (1988). Personality dimensions, schizotypal and borderline personality traits and psychosis proneness.

Personality and Individual Differences, 9, 257-268.

Murphy, D. L., Belmaker, R. H., & Wyatt, R. J. (1974). Monamine oxidase in schizophrenia and other behavioral disorders. Journal of Psychiatric Research, 11, 221-247.

Nash, M. R., & Lynn, S. J. (1986). Child abuse and hypnotic ability. Imagination, Cognition, and Personality, 5, 211-218.

Nash, M. R., Lynn, S. J., & Givens, D. (1984). Adult hypnotic susceptibility, childhood punishment, and child abuse. International Journal of Clinical and Experimental Hypnosis, 32, 14-18.

Nemiah, J. C. (1975). Obsessive-compulsive neurosis. In A. M. Friedman, H. I. Kaplan & B. J. Sadock (Eds.), Comprehensive Textbook of Psychiatry (Vol. 1, 2nd ed., pp. 1241-1255). Baltimore: Williams & Wilkins.

Nie, H. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., & Bent, D. H. (1975). SPSS: Statistical Package for the Social Sciences (2nd ed.). New York: McGraw-Hill.

Nielsen, T. C., & Petersen, K. E. (1976). Electrodermal correlates of extraversion, trait anxiety and

schizophrenism. Scandinavian Journal of Psychology, 17, 73-84.

Numbers, J. S., & Chapman, L. J. (1982). Social deficits in hypothetically psychosis-prone women. Journal of Abnormal Psychology, 91, 255-260.

O'Connor, J. J. (1984). The resurrection of a magical reality: Treatment of functional migraine in a child. Family Process, 23, 501-509.

O'Connor, J., & Hoorwitz, A. (1984). The bogeyman cometh: A strategic approach with difficult adolescents. Family Process, 23, 237-249.

Orne, M. (1959). The nature of hypnosis: Artifact and essence. Journal of Abnormal Social Psychology, 58, 277-299.

Oxman, T. E., Rosenberg, S. D., Schnurr, P. P., & Tucker, G. J. (1988). Somatization, paranoia, and language. Journal of Communication Disorders, 21, 33-50.

Panio, A. (1977, May). Assessing the families of drug abusers utilizing the Family Environment Scale. Paper presented at the National Drug Abuse Conference, San

Francisco, CA.

Persons, J. B. (1986). The advantages of studying psychological phenomena rather than psychiatric diagnoses. American Psychologist, 41, 1252-1260.

Peterson, D. R. (1954). The diagnosis of subclinical schizophrenia. Journal of Consulting Psychology, 18, 198-200.

Peterson, D. R. (1963). The diagnosis of subclinical schizophrenia. In G. S. Welsh & W. G. Dahlstrom (Eds.), Basic readings on the MMPI in psychology and medicine (pp. 415-418). Minneapolis: University of Minnesota Press.

Phares, E. J. (1965). Internal-external control as a determinant of amount of social influence exerted. Journal of Personality and Social Psychology, 2, 642-647.

Piaget, J. (1926). The language and thought of the child. New York: Harcourt, Brace & World.

Piaget, J. (1929). The child's conception of the world. New York: Harcourt, Brace & Co., Inc.

Piaget, J. (1951). Play, dreams, and imitation in childhood.

New York: W.W. Norton & Co., Inc.

Piaget, J. (1960). The child's conception of the world. Paterson: Littlefield-Adams.

Piaget, J. (1974). Understanding causality. New York: Norton.

Piaget, J., & Inhelder, B. (1951). The origin of the idea of chance in children. New York: Norton.

Pilette, W. L. (1983). Magical thinking by inpatient staff members. Psychiatric Quarterly, 55, 272-274.

Pittman, J. F., Price-Bonham, S., & McKenry, P. C. (1983). Marital cohesion: A path model. Journal of Marriage and the Family, 45, 521-531.

Polzella, D. J., Popp, R. J., & Hinsman, M. C. (1975). ESP? JSAS Catalog of Selected Documents in Psychology, 5, 322. (Ms. No. 1087).

Porac, C. & Coren, S. (1981). Lateral preferences and human behaviour. New York: Springer-Verlag.

Prentice, N. M., Manosevitz, M., & Hubbs, L. (1978).

Imaginary figures of early childhood: Santa Claus, Easter Bunny, and the Tooth Fairy. American Journal of Orthopsychiatry, 48, 618-628.

Price-Williams, D. R. (1975). Explorations in cross-cultural psychology. San Francisco: Chandler & Sharp.

Quinless, F. W., & Nelson, M. M. (1988). Development of a measure of learned helplessness. Nursing Research, 37, 11-15.

Rasmussen, R. (1980). Perceived family climate and interpersonal characteristics of alcoholic women and their husbands (Doctoral dissertation, California School of Professional Psychology, 1979). Dissertation Abstracts International, 40, 3418B.

Rawlings, D. (1983). An enquiry into the nature of psychoticism as a personality dimension. Unpublished doctoral thesis, University of Oxford, England.

Reinhart, G. (1977). A study of divorced mothers and adolescents using social climate and relationship styles (Doctoral dissertation, California School of Professional Psychology, 1977). Dissertation Abstracts International, 38, 2881B.

Rice, J., McGuffin, P., & Shaskan, E. G. (1982). A commingling analysis of platelet monoamine oxidase activity. Psychiatry Research, 7, 325-335.

Richman, C. L., Brown, K. P., & Clark, M. L. (1984). The relationship between self-esteem and maladaptive behaviors in high school students. Social Behavior and Personality, 12, 177-185.

Rhue, J. W., Lynn, S. J., Henry, S., Buhk, K., & Boyd, P. (1987, July). Hypnosis, imagination, and child abuse. Paper presented at the meeting of the Fourth European Congress of Hypnosis and Psychosomatic Medicine, Oxford, England.

Rosenberg, M. (1965). Society and the Adolescent Self-Image. Princeton, New Jersey: Princeton University Press.

Roth, W. T., & Cannon, E. H. (1972). Some features of the auditory evoked response in schizophrenics. Archives of General Psychiatry, 27, 466-471.

Roth, W. T., Pfefferbaum, A., Horvath, T. B., Berger, P. A., & Kopell. B. S. (1980). P3 reduction in auditory evoked potentials of schizophrenics. Electroencepha-

lography and Clinical Neurophysiology, 49, 497-505.

Roth, W. T., Pfefferbaum, A., Kelly, A. F., Berger, P. A., & Kopell, B. S. (1981). Auditory event-related potentials in schizophrenia and depression. Psychiatry Research, 4, 199-212.

Rotter, J. B. (1954). Social learning and clinical psychology. Englewood Cliffs: Prentice-Hall.

Rotter, J. B. (1960). Some implications of a social learning theory for the prediction of goal directed behaviour from testing procedures. Psychological Review, 67, 301-316.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs: General and Applied, 80, 1-28.

Rotter, J. B., Liverant, S., & Crowne, D. P. (1961). The growth and extinction of expectancies in chance controlled and skilled tests. Journal of Psychology, 52, 161-177.

Rotter, J. B., & Mulry, R. C. (1965). Internal versus external control of reinforcement and decision time. Journal of Personality and Social Psychology, 2, 598-604.

Sarbin, R. T., & Lim, D. T. (1963). Some evidence in support of the role-taking hypothesis. International Journal of Clinical and Experimental Hypnosis, 11, 98-103.

Scalf-McIver, L., & Thompson, J. K. (1989). Family correlates of bulimic characteristics in college females. Journal of Clinical Psychology, 45, 467-472.

Schuldberg, D., French, C., Stone, B. L., & Heberle, J. (1988). Creativity and schizotypal traits: Creativity test scores and perceptual aberration, magical ideation, and impulse nonconformity. Journal of Nervous and Mental Disease, 176, 648-657.

Schuldberg, D., & London, A. (1989). Psychological differentiation and schizotypal traits: Negative results with the Group Embedded Figures Test. Perceptual and Motor Skills, 68, 1219-1226.

Schulman, S. M. (1976). Cognitive deficits in students identified by elevated 2-7-8 code of the MMPI (Doctoral dissertation, New School for Social Research, 1976). Dissertation Abstracts International, 37, 3096B. (University Microfilms No. 76-28, 305)

Scoresby, A., & Christensen, B. (1976). Differences in

interaction and environmental conditions of clinic and non-clinic families: Implications for counselors. Journal of Marriage and Family Counseling, 2, 63-71.

Seeman, M. (1959). On the meaning of alienation. American Sociological Review, 24, 782-791.

Seeman, M. (1963). Alienation and social learning in a reformatory. American Journal of Sociology, 69, 270-284.

Seltzer, W. J., & Seltzer, M. R. (1983). Material, myth, and magic: A cultural approach to family therapy. Family Process, 22, 3-14.

Sheppy, M. I., Friesen, J. D., & Hakstian, A. R. (1988). Eco-systemic analysis of anorexia nervosa. Journal of Adolescence, 11, 373-391.

Shisslak, C. M., McKeon, R. T., & Crago, M. (1990). Family dysfunction in normal weight bulimic and bulimic anorexic families. Journal of Clinical Psychology, 46, 185-189.

Snor, R. E. (1960). The frequency of naturally occurring "hypnotic-like" experiences in the normal college population. International Journal of Clinical and Experimental Hypnosis, 8, 151-163.

Shor, R. E., Orne, M. T., & O'Connell, D. N. (1962). Validation and cross-validation of a scale of self-reported personal experiences which predicts hypnotizability. Journal of Psychology, 53, 55-75.

Shweder, R. A. (1977). Likeness and likelihood in everyday thought: magical thinking in judgments about personality. Current Anthropology, 18, 637-659.

Simons, R. F., & Katkin, W. (1985). Smooth pursuit eye movements in subjects reporting physical anhedonia and perceptual aberrations. Psychiatry Research, 14, 275-289.

Singer, J. (Ed.). (1973). The child's world of make-believe. New York: Academic Press.

Singer, J. L., & Antrobus, J. S. (1972). Daydreaming, imaginal processes, and personality: A normative study. In P. W. Sheehan (Ed.), The Function and Nature of Imagery (pp. 175-202). New York: Academic Press.

Snyder, M. (1974). Self-monitoring of expressive behaviour. Journal of Personality and Social Psychology, 30, 4, 526-537.

Spanos, N. P. (1982). A social-psychological approach to hypnotic behaviour. In G. Weary & H. L. Mirels (Eds.), Integration of clinical and social psychology (pp. 231-271). Oxford University Press.

Spitzer, R. L., & Endicott, J. (1977). Schedule for Affective Disorders and Schizophrenia - Life-time version (SADS-L). New York: New York State Psychiatric Institute.

Spitzer, R. L., & Endicott, J. (1978). Research diagnostic criteria for a selected group of functional disorders. New York: New York State Psychiatric Institute.

Spring, B., Lemon, M., Weinstein, L., & Haskell, A. (1989). Distractibility in schizophrenia: State and trait aspects. British Journal of Psychiatry, 155, 63-68.

Stace, W. T. (1960). Mysticism and Philosophy. Philadelphia: Lippincott.

Steinbock, L. (1978). Nest-leaving: Family systems of runaway adolescents (Doctoral Dissertation, California School of Professional Psychology, 1977). Dissertation Abstracts International, 38, 4544B.

Stern, S. L., Dixon, K. N., Jones, D., Lake, M., et al (1989). Family environment in anorexia nervosa and bulimia. International Journal of Eating Disorders, 8, 25-31.

Steronko, R. J, & Woods, D. J. (1978). Impairment in early stages of visual information processing in nonpsychotic schizotypic individuals. Journal of Abnormal Psychology, 87, 481-490.

Stone, M. H. (1980). The borderline syndromes. New York: McGraw-Hill.

Straits, B. C., & Sechrest, L. (1963). Further support of some findings about characteristics of smokers and non-smokers. Journal of Consulting Psychology, 27, 282.

Strickland, B. R. (1962). The relationships of awareness to verbal conditioning and extinction. Unpublished doctoral dissertation. Ohio State University.

Tal, D., Gil-Spielberg, R., Antonovsky, H., Tal, A., et al (1990). Teaching families to cope with childhood asthma. Family Systems Medicine, 8, 135-144.

Tellegen, A. (1976). Differential Personality Questionnaire.

Minneapolis: University of Minnesota.

Tellegen, A., & Atkinson, G. (1974). Openness to absorbing and self-altering experiences ("absorption"), a trait related to hypnotic susceptibility. Journal of Abnormal Psychology, 83, 3, 268-277.

Thompson, R. J., Kronenberger, W. G., Johnson, D. F., & Whiting, K. (1989). The role of central nervous system functioning and family functioning in behavioral problems of children with myelodysplasia. Journal of Developmental and Behavioral Pediatrics, 10, 242-248.

Tobacyk, J., & Milford, G. (1983). Belief in pararormal phenomena: Assessment instrument development and implications for personality functioning. Journal of Personality and Social Psychology, 44, 6, 1029.

Tower, R. B. (1983). Imagery: Its role in development. In A. A. Sheikh (Ed.), Imagery: Current theory, research, and application (pp. 222-251). New York: Wiley.

Van den Bosch, R. J., Rozendaal, N., & Mol, J.M. (1987). Symptom correlates of eye tracking dysfunction. Biological Psychiatry, 22, 919-921.

Wahlund, L. O., Smedby, Y., Saaf, J., Schulman, A., Ross, A.B., & Wetterberg, L. (1983). Influence of hemodialysis on monoamine oxidase kinetics in platelets from chronic schizophrenic patients. Artificial Organs, 7, 334-339.

Welsh, G. S., & Barron, F. (1963). Barron-Welsh Art Scale. Palo Alto, CA: Consulting Psychologists Press.

Werner, H. (1948). The comparative psychology of mental development. New York: Science Editions.

Wetzel, J. (1977). Dependence upon unsustaining environments as an antecedent variable of depression (Doctoral dissertation, Washington University, St. Louis, MO, 1976). Dissertation Abstracts International, 37, 5361A.

Wetzel, J. (1978). Depression and dependence upon unsustaining environments. Clinical Social Work Journal, 6, 75-89.

Wetzel, J., & Redmond, F. (1980). A person-environment study of depression. Social Service Review, 54, 363-375.

White, D. (1978). Schizophrenics' perceptions of family relationships (Doctoral dissertation, Saint Louis University, St. Louis, MO, 1978). Dissertation Abstracts

International, 39, 1451A.

White, K., Sheehan, P. W., & Ashton, R. (1977). Imagery assessment: A survey of self-report measures. Journal of Mental Imagery, 1, 145-170.

Wilson, S. C., & Barber, T. X. (1981). Vivid fantasy and hallucinatory abilities in the life histories of excellent hypnotic subjects ("somnambules"): Preliminary report with female subjects. In E. Klinger (Ed.), Imagery: Vol. 2. Concepts, results, and applications (pp. 133-149). New York: Plenum.

