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The effects of intuition and introversion on the ability to create iconic mental images in adult populations

Bonnie A. Barlow
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THE EFFECTS OF INTUITION AND INTROVERSION ON THE ABILITY TO CREATE ICONIC MENTAL IMAGES IN ADULT POPULATIONS

BY

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THESIS

Submitted to the University of New Hampshire
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In
Counseling

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ABSTRACT

THE EFFECTS OF INTUITION AND INTROVERSION ON THE ABILITY TO CREATE ICONIC MENTAL IMAGES IN ADULT POPULATIONS

by

Bonnie A. Barlow

University of New Hampshire, May, 2010

This study investigates whether intuition and introversion can predict imagery ability, utilizing the Keirsey Temperament Sorter-II and the Sheehan's Shortened Form of the Betts Questionnaire on Mental Imagery. Interventions using imagery are commonly used across theoretical orientations. These interventions have been shown to be particularly powerful, but not effective with those who have low imaging ability. Predicting imaging ability allows counselors to prescribe interventions more effectively. ANOVA was performed on the data to determine if individuals identified as Introverted and Intuitive have a better ability to imagine than those who are identified as Extroverted and Sensing. Knowing this predictive quality, a counselor can be more effective in electing treatment interventions. For example, the use of imagery in reducing performance anxiety is only beneficial if the client is able to create clear images (Lazarus, 2004). The interaction effects were only significant for visual imagery, and not predictive enough to be useful in choosing counseling interventions.
CHAPTER I

INTRODUCTION

There is a movement in counseling to tailor treatment to the individual. Bayne has suggested that personality type can be a method used to determine the most acceptable form of therapy, and aid in the selection of intervention modality (Bayne, 1995, Erickson, 1993). Utilizing the information from type indicators to choose treatment modality can aid in the palatability and effectiveness of treatment plans, and intuition’s effect on the ability to create vivid mental images can help determine the best interventions for the client. Type indicators are widely used instruments. Bayne (1995) suggests that clients identified as “intuiting” would be attracted to imaginative approaches, whereas “sensing” types would have less tolerance. He suggests that the Extroversion-Introversion (E-I) and Sensing-Intuiting (S-N) dimensions from Jung’s typology are the most important in determining appropriate counseling interventions. Jung thought that introverts were drawn toward internal images as opposed to extroverts who are drawn to external stimuli (Tedford, 1977). The effect of the two personality dimensions of intuition and introversion on the seven image modalities can determine better interventions for these personality types.

Imagery is a very powerful psychotherapeutic tool. Dyckman (1978) found imagery to be more effective for people who are high imagers than people who are low imagers and found that low imagers gain little or no benefit from techniques that involve imagery. For some clients, the use of images is a critical part in the therapeutic process.
This may be, in part, because imagination is the mind's process for solving problems creatively. The "network model" is one of several models that strive to explain highly creative thinking that occurs in great discoveries such as those found by Einstein, Kerkule, Poincare, Bohr and Heisenberg. In brief, the network model works as follows:

"The urge to solve a problem serves to 'hold' it in the unconscious, where concepts from apparently disparate disciplines are combined by proper choice of mental image or metaphor to catalyze the nascent moment of creativity. Unconscious thought is not bound by constraints of logic, and facts and concepts can be combined in new and adventurous ways. This necessarily non-linear thought process occurs unconsciously and not necessarily in real time." (Miller, 2007, p.48)

This quote illustrates a preferred style of information processing that is found in subjects that score high in intuition. Intuitive people focus on possibilities, and have the fluidity of mind that enables them to willingly suspend disbelief. This allows them to combine seemingly disparate ideas. They are less concerned about what is than what might be. The author quotes the mathematician Henri Poincare, who describes scientific creativity as the "process in which the human mind seems to borrow least from the exterior world, in which it acts or appears to act, only by itself and on itself" (Miller, 2007). This is the preferred focus of those who score high on introversion, and it would be expected that introverts would have much more vivid images (Tedford & Penk, 1977). In this creative process, the brain uses parallel processing. Chapter two will discuss these
issues in more depth.

**Purpose of the Study**

The aim of this study is to determine the effectiveness of interventions that use imagery. By understanding what interventions are more appropriate to each client, the counseling process becomes more effective and efficient. This study queried the relationship between the personality dimensions of introversion and intuition of an individual, and the concurrent ability to create images. Further, it investigated the relationship between these two personality characteristics and the ability to create mental images. Does the population identified as introverted and intuitive have greater ability to create mental images? Is there a positive correlation between the clear preference for introversion and intuition and the ability to create mental images? Several studies suggest that personality characteristics may suggest preferred counseling orientation (Bayne, 1995).

Knowing techniques that are preferable to specific clients would be beneficial to counselors. Achieving insight into which clients can best benefit from these widely used and powerful techniques would be valuable to both counselors and clients. Efficiency in counseling is desirable in managing the resources of time, money and mental health benefits. Utilizing a technique that is comfortable and effective with a particular client is a potent and direct means to gaining client confidence and increasing client satisfaction, which will enhance the counselor-client relationship. Providing a preferred path to processing information can aid clients in feeling efficacious and at ease. This can gain the client's trust in that the counselor understands and values their