Wilson, S. C., & Barber, T. X. (1983). The fantasy-prone personality: Implications for understanding imagery, hypnosis, and parapsychological phenomena. In A. A. Sheikh (Ed.), Imagery: Current theory, research, and application (pp. 222-251). New York: Wiley.

Wyckoff, L.B., & Sidowski, J. G. (1955). Probability discrimination in a motor task. Journal of Experimental Psychology, 50, 225-231.

Yehuda, R., Edell, W. S., & Meyer, J. S. (1987). Platelet MAO activity and psychosis proneness in college students. Psychiatry Research, 20, 129-142.

Young, R., Gaynor, J., Gould, E., & Stewart, M. (1979). The Family Environment Scale in a psychiatric inpatient sample. Unpublished manuscript, University of California, Department of Psychiatry, San Francisco.

Appendix A

Please circle whether each statement is true (T) or false (F) for you.

1. T F Sometimes I have had feelings that I am united with an object near me.

2. T F I have sometimes had the feeling that one of my arms or legs is disconnected from the rest of my body.

3. T F Some people can make me aware of them just by thinking about me.

4. T F I sometimes have to touch myself to make sure I'm still there.

5. T F I have had the momentary feeling that I might not be human.

6. T F Sometimes I have had the feeling that a part of my body is larger than it usually is.

7. T F I have sometimes been fearful of stepping on sidewalk cracks.

8. T F At times I have wondered if my body was really my own.

9. T F I think I could learn to read others' minds if I wanted to.

10. T F Parts of my body occasionally seem dead or unreal.

11. T F Horoscopes are right too often for it to be a coincidence.

12. T F Things sometimes seem to be in different places when I get home, even though no one has been there.

13. T F Sometimes I have had a passing thought that some part of my body was rotting away.

14. T F Numbers like 13 and 7 have no special powers.

15. T F Occasionally I have felt as though my body did not exist.

16. T F Sometimes I have felt that I could not distinguish my body from other objects around me.

17. T F I have occasionally had the silly feeling that a TV or radio broadcaster knew I was listening to him.

18. T F It has seemed at times as if my body was melting into my surroundings.

19. T F I have never felt that my arms or legs have momentarily grown in size.

20. T F I have worried that people on other planets may be influencing what happens on earth.

21. T F The boundaries of my body always seem clear.

22. T F The government refuses to tell us the truth about flying saucers.

23. T F I can remember when it seemed as though one of my limbs took on an unusual shape.

24. T F I have felt that there were messages for me in the way things were arranged, like in a store window.

25. T F I sometimes have had the feeling that my body is abnormal.

26. T F I have never doubted that my dreams are the products of my own mind.

27. T F I have sometimes had the feeling that my body is decaying inside.

28. T F Good luck charms don't work.

29. T F I have had the momentary feeling that the things I touch remain attached to my body.

30. T F I have noticed sounds on my records that are not there at other times.

31. T F Occasionally it has seemed as if my body had taken on the appearance of another person's body.

32. T F The hand motions that strangers make seem to influence me at times.

33. T F Sometimes I feel like everything around me is tilting.

34. T F I almost never dream about things before they happen.

35. T F Ordinary colors sometimes seem much too bright to me (without taking drugs).

36. T F I have had the momentary feeling that someone's place has been taken by a look-alike.

37. T F My hands or feet have never seemed far away.

38. T F It is not possible to harm others merely by thinking bad thoughts about them.

39. T F I have sometimes felt that some part of my body no longer belonged to me.

40. T F I have sometimes sensed an evil presence around me, although I could not see it.

41. T F I have felt that something outside my body was a part of my body.

42. T F I sometimes have a feeling of gaining or losing energy when certain people look at me or touch me.

43. T F I have felt that my body and another person's body were one and the same.

44. T F I have sometimes had the passing thought that strangers are in love with me.

45. T F Now and then when I look in the mirror, my face seems quite different than usual.

46. T F I have never had the feeling that certain thoughts of mine really belonged to someone else.

47. T F I have felt as though my head or limbs were somehow not my own.

48. T F When introduced to strangers, I rarely wonder whether I have known them before.

49. T F Sometimes when I look at things like tables and chairs, they seem strange.

50. T F If reincarnation were true, it would explain some unusual experiences I have had.

51. T F I have never had the passing feeling that my arms or legs had become longer than usual.

52. T F People often behave so strangely that one wonders if they are part of an experiment.

53. T F I sometimes have had the feeling that some parts of my body are not attached to the same person.

54. T F At times I perform certain little rituals to ward off negative influences.

55. T F I have had the momentary feeling that my body has become misshapen.

56. T F I have felt that I might cause something to happen just by thinking too much about it.

57. T F Sometimes part of my body has seemed smaller than it usually is.

58. T F My hearing is sometimes so sensitive that ordinary sounds become uncomfortable.

59. T F I have wondered whether the spirits of the dead can influence the living.

60. T F Sometimes people whom I know well begin to look like strangers.

61. T F I have sometimes felt confused as to whether my body was really my own.

62. T F At times I have felt that a professor's lecture was meant especially for me.

63. T F Often I have a day when indoor lights seem so bright that they bother my eyes.

64. T F I have sometimes felt that strangers were reading my mind.

65. T F For several days at a time I have had such a heightened awareness of sights and sounds that I cannot shut them out.

Appendix B

Please circle whether each statement is true (T) or false (F) for you.

1. T F Some people can make me aware of them just by thinking about me.

2. T F I have had the momentary feeling that I might not be human.

3. T F I have sometimes been fearful of stepping on sidewalk cracks.

4. T F I think I could learn to read others' minds if I wanted to.

5. T F Horoscopes are right too often for it to be a coincidence.

6. T F Things sometimes seem to be in different places when I get home, even though no one has been there.

7. T F Numbers like 13 and 7 have no special powers.

8. T F I have occasionally had the silly feeling that a TV or radio broadcaster knew I was listening to him.

9. T F I have worried that people on other planets may be influencing what happens on earth.

10. T F The government refuses to tell us the truth about flying saucers.

11. T F I have felt that there were messages for me in the way things were arranged, like in a store window.

12. T F I have never doubted that my dreams are the products of my own mind.

13. T F Good luck charms don't work.

14. T F I have noticed sounds on my records that are not there at other times.

15. T F The hand motions that strangers make seem to influence me at times.

16. T F I almost never dream about things before they happen.

17. T F I have had the momentary feeling that someone's place has been taken by a look-alike.

18. T F It is not possible to harm others merely by thinking bad thoughts about them.

19. T F I have sometimes sensed an evil presence around me, although I could not see it.

20. T F I sometimes have a feeling of gaining or losing energy when certain people look at me or touch me.

21. T F I have sometimes had the passing thought that strangers are in love with me.

22. T F I have never had the feeling that certain thoughts of mine really belonged to someone else.

23. T F When introduced to strangers, I rarely wonder whether I have known them before.

24. T F If reincarnation were true, it would explain some unusual experiences I have had.

25. T F People often behave so strangely that one wonders if they are part of an experiment.

26. T F At times I perform certain little rituals to ward off negative influences.

27. T F I have felt that I might cause something to happen just by thinking too much about it.

28. T F I have wondered whether the spirits of the dead can influence the living.

29. T F At times I have felt that a professor's lecture was meant especially for me.

30. T F I have sometimes felt that strangers were reading my mind.

Appendix C

Please circle whether each statement is true (T) or false (F) for you.

1. T F Sometimes I have had feelings that I am united with an object near me.

2. T F I have sometimes had the feeling that one of my arms or legs is disconnected from the rest of my body.

3. T F I sometimes have to touch myself to make sure I'm still there.

4. T F Sometimes I have had the feeling that a part of my body is larger than it usually is.

5. T F At times I have wondered if my body was really my own.

6. T F Parts of my body occasionally seem dead or unreal.

7. T F Sometimes I have had a passing thought that some part of my body was rotting away.

8. T F Occasionally I have felt as though my body did not exist.

9. T F Sometimes I have felt that I could not distinguish my body from other objects around me.

10. T F It has seemed at times as if my body was melting into my surroundings.

11. T F I have never felt that my arms or legs have momentarily grown in size.

12. T F The boundaries of my body always seem clear.

13. T F I can remember when it seemed as though one of my limbs took on an unusual shape.

14. T F I sometimes have had the feeling that my body is abnormal.

15. T F I have sometimes had the feeling that my body is decaying inside.

16. T F I have had the momentary feeling that the things I touch remain attached to my body.

17. T F Occasionally it has seemed as if my body had taken on the appearance of another person's body.

18. T F Sometimes I feel like everything around me is tilting.

19. T F Ordinary colors sometimes seem much too bright to me (without taking drugs).

20. T F My hands or feet have never seemed far away.

21. T F I have sometimes felt that some part of my body no longer belonged to me.

22. T F I have felt that something outside my body was a part of my body.

23. T F I have felt that my body and another person's body were one and the same.

24. T F Now and then when I look in the mirror, my face seems quite different than usual.

25. T F I have felt as though my head or limbs were somehow not my own.

26. T F Sometimes when I look at things like tables and chairs, they seem strange.

27. T F I have never had the passing feeling that my arms or legs had become longer than usual.

28. T F I sometimes have had the feeling that some parts of my body are not attached to the same person.

29. T F I have had the momentary feeling that my body has become misshapen.

30. T F Sometimes part of my body has seemed smaller than it usually is.

31. T F My hearing is sometimes so sensitive that ordinary sounds become uncomfortable.

32. T F Sometimes people whom I know well begin to look like strangers.

33. T F I have sometimes felt confused as to whether my body was really my own.

34. T F Often I have a day when indoor lights seem so bright that they bother my eyes.

35. T F For several days at a time I have had such a heightened awareness of sights and sounds that I cannot shut them out.

Appendix D - Demographic Questionnaire

For each of the following statements, circle the most appropriate answer on the scale from 0 to 9. By "childhood", this questionnaire refers to the period from your earliest memories until about age 12.

1. I would describe my childhood as a very happy, positive time.

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

2. During my childhood, when I was NOT in school, I enjoyed spending most of my time playing:

(i) alone

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

(ii) with adults, including parents, grandparents, aunts & uncles

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

3. During my childhood, when I was at school, I most often played

all alone									with a group of friends
0	1	2	3	4	5	6	7	8	9

4. During my childhood, I participated in art classes, or drama/theatre classes, or ballet

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

5. During my childhood, I participated in individual sports (such as distance running, high jump, speed swimming, etc)

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

6. During my childhood, I participated in team sports (such as baseball, team relay races, synchronized swimming, soccer, volleyball)

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

7. During my childhood, I experienced great feelings of loneliness and isolation

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

8. During my childhood, I was physically punished by my parent(s)

	very rarely		now & then		once a month		once a week		every day
0	1	2	3	4	5	6	7	8	9
never		a few times		quite a # of times		more than 1/month		more than 1/week	

9. During my childhood, I grew up mainly in an environment or neighbourhood that was

isolated, rural								large,busy and urban	
0	1	2	3	4	5	6	7	8	9

10. During my childhood, I would describe my overall home and family environment as warm and comfortable

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

11. When I was growing up, I was child # _?_ in a family of _?_ children (eg the second oldest in a family of four children would answer # _2_ in a family of _4_ children).

_____ in a family of _____ children.

12. During my childhood, at least one significant adult (eg parent, grandparent, neighbour, teacher, etc) encouraged me to do a lot of reading.

not at all			sometimes encouraged			frequently encouraged			always encouraged
0	1	2	3	4	5	6	7	8	9

13. During my childhood, at least one significant adult (eg parent, grandparent, neighbour, teacher, etc) read stories like fairy tales to me or told me stories and encouraged belief in fantasy.

not at all			sometimes encouraged			frequently encouraged			always encouraged
0	1	2	3	4	5	6	7	8	9

14. During my childhood, I experienced the death of a parent while still young.

not at all		at age 8 or 9		at age 4 or 5		at age 2		near birth	
0	1	2	3	4	5	6	7	8	9
	at age 10		at age 6 or 7		at age 3		at age 1		prior to birth

15. During my childhood, I experienced at least one parent as either having deserted the family or having had severe emotional problems or problems with alcoholism.

never			sometimes			frequently			entire childhood
0	1	2	3	4	5	6	7	8	9

16. During my childhood, I enjoyed going to school.

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

17. During my childhood, I felt very safe and secure.

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

18. During my childhood, outside the time I spent with my parents, brothers and sisters, I spent my time in this amount of contact with other children or adults:

no contact			contact sometimes			frequent contact			constant contact
0	1	2	3	4	5	6	7	8	9
	very limited							very extensive	

19. Most of the time during my childhood, I experienced a sense of success and a total lack of problems and failure.

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9
(extreme failure)			(moderate failure)			(moderate success)		(extreme success)	

20. During my childhood, I experienced a strong, loving bond with my mother.

never felt bond			sometimes felt bond			frequently felt bond			always felt bond
0	1	2	3	4	5	6	7	8	9

21. During my childhood, I experienced a strong, loving bond with my father.

never felt bond			sometimes felt bond			frequently felt bond			always felt bond
0	1	2	3	4	5	6	7	8	9

22. During my childhood, I tended to spend time daydreaming or in mental fantasy

never		occasion-ally		up to 5%	10%	25%	half time	75%	all day long
0	1	2	3	4	5	6	7	8	9
	rarely		once /day	1 hr /day	2 hr /day	4 hr /day	8 hr /day	12 hr /day	18hr /day

23. During my childhood, I had difficulty differentiating fantasized events and persons from nonfantasized ones.

never		3-4 times ever		occasion-ally		several /month		several /day	
0	1	2	3	4	5	6	7	8	9
	1-2 times ever		very rarely		frequently		about daily		always

24. My mother's level of education was (is)

none	mid public	grad public	mid high	grad Gr 12	grad Gr 13	college diploma	univ degree	Msters level	PhD
0	1	2	3	4	5	6	7	8	9

25. My father's level of education was (is)

none	mid public	grad public	mid high	grad Gr 12	grad Gr 13	college diploma	univ degree	Msters level	PhD
0	1	2	3	4	5	6	7	8	9

26. I currently feel I am a well-adjusted person.

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

27. In recent years, I have experienced physical/medical problems.

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

28. During adulthood (since age 16), I have had to seek out a professional in the helping professions (eg social worker, counsellor, psychologist) to discuss psychological/emotional problems I was having.

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

29. As an adult, I would characterize myself as having religious or spiritual beliefs and values that are

non-existent			sometimes obvious			frequently reinforced			very fervent
0	1	2	3	4	5	6	7	8	9

30. I currently have problems concentrating

never			sometimes			frequently			always
0	1	2	3	4	5	6	7	8	9

31. How frequently do you consume alcohol?

never at all		use to /not now		occasion -ally		weekly		once daily		>6 times daily
0	1	2	3	4	5	6	7	8	9	

32. How frequently do you smoke marijuana?

never at all		use to /not now		occasion -ally		weekly		once daily		>6 times daily
0	1	2	3	4	5	6	7	8	9	

33. How frequently do you use other drugs including stimulants (eg cocaine, amphetamine), depressants (eg barbiturates, Quaaludes), and hallucinogens(eg LSD, hallucinogenic mushroom)?

never at all		use to /not now		occasion -ally		weekly		once daily		>6 times daily
0	1	2	3	4	5	6	7	8	9	

34. How many times have either of your parents been a psychiatric inpatient in a hospital (eg for emotional problems)?

_____

35. How many times have you been a psychiatric inpatient in a hospital?

_____

36. What was your grade point average at the end of last school year?

_____

37. How many people would you currently call "close friends" in your life?

_____

38. How would people you know well rate your level of emotional and/or social adjustment?

not at all adjusted		poor		fair		moderately well adjusted		well		extremely well adjusted
0	1	2	3	4	5	6	7	8	9	

Appendix E

Instructions: Please answer each question with a 'YES' or 'NO' following the question. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the questions.

PLEASE REMEMBER TO ANSWER EACH QUESTION

1. Do you have many different hobbies? _____
2. Do you stop to think things over before doing anything? _____
3. Does your mood often go up and down? _____
4. Have you ever taken the praise for something you know someone else had really done? _____
5. Do you take much notice of what people think? _____
6. Are you a talkative person? _____
7. Would being in debt worry you? _____
8. Do you ever feel 'just miserable' for no reason? _____
9. Do you give money to charities? _____
10. Were you ever greedy by helping yourself to more than your share of anything? _____
11. Are you rather lively? _____
12. Would it upset you a lot to see a child or an animal suffer? _____
13. Do you often worry about things you should not have done or said? _____
14. Do you dislike people who do not know how to behave themselves? _____

15. If you say you will do something, do you always keep your promise no matter how inconvenient it might be? _____

16. Can you usually let yourself go and enjoy yourself at a lively party? _____

17. Are you an irritable person? _____

18. Should people always respect the law? _____

19. Have you ever blamed someone for doing something you knew was really your fault? _____

20. Do you enjoy meeting new people? _____

21. Are good manners very important? _____

22. Are your feelings easily hurt? _____

23. Are **all** your habits good and desirable ones? _____

24. Do you tend to keep in the background on social occasions? _____

25. Would you take drugs which may have strange or dangerous effects? _____

26. Do you often feel 'fed-up'? _____

27. Have you ever taken anything (even a pin or button) that belonged to someone else? _____

28. Do you like going out a lot? _____

29. Do you prefer to go your own way rather than act by the rules? _____

30. Do you enjoy hurting people you love? _____

31. Are you often troubled about feelings of guilt? _____

32. Do you sometimes talk about things you know nothing about? _____

33. Do you prefer reading to meeting people? _____

34. Do you have enemies who want to harm you? _____

35. Would you call yourself a nervous person? _____

36. Do you have many friends? _____

37. Do you enjoy practical jokes that can sometimes really hurt people? _____

38. Are you a worrier? _____

39. As a child did you do as you were told immediately and without grumbling? _____

40. Would you call yourself happy-go-lucky? _____

41. Do good manners and cleanliness matter much to you? _____

42. Have you often gone against your parents' wishes? _____

43. Do you worry about awful things that might happen? _____

44. Have you ever broken or lost something belonging to someone else? _____

45. Do you usually take the initiative in making new friends? _____

46. Would you call yourself tense or 'highly-strung'? _____

47. Are you mostly quiet when you are with other people? _____

48. Do you think marriage is old fashioned and should be done away with? _____

49. Do you sometimes boast a little? _____

50. Are you more easy-going about right and wrong than most people? _____

51. Can you easily get some life into a rather dull party? _____

52. Do you worry about your health? _____

53. Have you ever said anything bad or nasty about anyone? _____

54. Do you enjoy co-operating with others? _____

55. Do you like telling jokes and funny stories to your friends? _____

56. Do most things taste the same to you? _____

57. As a child were you ever cheeky to your parents? _____

58. Do you like mixing with people? _____

59. Does it worry you if you know there are mistakes in your work? _____

60. Do you suffer from sleeplessness? _____

61. Have people said that you sometimes act too rashly? _____

62. Do you always wash before a meal? _____

63. Do you nearly always have a 'ready answer' when people talk to you? _____

64. Do you like to arrive at appointments in plenty of time? _____

65. Have you often felt listless and tired for no reason? _____

66. Have you ever cheated at a game? _____

67. Do you like doing things in which you have to act quickly? _____

68. Is (or was) your mother a good woman? _____

69. Do you often make decisions on the spur of the moment? _____

70. Do you often feel life is very dull? _____

71. Have you ever taken advantage of someone? _____

72. Do you often take on more activities than you have time for? _____

73. Are there several people who keep trying to avoid you? _____

74. Do you worry a lot about your looks? _____

75. Do you think people spend too much time safeguarding their future with savings and insurances? _____

76. Have you ever wished that you were dead? _____

77. Would you dodge paying taxes if you were sure you could never be found out? _____

78. Can you get a party going? _____

79. Do you try not to be rude to people? _____

80. Do you worry too long after an embarrassing experience? _____

81. Do you generally 'look before you leap'? _____

82. Have you ever insisted on having your own way? _____

83. Do you suffer from 'nerves'? _____

84. Do you often feel lonely? _____

85. Can you on the whole trust people to tell the truth? _____

86. Do you always practice what you preach? _____

87. Are you easily hurt when people find fault with you or the work you do? _____

88. Is it better to follow society's rules than go your own way? _____

89. Have you ever been late for an appointment or work? _____

90. Do you like plenty of bustle and excitement around you? _____

91. Would you like other people to be afraid of you? _____

92. Are you sometimes bubbling over with energy and sometimes very sluggish? _____

93. Do you sometimes put off until tomorrow what you ought to do today? _____

94. Do other people think of you as being very lively? _____

95. Do people tell you a lot of lies? _____

96. Do you believe one has special duties to one's family? _____

97. Are you touchy about some things? _____

98. Are you always willing to admit it when you have made a mistake? _____

99. Would you feel very sorry for an animal caught in a trap? _____

100. When your temper rises, do you find it difficult to control? _____

Appendix F

Please indicate your degree of agreement or disagreement with each of the following statements by entering the appropriate letter for each statement.

a) I strongly disagree
b) I disagree
c) I am undecided
d) I agree
e) I strongly agree

1. The number "13" is unlucky. _____

2. Black cats can bring bad luck. _____

3. Witches do exist. _____

4. Some individuals are able to levitate (lift). _____

5. If you break a mirror, you will have bad luck. _____

6. There is a heaven and hell. _____

7. I believe in God. _____

8. Dreams can provide information about the future. _____

9. Psychokinesis, the movement of objects through psychic powers, does occur. _____

10. The Loch Ness monster of Scotland exists. _____

11. The idea of predicting the future is foolish. _____

12. Some people have the ability to predict the future. _____

13. Black magic really exists. _____

14. The soul continues to exist though the body may die. _____

15. During altered states, such as sleep or trances, the spirit can leave the body. _____

16. Big Foot exists. _____

17. A person's thoughts can influence the movement of a physical object. _____

Please indicate your degree of agreement or disagreement with each of the following statements by entering the appropriate letter for each statement.

a) I strongly disagree
b) I disagree
c) I am undecided
d) I agree
e) I strongly agree

18. Mind reading is not possible. _____

19. The abominable snowman of Tibet exists. _____

20. Reincarnation does occur. _____

21. There is a devil. _____

22. There are actual cases of Voodoo death. _____

23. Your mind or soul can leave your body and travel (astral projection). _____

24. It is possible to communicate with the dead. _____

25. Voodoo is a real method to use paranormal powers. _____

Appendix G

DIRECTIONS:

For each question, please indicate which response best applies.

1 - disagree
2 - disagree more than agree
3 - agree more than disagree
4 - agree

1. I can make just about anybody believe anything I say or do.

   ____

2. I like to imagine myself as being various types of people.

   ____

3. I like to watch people for movements and mannerisms that set them apart from other people.

   ____

4. I often try to guess what people are thinking before they tell me.

   ____

5. After acting in a play myself, or seeing a play or movie, I have felt partly as though I were one of the characters.

   ____

6. I can imitate at least three different well-known people.

   ____

7. When I read a novel, I become very involved, experiencing what is going on, joining in with the actors and characters.

   ____

8. If asked to play the part of a Russian peasant, I could do so convincingly.

   ____

9. If asked to play the part of a "hillbilly" factory worker whom everyone makes fun of, I could do so sympathetically.

   ____

10. I am able to exclude everything from my mind, construct a new, imaginary world, and feel for a time that it is real.

____

11. I have participated in a high school or college play or other amateur theatre production.

____

12. When telling a story I'm more interested in presenting the facts than creating a mood.

____

13. I have had the experience of telling a story with elaborations to make it sound better and then having the elaborations seem as real to me as the actual experience.

____

14. While watching a movie or show I sometimes become so involved that I feel myself participating in the action.

____

15. People tell me I am a good story teller.

____

16. I do not have a good memory for the way people move, gesture and make facial expressions.

____

17. If asked to play the part of an elderly person living alone in a big city, I could do so convincingly.

____

18. If asked to play the part of a tightrope walker with hiccups, I could do a convincing job of it.

____

19. I like to imitate the way people talk, move, gesture, and make facial expressions.

____

20. When talking with people, I pay more attention to what they say than how they say it.

____

21. When telling a story I like to play the parts of all the different people involved.

____

22. I am sometimes able to get so absorbed in fantasy that I forget about my present self and become someone else in my imagination.

____

23. People always seem to know when I'm not telling the complete truth.

____

24. I have a good memory for voices and the way people talk.

____

25. I have had the experience of imagining something so hard that it became almost real for me.

____

26. I can usually "put on a show" and liven things up without being self-conscious about it.

____

27. I am good at mimicking accents. ____

28. If I wish, I can imagine (or daydream) some things so vividly that they hold my attention in the way a good movie or story does.

____

29. I am good at playing the game of charades (acting out a concept in pantomime so that others can guess its meaning).

____

30. When I dance I often lose myself in the music and movement.

____

31. I have a serious interest in creative activities such as painting, writing, designing and the like.

____

32. I am good at faking things. ____

Appendix H

This booklet contains brief descriptions of a number of experiences. Some descriptions refer to phenomena that you may have experienced, while others refer to phenomena that you may not have experienced. In each case, note the description carefully and then place a mark in the right margin according to how much the description applies to your own experience. Circle -2, -1, ?, +1, or +2, depending on how you feel in each case.

-2 This description is definitely not true of my own experience or experiences.
-1 This description is probably not true of my own experience or experiences.
? I cannot decide.

+1 This description is probably true of my own experience or experiences.
+2 This description is definitely true of my own experience or experiences.

Please mark each item trying to avoid, if at all possible, marking any item with a ?. In responding to each item, please understand that the items may be considered as applying to one experience or as applying to many different experiences. After completing the questions, please be sure that all items have been marked - leave no items unanswered.

---

1. I have had an experience which was both timeless and spaceless.	-2	-1	?	+1	+2
2. I have never had an experience which was incapable of being expressed in words.	-2	-1	?	+1	+2
3. I have had an experience in which something greater than myself seemed to absorb me.	-2	-1	?	+1	+2
4. I have had an experience in which everything seemed to disappear from my head until I was conscious only of a void.	-2	-1	?	+1	+2
5. I have experienced profound joy.	-2	-1	?	+1	+2
6. I have never had an experience in which I felt myself to be absorbed in one with all things.	-2	-1	?	+1	+2

7. I have never experienced a perfectly peaceful state.	-2	-1	?	+1	+2
8. I have never had an experience in which I felt as if all things were alive.	-2	-1	?	+1	+2
9. I have never had an experience which seemed holy to me.	-2	-1	?	+1	+2
10. I have never had an experience in which all things seemed aware.	-2	-1	?	+1	+2
11. I have had an experience in which I had no sense of time or space.	-2	-1	?	+1	+2
12. I have had an experience in which I realized the oneness of myself with all things.	-2	-1	?	+1	+2
13. I have had an experience in which a new view of reality was revealed to me.	-2	-1	?	+1	+2
14. I have never experienced anything to be divine.	-2	-1	?	+1	+2
15. I have never had an experience in which time and space were non-existent.	-2	-1	?	+1	+2
16. I have never experienced anything that I could call ultimate reality.	-2	-1	?	+1	+2
17. I have had an experience in which ultimate reality was revealed to me.	-2	-1	?	+1	+2
18. I have had an experience in which I felt that all was perfection at that time.	-2	-1	?	+1	+2
19. I have had an experience in which I felt everything in the world to be part of the same whole.	-2	-1	?	+1	+2
20. I have had an experience which I knew to be sacred.	-2	-1	?	+1	+2
21. I have never had an experience which I was unable to express adequately through language.	-2	-1	?	+1	+2
22. I have had an experience which has left me with a feeling of awe.	-2	-1	?	+1	+2

23. I have had an experience that is impossible to communicate.	-2	-1	?	+1	+2
24. I have never had an experience in which my own self seemed to merge into something greater.	-2	-1	?	+1	+2
25. I have never had an experience which left me with a feeling of wonder.	-2	-1	?	+1	+2
26. I have never had an experience in which deeper aspects of reality were revealed to me.	-2	-1	?	+1	+2
27. I have never had an experience in which time, place, and distance were meaningless.	-2	-1	?	+1	+2
28. I have never had an experience in which I became more aware of a unity to all things.	-2	-1	?	+1	+2
29. I have had an experience in which all things seemed to be conscious.	-2	-1	?	+1	+2
30. I have never had an experience in which all things seemed to be unified into a single whole.	-2	-1	?	+1	+2
31. I have had an experience in which I felt nothing is ever really dead.	-2	-1	?	+1	+2
32. I have had an experience that cannot be expressed in words.	-2	-1	?	+1	+2

Appendix I

INSTRUCTIONS FOR THE I-E SCALE

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives numbered (1) and (10). Imagine these two alternatives on a scale from 1 to 10. Please choose a number (1 or 10 where possible, or an appropriate number between them, if necessary) to represent the one statement of each pair (**and only one**) which you more strongly **believe** to be the case as far as you are concerned, or to represent a position somewhere between the two extremes. Note that there is no exact middle position. Be sure to select the number you actually **believe** to be true rather than the one you think you **should** choose or the one you would like to be true. This is a measure of personal belief: obviously there are no right or wrong answers.

Your answers to the items on this inventory are to be recorded by writing a number from 1 to 10 beside each item.

Please answer these items **carefully** but do not spend too much time on any one item. Be sure to find an answer for **every** choice. For each item, choose either 1 or 10 if possible for the statement more true, or, if necessary, choose a number between the two representing the extent to which you believe each statement. Also try to respond to each item **independently** when making your choice; do not be influenced by your previous choices.

---

1. **(1)** Children get into trouble because their parents punish them too much.
   (10) The trouble with most children nowadays is that their parents are too easy with them.
   _____

2. **(1)** Many of the unhappy things in people's lives are partly due to bad luck.
   (10) People's misfortunes result from the mistakes they make.
   _____

3. **(1)** One of the major reasons we have wars is because people don't take enough interest in politics.
   (10) There will always be wars, no matter how hard people try to prevent them.
   _____

4. **(1)** In the long run people get the respect they deserve in this world.
   (10) Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
   _____

5. (1) The idea that teachers are unfair to students is nonsense.
(10) Most students don't realize the extent to which their grades are influenced by accidental happenings.
_____

6. (1) Without the right breaks one cannot be an effective leader.
(10) Capable people who fail to become leaders have not taken advantage of their opportunities.
_____

7. (1) No matter how hard you try some people just don't like you.
(10) People who can't get others to like them don't understand how to get along with others.
_____

8. (1) Heredity plays the major role in determining one's personality.
(10 It is one's experiences in life which determine what they're like.
_____

9. (1) I have often found that what is going to happen will happen.
(10) Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
_____

10. (1) In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
(10) Many times exam questions tend to be so unrelated to course work that studying is really useless.
_____

11. (1) Becoming a success is a matter of hard work, luck has little or nothing to do with it.
(10) Getting a good job depends mainly on being in the right place at the right time.
_____

12. (1) The average citizen can have an influence in government decisions.
(10) This world is run by the few people in power, and there is not much the little guy can do about it.
_____

13. (1) When I make plans, I am almost certain that I can make them work.
(10) It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
_____

14. (1) There are certain people who are just no good.

(10) There is some good in everybody.

_____

15. (1) In my case getting what I want has little or nothing to do with luck.
(10) Many times we might just as well decide what to do by flipping a coin.
___ ___

16. (1) Who gets to be the boss often depends on who was lucky enough to be in the right place first.
(10) Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.
_____

17. (1) As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
(10) By taking an active part in political and social affairs the people can control world events.
_____

18. (1) Most people don't realize the extent to which their lives are controlled by accidental happenings.
(10) There really is no such thing as "luck".
_____

19. (1) One should always be willing to admit mistakes.
(10) It is usually best to cover up one's mistakes.
_____

20. (1) It is hard to know whether or not a person really likes you.
(10) How many friends you have depends upon how nice a person you are.
_____

21. (1) In the long run the bad things that happen to us are balanced by the good ones.
(10) Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
_____

22. (1) With enough effort we can wipe out political corruption.
(10) It is difficult for people to have much control over the things politicians do in office.
_____

23. (1) Sometimes I can't understand how teachers arrive at the grades they give.
(10) There is a direct connection between how hard I study and the grades I get.
_____

24. (1) A good leader expects people to decide for themselves what they should do.
(10) A good leader makes it clear to everybody what their jobs are.
_____

25. (1) Many times I feel that I have little influence over the things that happen to me.
(10) It is impossible for me to believe that chance or luck plays an important role in my life.
_____

26. (1) People are lonely because they don't try to be friendly.
(10) There's not much use in trying too hard to please people, if they like you, they like you.
_____

27. (1) There is too much emphasis on athletics in high school.
(10) Team sports are an excellent way to build character.
_____

28. (1) What happens to me is my own doing.

(10) Sometimes I feel that I don't have enough control over the direction my life is taking.
_____

29. (1) Most of the time I can't understand why politicians behave the way they do.
(10) In the long run the people are responsible for bad government on a national as well as on a local level.
_____

Appendix J

Instructions: Please indicate your degree of agreement or disagreement with each of the following statements by circling the appropriate option for each statement.

SA = strongly agree

A = agree

D = disagree

SD = strongly disagree

---

1. On the whole, I am satisfied with myself.	SA	A	D	SD
2. At times I think I am no good at all.	SA	A	D	SD
3. I feel that I have a number of good qualities.	SA	A	D	SD
4. I am able to do things as well as most other people.	SA	A	D	SD
5. I feel I do not have much to be proud of.	SA	A	D	SD
6. I certainly feel useless at times.	SA	A	D	SD
7. I feel that I'm a person of worth, at least on an equal plane with others.	SA	A	D	SD
8. I wish I could have more respect for myself.	SA	A	D	SD
9. All in all, I am inclined to feel that I am a failure.	SA	A	D	SD
10. I take a positive attitude toward myself.	SA	A	D	SD

Appendix K

Differential Personality Questionnaire

In this booklet you will find a series of statements a person might use to describe her/his attitudes, opinions, interests, and other characteristics.

Each statement is followed by two choices, lettered (a) and (b). Read the statement and decide which choice best describes you. Then circle **either** (a) or (b).

Please answer every statement, even if you are not completely sure of the answer.

Read each statement carefully, but don't spend too much time deciding on the answer.

---

1. When I work on a committee, I like to take charge of things. (a) True (b) False

2. I keep close track of where my money goes. (a) True (b) False

3. I frequently find myself worrying about something. (a) True (b) False

4. I usually prefer to spend my leisure time with friends rather than alone. (a) True (b) False

5. Sometimes I feel and experience things as I did when I was a child. (a) True (b) False

6. My table manners are not always perfect. (a) True (b) False

7. If people criticise me, I usually point out their own weaknesses. (a) True (b) False

8. I am just naturally cheerful. (a) True (b) False

9. The surest way to a peaceful world is to improve people's morals. (a) True (b) False

10. I often keep working on a problem even if I am very tired. (a) True (b) False

11. Of the following two situations, I would like <u>least</u>: (a) Running a steam presser in a laundry for a week, (b) Being caught in a blizzard.

12. Some people go out of their way to keep me from getting ahead. (a) True (b) False

13. I often stop in the middle of one activity to start something else. (a) True (b) False

14. I can be greatly moved by eloquent or poetic language. (a) True (b) False

15. My feelings are hurt rather easily. (a) True (b) False

16. I don't like having to tell people what to do. (a) True (b) False

17. Smooth is most like (a) Rough (b) Soft

18. I could be happy living all alone in a cabin in the woods or mountains. (a) True (b) False

19. My future looks very bright to me. (a) True (b) False

20. I am always disgusted with the law when a criminal is freed through the arguments of a smart lawyer. (a) True (b) False

21. Of the following tow situations, I would like <u>least</u>: (a) being in a bank when suddenly three masked men with guns come in and make everyone raise their hands, (b) sitting through a two-hour concert of bad music.

22. When someone hurts me, I try to retaliate (get even). (a) True (b) False

23. While watching a movie, a T.V. show, or a play, I may become so involved that I forget about myself and my surroundings and experience the story as if it were real and as if I were taking part in it. (a) True (b) False

24. I see no point in sticking with a problem if there is little chance of success. (a) True (b) False

25. I like to be in the spotlight. (a) True (b) False

26. When faced with a decision, I usually take time to consider and weigh all aspects. (a) True (b) False

27. I get "rattled" easily at critical moments. (a) True (b) False

28. I have always been extremely courageous in facing difficult situations. (a) True (b) False

29. Many people try to push me around. (a) True (b) False

30. As young people grow up they ought to try to carry out some of their rebellious ideas instead of just settling down. (a) True (b) False

31. When I am unhappy about something, (a) I tend to seek the company of a friend, (b) I prefer to be alone.

32. If I stare at a picture and then look away from it, I can sometimes "see" an image of the picture, almost as if I were still looking at it. (a) True (b) False

33. It might be enjoyable and exciting to experience an earthquake. (a) True (b) False

34. It is easy for me to become enthusiastic about things I am doing. (a) True (b) False

35. I perform in public whenever I have the opportunity. (a) True (b) False

36. I play hard and I work hard. (a) True (b) False

37. I enjoy violent movies. (a) True (b) False

38. I often become irritated over little annoyances. (a) True (b) False

39. Slow resembles: (a) Sluggish, (b) Fast.

40. Sometimes I feel as if my mind could envelop the whole world. (a) True (b) False

41. I often act without thinking. (a) True (b) False

42. Most people make friends because friends are likely to be useful. (a) True (b) False

43. Of the following two situations, I would like <u>least</u>: (a) Attempting to beat a railroad train at a crossing, (b) Spraining my ankle so that I can't walk on it.

44. I'd be extremely embarrassed to tell people that I'd spent my vacation at a nudist camp. (a) True (b) False

45. I prefer not to "open up" too much, not even to friends. (a) True (b) False

46. I often feel happy and satisfied for no particular reason. (a) True (b) False

47. I usually prefer to let someone else take the lead on social occasions. (a) True (b) False

48. I suffer from nervousness. (a) True (b) False

49. I like to watch cloud shapes change in the sky. (a) True (b) False

50. At times I have been envious of someone. (a) True (b) False

51. I like to stop and think things over before I do them. (a) True (b) False

52. When I have to stand in line, I never try to get ahead of other people. (a) True (b) False

53. I am very religious (more than most people). (a) True (b) False

54. Of the following two situations, I would like <u>least</u>: (a) Standing in line for something, (b) Getting an electric shock as part of a medical experiment.

55. I enjoy putting in long hours. (a) True (b) False

56. I live a very interesting life. (a) True (b) False

57. People have often tried to take advantage of me. (a) True (b) False

58. If I wish, I can imagine (or daydream) some things

so vividly that they hold my attention as a good movie or story does. (a) True (b) False

59. I often monopolize a conversation. (a) True (b) False

60. I am a warm person rather than cool and detached. (a) True (b) False

61. Eagle is most unlike: (a) Bird, (b) Fly.

62. I often experience periods of loneliness. (a) True (b) False

63. What this country needs most are higher standards of conduct. (a) True (b) False

64. I often prefer to "play things by ear" rather than to plan ahead. (a) True (b) False

65. Of the following two situations, I would like <u>least</u>: (a) Balancing along the top rail of a picket fence, (b) Walking up four flights of stairs.

66. I see no objection to stepping on people's toes a little if it is to my advantage. (a) True (b) False

67. I think I really know what some people mean when they talk about mystical experiences. (a) True (b) False

68. I don't enjoy problems that can't be solved quickly and efficiently. (a) True (b) False

69. Every day I do some things that are fun. (a) True (b) False

70. My opinions are always completely reasonable. (a) True (b) False

71. I am (or could be) a very effective sales person. (a) True (b) False

72. When I want to, I can usually put fears and worries out of my head. (a) True (b) False

73. Of the following tow statements, I agree more with: (a) Most parents today let their children get away with too much, (b) Most parents today do a pretty good job of raising their children.

74. People often just use me instead of treating me as a person. (a) True (b) False

75. I am usually happier when I am alone. (a) True (b) False

76. I sometimes "step outside" my usual self and experience an entirely different state of being. (a) True (b) False

77. I might enjoy riding to the top of an unfinished skyscraper in an open elevator. (a) True (b) False

78. I don't like to start a project until I know exactly how to proceed. (a) True (b) False

79. Mountain resembles least: (a) Hill, (b) Lake.

80. People say that I drive myself hard. (a) True (b) False

81. I would not enjoy being a politician. (a) True (b) False

82. When I get angry, I am often ready to hit someone. (a) True (b) False

83. Most of the time, I feel at peace with the world. (a) True (b) False

84. Textures - such as wool, sand, wood - sometimes remind me of colors or music. (a) True (b) False

85. I often find it difficult to sleep at night. (a) True (b) False

86. I prefer working with people to working with things. (a) True (b) False

87. Of the following tow situations, I would like <u>least</u>: (a) Walking a mile when it's 15 degrees below zero, (b) Being near when a volcano erupts.

88. I am almost always treated fairly. (a) True (b) False

89. I would prefer to see: (a) Stricter observance of the Sabbath, (b) Greater freedom in regard to divorce.

90. I am very level-headed and always like to keep my feet on the ground. (a) True (b) False

91. I have at times eaten too much. (a) True (b) False

92. Sometimes I experience things as if they were doubly real. (a) True (b) False

93. It is very easy for me to see the bright side of things. (a) True (b) False

94. I am quite effective at talking people into things. (a) True (b) False

95. My mood often goes up and down. (a) True (b) False

96. I would not enjoy fighting a forest fire. (a) True (b) False

97. I admit that I sometimes take pleasure in hurting someone physically. (a) True (b) False

98. I often keep working on a problem long after others would have given up. (a) True (b) False

99. I have few or no close friends. (a) True (b) False

100. Most censorship of books and movies is a violation of free speech and should be abolished. (a) True (b) False

101. Anger is least like: (a) Happy, (b) Mad.

102. When I listen to music, I can get so caught up in it that I don't notice anything else. (a) True (b) False

103. I have had an awful lot of bad luck. (a) True (b) False

104. I am more likely to be fast and careless than to be slow and plodding. (a) True (b) False

105. I have a natural talent for influencing people. (a) True (b) False

106. Of the following tow situations, I would like <u>least</u>: (a) Having to walk around all day on a blistered foot, (b) Sleeping out an a camping trip in an area

where there are rattlesnakes.

107. I sometimes feel "just miserable" for no good reason. (a) True (b) False

108. I enjoy nearly every thing I do. (a) True (b) False

109. I consider it very important to have a good reputation in my community. (a) True (b) False

110. I try to work just hard enough to get by because I don't want to overdo it. (a) True (b) False

111. If I wish, I can imagine that my body is so heavy that I could not move it if I wanted to. (a) True (b) False

112. I can't help but enjoy it when someone I dislike makes a fool of herself/himself. (a) True (b) False

113. I am more of a "loner" than most people. (a) True (b) False

114. I have always been completely fair to others. (a) True (b) False

115. Rarely, if ever, do I do anything reckless. (a) True (b) False

116. I have personal enemies who would like to harm me. (a) True (b) False

117. I am not interested in obtaining positions of leadership. (a) True (b) False

118. I often have a feeling of unworthiness. (a) True (b) False

119. Of the following tow situation, I would like <u>least</u>: (a) Having a pilot announce that the plane has engine trouble and he may have to make an emergency landing, (b) Working a week in the fields digging potatoes.

120. I can often somehow sense the presence of another person before I actually see or hear her/him. (a) True (b) False

121. I very much dislike it when someone breaks accepted rules of good conduct. (a) True (b) False

122. Basically I am a happy person. (a) True (b) False

123. Dark is similar to: (a) Black, (b) Light.

124. I like to try difficult things. (a) True (b) False

125. It is very important to me that some people are concerned about me. (a) True (b) False

126. When I need one thing at the store, I get it without thinking about what else I may need soon. (a) True (b) False

127. I would rather turn the other cheek than retaliate (get even) when someone treats me badly. (a) True (b) False

128. It would be fun to explore an old deserted house at night. (a) True (b) False

129. People consider me forceful. (a) True (b) False

130. The crackle and flames of a wood fire stimulate my imagination. (a) True (b) False

131. Occasionally I have strong emotional moods - anxiety, anger, gaiety, etc. - that seem to arise without much real cause. (a) True (b) False

132. People who think primarily of their own happiness are very selfish. (a) True (b) False

133. I would have been more successful if people had not made things difficult for me. (a) True (b) False

134. I usually find ways to liven up my day. (a) True (b) False

135. I have at times been angry at someone. (a) True (b) False

136. I like hard work. (a) True (b) False

137. It is sometimes possible for me to be completely immersed in nature or in art and to feel as if my whole state of consciousness has somehow been temporarily altered. (a) True (b) False

138. I tend to value and follow a rational, "sensible"

approach to things. (a) True (b) False

139. Of the following tow situations, I would like least: (a) Being on a sailboat during a great storm at sea, (b) Having to stay home every night for two weeks with a sick relative.

140. I can often go a whole morning without wanting to speak to anyone. (a) True (b) False

141. I am easily startled by things that happen unexpectedly. (a) True (b) False

142. With a little effort, I can "wrap most people around my little finger". (a) True (b) False

143. I am ready for a fight when someone tries to take advantage of me. (a) True (b) False

144. The church has outgrown its usefulness and should be radically reformed or done away with. (a) True (b) False

145. Spider is a kind if: (a) Web, (b) Animal.

146. Different colors have distinctive and special meanings for me. (a) True (b) False

147. People often say mean things about me. (a) True (b) False

148. I have several pastimes or hobbies that are great fun. (a) True (b) False

149. I would enjoy trying to cross the ocean in a small but seaworthy sailboat. (a) True (b) False

150. I do not like to be the center of attention an a social occasion. (a) True (b) False

151. I often do things on the spur of the moment. (a) True (b) False

152. For me one of the most satisfying experiences is the warm feeling of being in a group of good friends. (a) True (b) False

153. In my work I have learned not to demand perfection of myself. (a) True (b) False

154. I am often nervous for no reason. (a) True (b) False

155. My parents' ideas of right and wrong have always proved to be best. (a) True (b) False

156. I am able to wander off into my own thoughts while doing a routine task and actually forget that I am doing the task, and then find a few minutes later that I have completed it. (a) True (b) False

157. I always tell the entire truth. (a) True (b) False

158. Sometimes I seem to enjoy hurting someone by saying something mean. (a) True (b) False

159. I seldom feel really happy. (a) True (b) False

160. Of the following two situation, I would like <u>least</u>: (a) Riding a long stretch of rapids in a canoe, (b) Waiting for someone who's late.

161. I feel that life has handed me a raw deal. (a) True (b) False

162. I generally rely on careful reasoning when making up my mind. (a) True (b) False

163. I usually do not like to be a "follower". (a) True (b) False

164. I can sometimes recollect certain past experiences in my life with such clarity and vividness that it is like living them again or almost so. (a) True (b) False

165. I often feel fed-up. (a) True (b) False

166. Even when I have done something very well, I usually demand that I do better next time. (a) True (b) False

167. I think people should observe moral laws more strictly than they do. (a) True (b) False

168. I prefer to work alone. (a) True (b) False

169. Blossom differs most from: (a) Apple, (b) Flower.

170. Most mornings the day ahead looks bright to me. (a) True (b) False

171. It might be fun learning to walk a tightrope. (a) True (b) False

172. I enjoy a good brawl. (a) True (b) False

173. Things that might seem meaningless to others often make sense to me. (a) True (b) False

174. When I am with someone else, I do most of the decision-making. (a) True (b) False

175. I sometimes get in a state of tension and turmoil as I think of the day's happenings. (a) True (b) False

176. I am often not as cautious as I should be. (a) True (b) False

177. I am disgusted by foul language. (a) True (b) False

178. I know that people have purposely spread false rumors about me. (a) True (b) False

179. Sometimes I am a bit lazy. (a) True (b) False

180. Some people say that I put my work ahead of too many other things. (a) True (b) False

181. I would rather have a house (a) in a friendly suburb, (b) alone in a deep woods.

182. When acting in a play, I think I could really feel the emotions of the character and "become" her/him for the time being, forgetting both myself and the audience. (a) True (b) False

183. Of the following two situations, I would like <u>least</u>: (a) Being at the circus when two lions suddenly get loose down in the ring, (b) Bringing my whole family to the circus and then not being able to get in because a clerk sold me tickets for the wrong night.

184. Most days I have moments of real fun or joy. (a) True (b) False

185. I get a kick out of really frightening someone. (a) True (b) False

186. Of the following two statements, I agree more with: (a) If a boy 6 or 7 years old lies or steals, he

should be punished severely; (b) Lying and stealing aren't very serious in boys aged 6 or 7.

187. I do not like to organize other people's activities. (a) True (b) False

188. I am often troubled by feelings of guilt. (a) True (b) False

189. Needle is least like: (a) Pin, (b) Thread.

190. My work is planned and organized in detail before it is begun. (a) True (b) False

191. My thoughts often don't occur as words but as visual images. (a) True (b) False

192. Most people stay friendly only as long as it is to their advantage. (a) True (b) False

193. Of the following tow situations, I would like least: (a) Having to drive alone for a day and a half without stopping for sleep because I stayed on my vacation too long, (b) Jumping from a third-story window into a fireman's net.

194. I often feel sort of lucky for no special reason. (a) True (b) False

195. If I have a problem, I like to work it out alone. (a) True (b) False

196. I am not a terribly ambitious person. (a) True (b) False

197. I am a better talker than a listener. (a) True (b) False

198. I would describe myself as a tense person. (a) True (b) False

199. No decent person could ever think of hurting a close friend or relative. (a) True (b) False

200. I often take delight in small things (like the five-pointed star shape that appears when you cut an apple across the core or the colors in soap bubbles). (a) True (b) False

201. Never in my whole life have I taken advantage of

anyone. (a) True (b) False

202. Sometimes I hit people who have done something to deserve it. (a) True (b) False

203. I often start projects with only a vague idea of what the end result will be. (a) True (b) False

204. I would not like to try skydiving. (a) True (b) False

205. People rarely try to take advantage of me. (a) True (b) False

206. I often take it upon myself to liven up a dull party. (a) True (b) False

207. When listening to organ music or other powerful music, I sometimes feel as if I am being lifted into the air. (a) True (b) False

208. It is easy for me to feel affection for a person. (a) True (b) False

209. Every day interesting and exciting things happen to me. (a) True (b) False

210. Of the following two statements, I agree more with: (a) Parents should ignore it when small children use naughty words, (b) Parents should punish small children when they use naughty words.

211. City is least like: (a) Town, (b) Park.

212. Minor setbacks occasionally irritate me too much. (a) True (b) False

213. I push myself to my limits. (a) True (b) False

214. People say that I am methodical (that I do things in a systematic manner). (a) True (b) False

215. Of the following two situations, I would like <u>least</u>: (a) Finding out my car was stolen when I don't have theft insurance, (b) Riding a runaway horse.

216. Sometimes I can change noise into music by the way I listen to it. (a) True (b) False

217. I would not hurt others to get what I want. (a) True

(b) False

218. On social occasions I usually allow others to dominate the conversation. (a) True (b) False

219. I have sometimes felt slightly hesitant about helping someone who asked me to. (a) True (b) False

220. I always make it a point when deciding anything to refer to the basic rules of right and wrong. (a) True (b) False

221. I am rather aloof and maintain distance between myself and others. (a) True (b) False

222. I get over a humiliating experience very quickly. (a) True (b) False

223. I find it really hard to give up on a project when it proves too difficult. (a) True (b) False

224. In my spare time, I usually find something interesting to do. (a) True (b) False

225. Of the following two situations, I would like <u>least</u>: (a) Being chosen as the "target" for a knife-throwing act, (b) Being sick to my stomach for 24 hours.

226. Several people would like to take away what success I have. (a) True (b) False

227. Some of my most vivid memories are called up by scents and smells. (a) True (b) False

228. I am a cautious person. (a) True (b) False

229. Sweet is most like: (a) Gentle, (b) Sour.

230. It is a pretty callous (unfeeling) person who does not feel love and gratitude toward her/his parents. (a) True (b) False

231. I am usually light-hearted. (a) True (b) False

232. I like to watch a good, vicious fight. (a) True (b) False

233. I am quite good at convincing others to see things my way. (a) True (b) False

234. I have often lost sleep over my worries. (a) True (b) False

235. Certain pieces of music remind me of pictures or moving patterns of color. (a) True (b) False

236. I am happiest when I see people most of the time. (a) True (b) False

237. I like (or would like) to dive off a high board. (a) True (b) False

238. My "friends" have often betrayed me. (a) True (b) False

239. I generally do not like to have detailed plans. (a) True (b) False

240. I see no point in spending time on a task that is probably too difficult. (a) True (b) False

241. I have never felt that I was better than someone else. (a) True (b) False

242. Of the following two statements, I agree more with: (a) No child should be permitted to strike her/his mother, (b) A mother should not be harsh with a small child who strikes her.

243. I often know what someone is going to say before he or she says it. (a) True (b) False

244. I would enjoy being a powerful executive or politician. (a) True (b) False

245. I worry about awful things that might happen. (a) True (b) False

246. I sometimes tease people rather mercilessly. (a) True (b) False

247. I feel pretty optimistic about my future. (a) True (b) False

248. Of the following tow situations, I would like <u>least</u>: (a) Tying up a truck full of newspapers for a paper sale, (b) Seeing a tornado cloud moving toward me when I'm driving in the country.

249. I tend to keep my problems to myself. (a) True

(b) False

250. I have often been lied to. (a) True (b) False

251. I often have "physical memories"; for example, after I've been swimming I may still feel as if I'm in the water. (a) True (b) False

252. Striving for excellence means more to me than almost anything else. (a) True (b) False

253. I dislike seeing religious authority overturned by so-called progress and logical reasoning. (a) True (b) False

254. Whenever I go out to have fun, I like to have a pretty good idea of what I'm going to do. (a) True (b) False

255. Cottage is most unlike: (a) Garden, (b) House.

256. For me Life is a great adventure. (a) True (b) False

257. I don't enjoy trying to convince people of something. (a) True (b) False

258. I have often felt listless and tired for no good reason. (a) True (b) False

259. Of the following two situations, I would like <u>least</u>: (a) Being in a flood, (b) Carrying a ton of coal from the backyard into the basement.

260. The sound of a voice can be so fascinating to me that I can just go on listening to it. (a) True (b) False

261. When people insult me, I try to get even. (a) True (b) False

262. Strict home discipline would prevent much of the crime in our society. (a) True (b) False

263. I often prefer not to have people around me. (a) True (b) False

264. I have occasionally felt discouraged about something. (a) True (b) False

265. People consider me a rather freewheeling and

spontaneous person. (a) True (b) False

266. I would describe myself as a pretty "strong" personality. (a) True (b) False

267. I like the kind of work that requires my close attention. (a) True (b) False

268. I know that certain people would enjoy it if I got hurt. (a) True (b) False

269. I would enjoy learning to handle poisonous snakes. (a) True (b) False

270. There are days when I'm "on edge" all of the time. (a) True (b) False

271. At times I somehow feel the presence of someone who is not physically there. (a) True (b) False

272. Quiet is similar to: (a) Loud, (b) Soft.

273. Without being conceited, I feel pretty good about myself. (a) True (b) False

274. Before I get into a new situation, I like to find out what I can expect from it. (a) True (b) False

275. I am not at all sorry to see many of the traditional values change. (a) True (b) False

276. Without close relationships with others, my life would not be nearly as enjoyable. (a) True (b) False

277. I could not feel happy about anybody's bad luck. (a) True (b) False

278. People seem naturally to turn to me when decisions have to be made. (a) True (b) False

279. Of the following two situations, I would like <u>least</u>: (a) Realizing the ice is unsafe when I'm standing in the middle of a frozen lake, (b) Finding that someone has slashed all four of my car tires.

280. Sometimes thoughts and images come to me without the slightest effort on my part. (a) True (b) False

281. I am too sensitive for my own good. (a) True (b) False

282. I don't like to do more than is really necessary in my work. (a) True (b) False

283. When people are friendly, they usually want something from me. (a) True (b) False

284. I find it very easy to enjoy life. (a) True (b) False

285. High moral standards are the most important thing parents can teach their children. (a) True (b) False

286. Never in my whole life have I wished for anything that I was not entitled to. (a) True (b) False

287. On social occasions, I don't particularly care to "run the show". (a) True (b) False

288. I find that different odors have different colors. (a) True (b) False

289. I often like to do the first thing that comes to my mind. (a) True (b) False

290. Of the following two situations, I would like <u>least</u>: (a) Being seasick every day for a week while on an ocean voyage, (b) Having to stand on the ledge of the 25th floor of a hotel because there's a fire in my room.

291. I could pull up my roots, leave my home, my parents, and my friends without suffering great regrets. (a) True (b) False

292. I sometimes change from happiness to sadness, or vice versa, without good reason. (a) True (b) False

293. Sometimes I just like to hit someone. (a) True (b) False

294. I set extremely high standards for myself in my work. (a) True (b) False

295. Carpet is most unlike: (a) Wool, (b) Rug.

296. I always seem to have something pleasant to look forward to. (a) True (b) False

297. I can be deeply moved by a sunset. (a) True

(b) False

298. Some people oppose me for no good reason. (a) True (b) False

299. I admire my parents in all important respects. (a) True (b) False

300. Of the following two situations, I would like <u>least</u>: (a) Burning my arm badly by leaning against a hot water pipe, (b) Swimming where sharks have been reported.

Appendix L

Please find all possible arrangements of these four letters and write them down.

A B C D

Appendix M

INFORMED CONSENT AGREEMENT

This project has been reviewed and approved by the Committee on Research with Human Subjects, in the Department of Psychology at Carleton University. It has been found to preserve the safeguards of subjects' privacy, welfare, and civil liberties.

I hereby agree to cooperate and participate in the research project entitled

Non-Causal Cognitive Patterns

conducted by Linda A. Johnston and supervised by Professor Nicholas P. Spanos of the Psychology Department at Carleton University. I have informed the investigator that I have no medical condition that would prohibit my participation in this project.

I acknowledge that, by participating in this study, I will be required to fill in a large battery of questionnaires in two scheduled sessions. I have been warned about the sensitivity of certain questions in this battery of questionnaires; namely, that some people might find certain questions offensive or disturbing.

I acknowledge that I have been informed about my participation in this experiment. I understand that data reported from this study will only pertain to group characteristics -- thereby protecting my individual privacy.

I understand that I have the freedom and right to withdraw from the study at any time, without question or reprimand by either the principal investigators or Carleton University.

_____ _____

Participant's Signature Date

_____

Principal Investigator

Appendix N

Debriefing Summary

The purpose of this experiment was to investigate the Magical Ideation Scale, a measure of "magical thinking" which includes beliefs in such phenomena as astrology, precognition, superstition, thought transmission and astral travel.

The researchers who developed and who are using the Magical Ideation Scale have not yet clearly shown what it is measuring - from non-causal thinking to a symptom of illness; multiple theories have been put forward concerning what it may predict. Longitudinal studies are ongoing to attempt to clarify these questions. My approach to the research you have just been involved in has been to hopefully demonstrate that high scorers on this scale may show a variety of healthy or unhealthy symptoms and that they are, in fact, likely to be imaginative individuals.

Participants in this study were pre-screened on this measure of magical thinking and were selected to participate in one of four groups - very high magical thinkers, moderately high magical thinkers, low magical thinkers, and a control group. A number of paper and pencil exercises were used to measure variables such as degree of imaginative thinking, roleplaying, anxiety, self-esteem, and various personality measures in the four groups. This study also gathered demographic information which will be used to attempt shed light on the childhood origins of magical thinking in adults.

Thank you for participating in this study. The data that we have collected, as a result of your cooperation, will be used to add to the investigative findings from other research laboratories in Canada, the United States, and Europe.

Participants who would like further clarification about this research are encouraged to leave a note for **Linda Johnston, part time graduate student**, in the **Deparment of Psychology** office, **Room B550 Loeb Building.**

If further questions concerning this research or ethical questions should arise, please contact:

Faculty Sponsor, Dr. N. Spanos	788-2682
Chair of Ethics Committee, Dr. C. Herdman	788-2689
Chair of Department of Psychology, Dr. W. Jones	788-2648

Appendix O

This questionnaire consists of 21 groups of statements. After reading each group of statements, circle the number (0, 1, 2, or 3) next to the one statement in each group which **best** describes the way you have been feeling the **past week, including today.** If several statements within a group seem to apply equally well, circle each one. **Be sure to read all the statements in each group before making your choice.**

1	0	I do not feel sad.
	1	I feel sad.
	2	I am sad all the time and I can't snap out of it.
	3	I am so sad or unhappy that I can't stand it.
2	0	I am not particularly discouraged about the future.
	1	I feel discouraged about the future.
	2	I feel I have nothing to look forward to.
	3	I feel that the future is hopeless and that things cannot improve.
3	0	I do not feel like a failure.
	1	I feel that I have failed more than the average person.
	2	As I look back on my life, all I can see is a lot of failures.
	3	I feel I am a complete failure as a person.
4	0	I get as much satisfaction out of things as I used to.
	1	I don't enjoy things the way I used to.
	2	I don't get real satisfaction out of anything anymore.
	3	I am dissatisfied or bored with everything.
5.	0	I don't feel particularly guilty.
	1	I feel guilty a good part of the time.
	2	I feel quite guilty most of the time.
	3	I feel guilty all of the time.
6.	0	I don't feel I am being punished.
	1	I feel I may be punished.
	2	I expect to be punished.
	3	I feel I am being punished.

7	0	I don't feel disappointed in myself.
	1	I am disappointed in myself.
	2	I am disgusted with myself.
	3	I hate myself.
8	0	I don't feel I am any worse than anybody else.
	1	I am critical of myself for my weaknesses or mistakes.
	2	I blame myself all the time for my faults.
	3	I blame myself for everything bad that happens.
9	0	I don't have any thoughts of killing myself.
	1	I have thoughts of killing myself, but I would not carry them out.
	2	I would like to kill myself.
	3	I would kill myself if I had the chance.
10	0	I don't cry any more than usual.
	1	I cry more now than I used to.
	2	I cry all the time now.
	3	I used to be able to cry, but now I can't cry even though I want to.
11	0	I am no more irritated now than I ever am.
	1	I get annoyed or irritated more easily than I used to.
	2	I feel irritated all the time now.
	3	I don't get irritated at all by the things that used to irritate me.
12	0	I have not lost interest in other people.
	1	I am less interested in other people than I used to be.
	2	I have lost most of my interest in other people.
	3	I have lost all of my interest in other people.
13	0	I make decisions about as well as I ever could.
	1	I put off making decisions more than I used to.
	2	I have greater difficulty in making decisions than before.
	3	I can't make decisions at all anymore.
14	0	I don't feel I look any worse than I used to.
	1	I am worried that I am looking old or unattractive.
	2	I feel that there are permanent changes in my appearance that make me look unattractive.
	3	I believe that I look ugly.

15 0 I can work about as well as before.
1 It takes an extra effort to get started at doing something.
2 I have to push myself very hard to do anything.
3 I can't do any work at all.

16 0 I can sleep as well as usual.
1 I don't sleep as well as I used to.
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
3 I wake up several hours earlier than I used to and cannot get back to sleep.

17 0 I don't get more tired than usual.
1 I get tired more easily than I used to.
2 I get tired from doing almost anything.
3 I am too tired to do anything.

18 0 My appetite is no worse than usual.
1 My appetite is not as good as it used to be.
2 My appetite is much worse now.
3 I have no appetite at all anymore.

19 0 I haven't lost much weight, if any, lately.
1 I have lost more than 5 pounds.
2 I have lost more than 10 pounds.
3 I have lost more than 15 pounds.

I am purposely trying to lose weight by eating less.
Yes _____ No _____

20 0 I am no more worried about my health than usual.
1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
2 I am very worried about physical problems and it's hard to think of much else.
3 I am so worried about my physical problems that I cannot think about anything else.

21 0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

Appendix P

This inventory consists of numbered statements. Read each statement and decide whether it is true as applied to you or false as applied to you. If a statement is TRUE or MOSTLY TRUE, as applied to you, circle the T. If a statement is FALSE or NOT USUALLY TRUE, as applied to you, circle the F. If a statement does not apply to you or if it is something you do not know about, choose no answer. Remember to give YOUR OWN opinion of yourself. Do not leave any blank spaces if you can avoid it.

1. I like mechanics magazines. T F

2. I have a good appetite. T F

3. I wake up fresh and rested most mornings. T F

4. I think I would like the work of a librarian. T F

5. I am easily awakened by noise. T F

6. My father is a good man, or (if your father is dead) my father was a good man. T F

7. I like to read newspaper articles on crime. T F

8. My hands and feet are usually warm enough. T F

9. My daily life is full of things that keep me interested. T F

10. I am about as able to work as I ever was. T F

11. There seems to be a lump in my throat much of the time. T F

12. My sex life is satisfactory. T F

13. People should try to understand their dreams and be guided by or take warning from them. T F

14. I enjoy detective or mystery stories. T F

15. I work under a great deal of tension. T F

16. Once in a while I think of things too bad to talk about. T F

17. I am sure I get a raw deal from life. T F

18. I am troubled by attacks of nausea and vomiting. T F

19. When I take a new job, I like to find out who it is important to be nice to. T F

20. I am very seldom troubled by constipation. T F

21. At times I have very much wanted to leave home. T F

22. No one seems to understand me. T F

23. At times I have fits of laughing and crying that I cannot control. T F

24. Evil spirits possess me at times. T F

25. I would like to be a singer. T F

26. I feel that it is certainly best to keep my mouth shut when I'm in trouble. T F

27. When people do me a wrong, I feel I should pay them back if I can, just for the principle of the thing. T F

28. I am bothered by an upset stomach several times a week. T F

29. At times I feel like swearing. T F

30. I have nightmares every few nights. T F

31. I find it hard to keep my mind on a task or job. T F

32. I have had very peculiar and strange experiences. T F

33. I seldom worry about my health. T F

34. I have never been in trouble because of my sex behavior. T F

35. Sometimes when I was young I stole things. T F

36. I have a cough most of the time. T F

37. At times I feel like smashing things. T F

38. I have had periods of days, weeks, or months when I couldn't take care of things because I couldn't "get going". T F

39. My sleep is fitful and disturbed. T F

40. Much of the time my head seems to hurt all over. T F

41. I do not always tell the truth. T F

42. If people had not had it in for me I would have been much more successful. T F

43. My judgment is better than it ever was. T F

44. Once a week or oftener I suddenly feel hot all over, without apparent cause. T F

45. I am in just as good physical health as most of my friends. T F

46. I prefer to pass by school friends, or people I know but have not seen for a long time, unless they speak to me first. T F

47. I am almost never bothered by pains over the heart or in my chest. T F

48. Most any time I would rather sit and daydream than to do anything else. T F

49. I am a very sociable person. T F

50. I have often had to take orders from someone who did not know as much as I did. T F

51. I do not read every editorial in the newspaper every day. T F

52. I have not lived the right kind of life. T F

53. Parts of my body often have feelings like burning, tingling, crawling, or like "going to sleep". T F

54. My family does not like the work I have chosen (or the work I intend to choose for my life work). T F

55. I sometimes keep on at a thing until others lose their patience with me. T F

56. I wish I could be as happy as others seem to be. T F

57. I hardly ever feel pain in the back of the neck. T F

58. I think a great many people exaggerate their misfortunes in order to gain the sympathy and help of others. T F

59. I am troubled by discomfort in the pit of my stomach every few days or oftener. T F

60. When I am with people, I am bothered by hearing very strange things. T F

61. I am an important person. T F

62. I have often wished I were a girl.(Or if you are a girl) I have never been sorry that I am a girl. T F

63. My feelings are not easily hurt. T F

64. I enjoy reading love stories. T F

65. Most of the time I feel blue. T F

66. It would be better if almost all laws were thrown away. T F

67. I like poetry. T F

68. I sometimes tease animals. T F

69. I think I would like the kind of work a forest ranger does. T F

70. I am easily downed in an argument. T F

71. These days I find it hard not to give up hope of amounting to something. T F

72. My soul sometimes leaves my body. T F

73. I am certainly lacking in self-confidence. T F

74. I would like to be a florist. T F

75. I usually feel that life is worth while. T F

76. It takes a lot of argument to convince most people of the truth. T F

77. Once in a while I put off until tomorrow what I ought to do today. T F

78. I am liked by most people who know me. T F

79. I do not mind being made fun of. T F

80. I would like to be a nurse. T F

81. I think most people would lie to get ahead. T F

82. I do many things that I regret afterwards (I regret things more or more often than others seem to). T F

83. I have very few quarrels with members of my family. T F

84. I was suspended from school one or more times for bad behavior. T F

85. At times I have a strong urge to do something harmful or shocking. T F

86. I like to go to parties and other affairs where there is lots of loud fun. T F

87. I have met problems so full of possibilities that I have been unable to make up my mind about them. T F

88. I believe women ought to have as much sexual freedom as men. T F

89. My hardest battles are with myself. T F

90. I love my father, or (if your father is dead) I loved my father. T F

91. I have little or no trouble with my muscles twitching or jumping. T F

92. I don't seem to care what happens to me. T F

93. Sometimes when I am not feeling well I am irritable. T F

94. Much of the time I feel as if I have done something wrong or evil. T F

95. I am happy most of the time. T F

96. I see things or animals or people around me that others do not see. T F

97. There seems to be a fullness in my head or nose most of the time. T F

98. Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right. T F

99. Someone has it in for me. T F

100. I have never done anything dangerous for the thrill of it. T F

101. Often I feel as if there is a tight band around my head. T F

102. I get angry sometimes. T F

103. I enjoy a race or game more when I bet on it. T F

104. Most people are honest chiefly because they are afraid of being caught. T F

105. In school I was sometimes sent to the principal for bad behavior. T F

106. My speech is the same as always (not faster or slower, no slurring or hoarseness). T F

107. My table manners are not quite as good at home as when I am out in company. T F

108. Anyone who is able and willing to work hard has a good chance of succeeding. T F

109. I seem to be about as capable and smart as most others around me. T F

110. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it. T F

111. I have a great deal of stomach trouble. T F

112. I like dramatics. T F

113. I know who is responsible for most of my troubles. T F

114. Sometimes I am strongly attracted by the personal articles of others such as shoes, gloves, etc., so that I want to handle or steal them though I have no use for them. T F

115. The sight of blood neither frightens me nor makes me sick. T F

116. Often I can't understand why I have been so irritable and grouchy. T F

117. I have never vomited blood or coughed up blood. T F

118. I do not worry about catching diseases. T F

119. I like collecting flowers or growing house plants. T F

120. I frequently find it necessary to stand up for what I think is right. T F

121. I have never indulged in any unusual sex practices. T F

122. At times my thoughts have raced ahead faster than I could speak them. T F

123. If I could get into a movie wothout paying and be sure I was not seen I would probably do it. T F

124. I often wonder what hidden reason another person may have for doing something nice for me. T F

125. I believe that my home life is as pleasant as that of most people I know. T F

126. I believe in law enforcement. T F

127. Criticism or scolding hurts me terribly. T F

128. I like to cook. T F

129. My conduct is largely controlled by the behavior of those around me. T F

130. I certainly feel useless at times. T F

131. When I was a child, I belonged to a group of friends that tried to be loyal through all kinds of trouble. T F

132. I believe in a life hereafter. T F

133. I would like to be a soldier. T F

134. At times I feel like picking a fist fight with someone. T F

135. I have often lost out on things because I couldn't make up my mind soon enough. T F

136. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important. T F

137. I used to keep a diary. T F

138. I believe I am being plotted against. T F

139. I would rather win than lose in a game. T F

140. Most nights I go to sleep without thoughts or ideas bothering me. T F

141. During the past few years I have been well most of the time. T F

142. I have never had a fit or convulsion. T F

143. I am neither gaining nor losing weight. T F

144. I believe I am being followed. T F

145. I feel that I have often been punished without cause. T F

146. I cry easily. T F

147. I cannot understand what I read as well as I used to. T F

148. I have never felt better in my life than I do now. T F

149. The top of my head sometimes feels tender. T F

150. Sometimes I feel as if I must injure either myself or someone else. T F

151. I resent having anyone trick me so cleverly that I have to admit I was fooled. T F

152. I do not tire quickly. T F

153. I like to know some important people because it makes me feel important. T F

154. I am afraid when I look down from a high place. T F

155. It wouldn't make me nervous if any members of my family got into trouble with the law. T F

156. I am never happy unless I am roaming or travelling around. T F

157. What others think of me does not bother me. T F

158. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things. T F

159. I have never had a fainting spell. T F

160. I liked school. T F

161. I frequently have to fight against showing that I am bashful. T F

162. Someone has been trying to poison me. T F

163. I do not have a great fear of snakes. T F

164. I seldom or never have dizzy spells. T F

165. My memory seems to be all right. T F

166. I am worried about sex. T F

167. I find it hard to make talk when I meet new people. T F

168. I have had periods in which I carried on activities without knowing later what I had been doing. T F

169. When I get bored I like to stir up some excitement. T F

170. I am afraid of losing my mind. T F

171. I am against giving money to beggars. T F

172. I frequently notice my hand shakes when I try to do something. T F

173. I can read a long while without tiring my eyes. T F

174. I like to study and read about things that I am working at. T F

175. I feel weak all over much of the time. T F

176. I have very few headaches. T F

177. My hands have not become clumsy or awkward. T F

178. Sometimes, when embarrassed, I break out in a sweat which annoys me greatly. T F

179. I have had no difficulty keeping my balance in walking. T F

180. There is something wrong with my mind. T F

181. I do not have spells of hay fever or asthma. T F

182. I have had attacks in which I could not control my movements or speech but in which I knew what was going on around me. T F

183. I do not like everyone I know. T F

184. I daydream very little. T F

185. I wish I were not so shy. T F

186. I am not afraid to handle money. T F

187. If I were a reporter I would very much like to report news of the theatre. T F

188. I enjoy many different kinds of play and recreation. T F

189. I like to flirt. T F

190. My people treat me more like a child than a grown-up. T F

191. I would like to be a journalist. T F

192. My mother is a good woman, or (if your mother is dead) my mother was a good woman. T F

193. In walking I am very careful to step over sidewalk cracks. T F

194. I have never had any breaking out on my skin that has worried me. T F

195. There is very little love and companionship in my family as compared to other homes. T F

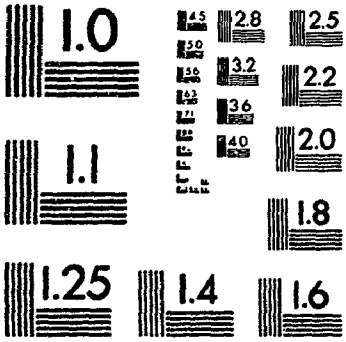
196. I frequently find myself worrying about something. T F

197. I think I would like the work of a building contractor. T F

198. I often hear voices without knowing where they come from. T F

4 of/de 4

PM-1 3½"x4" PHOTOGRAPHIC MICROCOPY TARGET
NBS 1010a ANSI/ISO #2 EQUIVALENT



199. I like science. T F

200. It is not hard for me to ask help from my friends even though I cannot return the favour. T F

201. I very much like hunting. T F

202. My parents have often objected to the kind of people I went around with. T F

203. I gossip a little at times. T F

204. My hearing is apparently as good as that of most people. T F

205. Some of my family have habits that bother and annoy me very much. T F

206. At times I feel that I can make up my mind with unusually great ease. T F

207. I would like to belong to several clubs. T F

208. I hardly ever notice my heart pounding and I am seldom short of breath. T F

209. I like to talk about sex. T F

210. I like to visit places where I have never been before. T F

211. I have been inspired to a program of life based on duty which I have since carefully followed. T F

212. I have at times stood in the way of people who were trying to do something, not because it amounted to much but because of the principle of the thing. T F

213. I get mad easily and then get over it soon. T F

214. I have been quite independent and free from family rule. T F

215. I brood a great deal. T F

216. Someone has been trying to rob me. T F

217. My relatives are nearly all in sympathy with me. T F

218. I have periods of such great restlessness that I cannot sit long in a chair. T F

219. I have been disappointed in love. T F

220. I never worry about my looks. T F

221. I dream frequently about things that are best kept to myself. T F

222. Children should be taught all the main facts of sex. T F

223. I believe I am no more nervous than most others. T F

224. I have few or no pains. T F

225. My way of doing things is apt to be misunderstood by others. T F

226. Sometimes without any reason or even when things are going wrong I feel excited happy, "on top of the world". T F

227. I don't blame people for trying to grab everything they can get in this world. T F

228. There are persons sho are trying to steal my thoughts and ideas. T F

229. I have had blank spells in which my activities were interrupted and I did not know what was going on around me. T F

230. I can be friendly with people who do things which I consider wrong. T F

231. I like to be with a crowd who plays jokes on one another. T F

232. Sometimes in elections I vote for people about whom I know very little. T F

233. I have difficulty in starting to do things. T F

234. I believe I am a condemned person. T F

235. I was a slow learner in school. T F

236. If I were an artist I would like to draw flowers. T F

237. It does not bother me that I am not better looking. T F

238. I sweat very easily even on cool days. T F

239. I am entirely self-confident. T F

240. At times it has been impossible for me to keep from stealing or shoplifting something. T F

241. It is safer to trust nobody. T F

242. Once a week or oftener I become very excited. T F

243. When in a group of people I have trouble thinking of the right things to talk about. T F

244. Something exciting will almost always pull me out of it when I am feeling low. T F

245. When I leave home I do not worry about whether the door is locked and the windows closed. T F

246. I believe my sins are unpardonable. T F

247. I have numbness in one or more places on my skin. T F

248. I do not blame a person for taking advantage of people who leave themselves open to it. T F

249. My eyesight is as good as it has been for years. T F

250. At times I have been so entertained by the cleverness of some criminals that I have hoped they would get away with it. T F

251. I have often felt that strangers were looking at me critically. T F

252. Everything tastes the same. T F

253. I drink an unusually large amount of water every day. T F

254. Most people make friends because friends are likely to be useful to them. T F

255. I do not often notice me ears ringing or buzzing. T F

256. Once in a while I feel hate toward members of my family whom I usually love. T F

257. If I were a reporter I would very much like to report sporting news. T F

258. I can sleep during the day but not at night. T F

259. I am sure I am being talked about. T F

260. Once in a while I laugh at a dirty joke. T F

261. I have very few fears compared to my friends. T F

262. In a group of people I would not be embarrassed to be called upon to start a discussion or give an opinion about something I know well. T F

263. I am always disgusted with the law when a criminal is freed through the arguments of a smart lawyer. T F

264. I have used alcohol excessively. T F

265. I am likely not to speak to people until they speak to me. T F

266. I have never been in trouble with the law. T F

267. I have periods in which I feel unusually cheerful without any special reason. T F

268. I wish I were not bothered by thoughts about sex. T F

269. If several people find themselves in trouble, the best thing for them to do is to agree upon a story and stick to it. T F

270. It does not bother me particularly to see animals suffer. T F

271. I think that I feel more intensely than most people do. T F

272. There never was a time in my life when I liked to play with dolls. T F

273. Life is a strain for me much of the time. T F

274. I am so touchy on some subjects that I can't talk about them. T F

275. In school I found it very hard to talk before the class. T F

276. I love my mother, or (if your mother is dead) I loved my mother. T F

277. Even when I am with people I feel lonely much of the time. T F

278. I get all the sympathy I should. T F

279. I refuse to play some games because I am not good at them. T F

280. I seem to make friends about as quickly as others do. T F

281. I dislike having people about me. T F

282. I have been told that I walk during sleep. T F

283. The person who provides temptation by leaving valuable property unprotected is about as much to blame for its theft as the one who steals it. T F

284. I think nearly anyone would tell a lie to keep out of trouble. T F

285. I am more sensitive than most other people. T F

286. Most people inwardly dislike putting themselves out to help other people. T F

287. Many of my dreams are about sex. T F

288. My parents and family find more fault with me than they should. T F

289. I am easily embarrassed. T F

290. I worry over money and business. T F

291. I have never been in love with anyone. T F

292. The things that some of my family have done frighten me. T F

293. I almost never dream. T F

294. My neck spots with red often. T F

295. I have never been paralysed or had any unusual weakness of any of my muscles. T F

296. Sometimes my voice leaves me or changes even though I have no cold. T F

297. My mother or father often made me obey even when I thought that it was unreasonable. T F

298. Peculiar odors come to me at times. T F

299. I cannot keep my mind on one thing. T F

300. I have reason for feeling jealous of one or more members of my family. T F

301. I feel anxiety about something or someone almost all the time. T F

302. I easily become impatient with people. T F

303. Most of the time I wish I were dead. T F

304. Sometimes I become so excited that I find it hard to get to sleep. T F

305. I have certainly had more than my share of things to worry about. T F

306. No ones cares much whats happens to you. T F

307. At times I hear so well it bothers me. T F

308. I forget right away what people say to me. T F

309. I usually have to stop and think before I act even in small matters. T F

310. Often I cross the street in order not to meet someone I see. T F

311. I often feel as if things were not real. T F

312. The only interesting part of newspapers is the "funnies". T F

313. I have a habit of counting things that are not important such as bulbs on an electric sign, and so forth. T F

314. I have no enemies who really wish to harm me. T F

315. I tend to be on my guard with people who are somewhat more friendly than I had expected. T F

316. I have strange and peculiar thoughts. T F

317. I get anxious and upset when I have to make a short trip away from home. T F

318. I usually expect to succeed in things I do. T F

319. I hear strange things when I am alone. T F

320. I have been afraid of things or people that I knew could not hurt me. T F

321. I have no dread of going into a room by myself where other people have already gathered and are talking. T F

322. I am afraid of using a knife or anything very sharp or pointed. T F

323. Sometimes I enjoy hurting persons I love. T F

324. I can easily make other people afraid of me, and sometimes do for the fun of it. T F

325. I have more trouble concentrating than others seem to have. T F

326. I have several times given up doing a thing because I thought too little of my ability. T F

327. Bad words, often terrible words, come into my mind and I cannot get rid of them. T F

328. Sometimes some unimportant thought will run through my mind and bother me for days. T F

329. Almost every day something happens to frighten me. T F

330. At times I am full of energy. T F

331. I am inclined to take things hard. T F

332. At times I have enjoyed being hurt by someone I loved. T F

333. People say insulting and vulgar things about me. T F

334. I feel uneasy indoors. T F

335. I am not unusually self-conscious. T F

336. Someone has control over my mind. T F

337. At parties I am more likely to sit by myself or with just one other person than to join in with the crowd. T F

338. People often disappoint me. T F

339. I have sometimes felt that difficulties were piling up so high that I could not overcome them. T F

340. I love to go to dances. T F

341. At periods my mind seems to work more slowly than usual. T F

342. While in trains, busses, etc., I often talk to strangers. T F

343. I enjoy children. T F

344. I enjoy gambling for small stakes. T F

345. If given the chance I could do some things that would be of great benefit to the world. T F

346. I have often met people who were supposed to be experts who were no better than I. T F

347. It makes me feel like a failure when I hear of the success of someone I know well. T F

348. I often think, "I wish I were a child again". T F

349. I am never happier than when alone. T F

350. If given the chance I would make a good leader of people. T F

351. I am embarrassed by dirty jokes. T F

352. People generally demand more respect for their own rights than they are willing to allow for others. T F

353. I enjoy social gatherings just to be with people. T F

354. I try to remember good stories to pass them on to other people. T F

355. At one or more times in my life I felt that someone was making me do things by hypnotizing me. T F

356. I find it hard to set aside a task that I have undertaken, even for a short time. T F

357. I am quite often not in on the gossip and talk of the group I belong to. T F

358. I have often found people jealous of my good ideas, just because they had not thought of them first. T F

359. I enjoy the excitement of a crowd. T F

360. I do not mind meeting strangers. T F

361. Someone has been trying to influence my mind. T F

362. I can remember "playing sick" to get out of doing something. T F

363. My worries seem to disappear when I get into a crowd of lively friends. T F

364. I feel like giving up quickly when things go wrong. T F

365. I like to let people know where I stand on things. T F

366. I have had periods when I felt so full of pep that sleep did not seem necessary for days at a time. T F

367. Whenever possible I avoid being in a crowd. T F

368. I shrink from facing a crisis or difficulty. T F

369. I am apt to pass up something I want to do when others feel that it isn't worth doing. T F

370. I like parties and socials. T F

371. I have often wished I were a member of the opposite sex. T F

372. I am not easily angered. T F

373. I have done some bad things in the past that I never tell anyone about. T F

374. Most people will use somewhat unfair means to get ahead in life. T F

375. It makes me nervous when people ask me personal questions. T F

376. I do not feel I can plan my own future. T F

377. I am not happy with myself the way I am. T F

378. I get angry when my friends or family give me advice on how to live my life. T F

379. I got many beatings when I was a child. T F

380. It bothers me when people say nice things about me. T F

381. I don't like hearing other people give their opinions about life. T F

382. I often have serious disagreements with people who are close to me. T F

383. When things get really bad, I know I can count on my family for help. T F

384. I liked playing "house" when I was a child. T F

385. I am not afraid of fire. T F

386. I have sometimes stayed away from another person because I feared doing or saying something that I might regret afterwards. T F

387. I can express my true feelings only when I drink. T F

388. I very seldom have spells of the blues. T F

389. I am often said to be hotheaded. T F

390. I wish I could get over worrying about things I have said that may have injured other people's feelings. T F

391. I feel unable to tell anyone all about myself. T F

392. Lightning is one of my fears. T F

393. I like to keep people guessing what I'm going to do next. T F

394. My plans have frequently seemed so full of difficulties that I have had to give them up. T F

395. I am afraid to be alone in the dark. T F

396. I have often felt bad about being misunderstood when trying to keep someone from making a mistake. T F

397. A windstorm terrifies me. T F

398. I frequently ask people for advice. T F

399. The future is too uncertain for a person to make serious plans. T F

400. Often, even though everything is going fine for me, I feel that I don't care about anything. T F

401. I have no fear of water. T F

402. I often must sleep over a matter before I decide what to do. T F

403. People have often misunderstood my intentions when I was trying to put them right and be helpful. T F

404. I have no trouble swallowing. T F

405. I am usually calm and not easily upset. T F

406. I would certainly enjoy beating criminals at their own game. T F

407. I deserve severe punishment for my sins. T F

408. I am apt to take disappointments so keenly that I can't put them out of my mind. T F

409. It bothers me to have someone watch me at work even though I know I can do it well. T F

410. I am often so annoyed when someone tries to get ahead of me in a line of people that I speak to that person about it. T F

411. At times I think I am no good at all. T F

412. When I was young I often did not go to school even when I should have gone. T F

413. One or more members of my family are very nervous. T F

414. I have at times had to be rough with people who were rude or annoying. T F

415. I worry quite a bit over possible misfortunes. T F

416. I have strong political opinions. T F

417. I would like to be an auto racer. T F

418. It is all right to get around the law if you don't actually break it. T F

419. There are certain people whom I dislike so much that I am inwardly pleased when they are catching it for something they have done. T F

420. It makes me nervous to have to wait. T F

421. I am apt to pass up something I want to do because others feel that I am not going about it in the right way. T F

422. I was fond of excitement when I was young. T F

423. I am often inclined to go out of my way to win a point with someone who has opposed me. T F

424. I am bothered by people outside, on the streets, in stores, etc., watching me. T F

425. The man who had most to do with me when I was a child (such as my father, stepfather, etc.) was very strict with me. T F

426. I used to like to play hopscotch and jump rope. T F

427. I have never seen a vision. T F

428. I have several times had a change of heart about my lifework. T F

429. Except by doctor's orders I never take drugs or sleeping pills. T F

430. I am often sorry because I am so irritable and grouchy. T F

431. In school my marks in classroom behavior were quite regularly bad. T F

432. I am fascinated by fire. T F

433. When I am cornered I tell that portion of the truth which is not likely to hurt me. T F

434. If I was in trouble with several friends who were as guilty as I was, I would rather take the whole blame than give them away. T F

435. I am often afraid of the dark. T F

436. When a man is with a woman he is usually thinking about things related to her sex. T F

437. I am usually very direct with people I am trying to correct or improve. T F

438. I dread the thought of an earthquake. T F

439. I readily become one hundred percent sold on a good idea. T F

440. I usually work things out for myself rather than get someone to show me how. T F

441. I am afraid of finding myself in a closet or small closed place. T F

442. I must admit that I have at times been worried beyond reason over something that really did not matter. T F

443. I do not try to cover up my poor opinion or pity of people so that they won't know how I feel. T F

444. I am a high-strung person. T F

445. I have frequently worked under people who seem to have things arranged so that they get credit for good work but are able to pass off mistakes onto those under them. T F

446. I sometimes find it hard to stick up for my rights because I am so reserved. T F

447. Dirt frightens or disgusts me. T F

448. I have a daydream life about which I do not tell other people. T F

449. Some of my family have quick tempers. T F

450. I cannot do anything well. T F

451. I often feel guilty because I pretend to feel more sorry about something than I really do. T F

452. I strongly defend my own opinions as a rule. T F

453. I have no fear of spiders. T F

454. The future seems hopeless to me. T F

455. The members of my family and my close relatives get along quite well. T F

456. I would like to wear expensive clothes. T F

457. People can pretty easily change my mind even when I have made a decision about something. T F

458. I am made nervous by certain animals. T F

459. I can stand as much pain as others can. T F

460. Several times I have been the last to give up trying to do a thing. T F

461. It makes me angry to have people hurry me. T F

463. Several times a week I feel as if something dreadful is about to happen. T F

464. I feel tired a good deal of the time. T F

465. I like repairing a door latch. T F

466. Sometimes I am sure that other people can tell what I am thinking. T F

467. I like to read about science. T F

468. I am afraid of being alone in a wide-open place. T F

469. I sometimes feel that I am about to go to pieces. T F

470. A large number of people are guilty of bad sexual conduct. T F

471. I have often been frightened in the middle of the night. T F

472. I am greatly bothered by forgetting where I put things. T F

473. The one to whom I was most attached and whom I most admired as a child was a woman (mother, sister, aunt, or other woman). T F

474. I like adventure stories better than romantic stories. T F

475. Often I get confused and forget what I want to say. T F

476. I am very awkward and clumsy. T F

477. I really like playing rough sports (such as football or soccer). T F

478. I hate my whole family. T F

479. Some people think it's hard to get to know me. T F

480. I spend most of my spare time by myself. T F

481. When people do something that makes me angry, I let them know how I feel about it. T F

482. I usually have a hard time deciding what to do. T F

483. People do not find me attractive. T F

484. People are not very kind to me. T F

485. I often feel that I'm not as good as other people. T F

486. I am very stubborn. T F

487. I have enjoyed using marijuana. T F

488. Mental illness is a sign of weakness. T F

489. I have a drug or alcohol problem. T F

490. Ghosts or spirits can influence people for good or bad. T F

491. I feel helpless when I have to make some important decisions. T F

492. I always try to be pleasant even when others are upset or critical. T F

493. When I have a problem it helps to talk it over with someone. T F

494. My main goals in life are within my reach. T F

495. I believe that people should keep personal problems to themselves. T F

496. I am not feeling much pressure or stress these days. T F

497. It bothers me greatly to think of making changes in my life. T F

498. My greatest problems are caused by the behavior of someone close to me. T F

499. I hate going to doctors even when I'm sick. T F

500. Although I am not happy with my life, there is nothing I can do about it now. T F

501. Talking over problems and worries with someone is often more helpful than taking drugs or medecine. T F

502. I have some habits that are really harmful. T F

503. When problems need to be solved, I usually let other people take charge. T F

504. I recognize several faults in myself that I will not be able to change. T F

505. I am so sick of what I have to do every day that I just want to get out of it all. T F

506. I have recently considered killing myself. T F

507. I often become very irritable when people interrupt my work. T F

508. I often feel I can read other people's minds. T F

509. Having to make important decisions makes me nervous. T F

510. Others tell me I eat too fast. T F

511. Once a week or more I get high or drunk. T F

512. I have had a trajic loss in my life that I know I'll never get over. T F

513. Sometimes I get so angry and upset I don't know what comes over me. T F

514. When people ask me to do something I have a hard time saying no. T F

515. I am never happier than when I am by myself. T F

516. My life is empty and meaningless. T F

517. I find it difficult to hold down a job. T F

518. I have made lots of bad mistakes in my life. T F

519. I get angry with myself for giving in to other people so much. T F

520. Lately I have thought a lot about killing myself. T F

521. I like making decisions and assigning jobs to others. T F

522. Even without my family I know there will always be someone there to take care of me. T F

523. At movies, restaurants, or sporting events, I hate to have to stand in line. T F

524. No one knows it but I have tried to kill myself. T F

525. Everything is going on too fast around me. T F

526. I know I am a burden to others. T F

527. After a bad day, I usually need a few drinks to relax. T F

528. Much of the trouble I am having is due to bad luck. T F

529. At times I can't seem to stop talking. T F

530. Sometimes I cut or injure myself on purpose without knowing why. T F

531. I work very long hours even though my job doesn't require this. T F

532. I usually feel better after a good cry. T F

533. I forget where I leave things. T F

534. If I could live my life over again, I would not change much. T F

535. I get very irritable when people I depend on don't get their work done on time. T F

536. If I get upset I'm sure to get a headache. T F

537. I like to drive a hard bargain. T F

538. Most men are unfaithful to their wives now and then. T F

539. Lately I have lost my desire to work out my problems. T F

540. I have gotten angry and broken furniture or dishes when I was drinking. T F

541. I work best when I have a definite deadline. T F

542. I have become so angry with someone that I have felt as if I would explode. T F

543. Terrible thoughts about my family come to me at times. T F

544. People tell me I have a problem with alcohol but I disagree. T F

545. I always have too little time to get things done. T F

546. My thoughts these days turn more and more to death and the life hereafter. T F

547. I often keep and save things that I will probably never use. T F

548. I've been so angry at times that I've hurt someone in a physical fight. T F

549. In everything I do lately I feel that I am being tested. T F

550. I have very little to do with my relatives now. T F

551. I sometimes seem to hear my thoughts being spoken out loud. T F

552. When I am sad, visiting with friends can always pull me out of it. T F

553. Much of what is happening to me now seems to have happened to me before. T F

554. When my life gets difficult, it makes me want to just give up. T F

555. I can't go into a dark room alone even in my own home. T F

556. I worry a great deal over money. T F

557. The man should be the head of the family. T F

558. The only place where I feel relaxed is in my own home. T F

559. The people I work with are not sympathetic with my problems. T F

560. I am satisfied with the amount of money I make. T F

561. I usually have enough energy to do my work. T F

562. It is hard for me to accept compliments. T F

563. In most marriages one or both partners are unhappy. T F

564. I almost never lose self-control. T F

565. It takes a great deal of effort for me to remember what people tell me these days. T F

566. When I am sad or blue, it is my work that suffers. T F

567. Most married couples don't show much affection for each other. T F

Appendix Q

The following are "syllogisms" each composed of two statements representing given facts or assumptions and a conclusion reached based on the two statements. In each case, you must assume that the 2 statements are true.

For the following syllogisms, some of the conclusions are valid (that is, absolutely true based on the 2 statements) and some are invalid (either false or not necessarily true based on the 2 statements).

For each syllogism, please circle either "valid" or "invalid" for the conclusion.

---

1. All textbooks are books intended for careful study.
   No sensational novels are textbooks.

   Therefore no sensational novels are books intended for careful study.

   valid / invalid

2. No poisonous things are nourishing foods.
   Some berries are not nourishing foods.

   Therefore some berries are poisonous things.

   valid / invalid

3. All departures from law are punishable offences.
   All things which happen by chance are departures from law.

   Therefore all things which happen by chance are punishable offences.

   valid / invalid

4. Some carbon compounds are exceedingly hard substances.
   All diamonds are carbon compounds.

   Therefore some diamonds are exceedingly hard substances.

   valid / invalid

5. No dogs of mixed breed are good hunters.
   Some dogs are good hunters.

   Therefore some dogs are not of mixed breed.

   valid / invalid

6. All chocolate eclairs are pastries.
Some fattening foods are not pastries.

Therefore all chocolate eclairs are fattening foods.

valid / invalid

7. Some snakes are not warm-blooded animals.
All snakes are reptiles.

Therefore no reptiles are warm-blooded animals.

valid / invalid

8. All men who see new patterns in familiar things are inventors.
All men who see new patterns in familiar things are eccentrics.

Therefore all inventors are eccentrics.

valid / invalid

9. All elephants which are natives of Australia are elephants.
All elephants which are natives of Australia are natives of Australia.

Therefore some elephants are natives of Australia.

valid / invalid

10. All projects which create an abundance of work are things which make for prosperity.
All acts of arson on a large scale are projects which create an abundance of work.

Therefore all acts of arson on a large scale are things which make for prosperity.

valid / invalid

Appendix R
Family Environment Scale

There are 90 statements in this questionnaire. They are statements about families. For the purposes of this questionnaire, you should imagine yourself as a child in your family with your parents. You are to decide which of these statements are true of your family and which are false. If you think the statement is **True** or **mostly True** of your family, circle T (true). If you think the statement is **False** or **mostly False** of your family, circle F (false).

---

1. T F Family members really help and support one another.

2. T F Family members often keep their feelings to themselves.

3. T F We fight a lot in our family.

4. T F We don't do things on our own very often in our family.

5. T F We feel it is important to be the best at whatever you do.

6. T F We often talk about political and social problems.

7. T F We spend most weekends and evenings at home.

8. T F Family members attend church, synagogue, or Sunday School fairly often.

9. T F Activities in our family are pretty carefully planned.

10. T F Family members are rarely ordered around.

11. T F We often seem to be killing time at home.

12. T F We say anything we want to around home.

13. T F Family members rarely become openly angry.

14. T F In our family, we are strongly encouraged to be independent.

15. T F Getting ahead in life is very important in our family.

16. T F We rarely go to lectures, plays or concerts.

17. T F Friends often come over for dinner or to visit.

18. T F We don't say prayers in our family.

19. T F We are generally very neat and orderly.

20. T F There are very few rules to follow in our family.

21. T F We put a lot of energy into what we do at home.

22. T F It's hard to "blow off steam" at home without upsetting somebody.

23. T F Family members sometimes get so angry they throw things.

24. T F We think things out for ourselves in our family.

25. T F How much money a person makes is not very important to us.

26. T F Learning about new and different things is very important in our family.

27. T F Nobody in our family is active in sports, Little League, bowling, etc.

28. T F We often talk about the religious meaning of Christmas, Passover, or other holidays.

29. T F It's often hard to find things when you need them in our household.

30. T F There is one family member who makes most of the decisions.

31. T F There is a feeling of togetherness in our family.

32. T F We tell each other about our personal problems.

33. T F Family members hardly ever lose their tempers.

34. T F We come and go as we want to in our family.

35. T F We believe in competition and "may the best man win".

36. T F We are not that interested in cultural activities.

37. T F We often go to movies, sports events, camping, etc.

38. T F We don't believe in heaven or hell.

39. T F Being on time is very important in our family.

40. T F There are set ways of doing things at home.

41. T F We rarely volunteer when something has to be done at home.

42. T F If we feel like doing something on the spur of the moment we often just pick up and go.

43. T F Family members often criticize each other.

44. T F There is very little privacy in our family.

45. T F We always strive to do things just a little better the next time.

46. T F We rarely have intellectual discussions.

47. T F Everyone in our family has a hobby or two.

48. T F Family members have strict ideas about what is right and wrong.

49. T F People change their minds often in our family.

50. T F There is a strong emphasis on following rules in our family.

51. T F Family members really back each other up.

52. T F Someone usually gets upset if you complain in our family.

53. T F Family members sometimes hit each other.

54. T F Family members almost always rely on themselves when a problem comes up.

55. T F Family members rarely worry about job promotions, school grades etc.

56. T F Someone in our family plays a musical instrument.

57. T F Family members are not very involved in recreational activities outside work or school.

58. T F We believe there are some things you just have to take on faith.

59. T F Family members make sure their rooms are neat.

60. T F Everyone has an equal say in family decisions.

61. T F There is very little group spirit in our family.

62. T F Money and paying bills is openly talked about in our family.

63. T F If there's a disagreement in our family, we try hard to smooth things over and keep the peace.

64. T F Family members strongly encourage each other to stand up for their rights.

65. T F In our family, we don't try that hard to succeed.

66. T F Family members often go to the library.

67. T F Family members sometimes attend courses or take lessons for some hobby or interest (outside of school).

68. T F In our family each person has different ideas about what is right and wrong.

69. T F Each person's duties are clearly defined in our family.

70. T F We can do whatever we want to in our family.

71. T F We really get along well with each other.

72. T F We are usually careful about what we say to each other.

73. T F Family members often try to one-up or out-do each other.

74. T F It's hard to be by yourself without hurting someone's feelings in our household.

75. T F "Work before play" is the rule in our family.

76. T F Watching TV is more important than reading in our family.

77. T F Family members go out a lot.

78. T F The Bible is a very important book in our home.

79. T F Money is not handled very carefully in our family.

80. T F Rules are pretty inflexible in our household.

81. T F There is plenty of time and attention for everyone in our family.

82. T F There are a lot of spontaneous discussions in our family.

83. T F In our family, we believe you don't ever get anywhere by raising your voice.

84. T F We are not really encouraged to speak up for ourselves in our family.

85. T F Family members are often compared with others as to how well they are doing at work or school.

86. T F Family members really like music, art and literature.

87. T F Our main form of entertainment is watching TV or listening to the radio.

88. T F Family members believe that if you sin you will be punished.

89. T F Dishes are usually done immediately after eating.

90. T F You can't get away with much in our family.

END

28·05·92

FIN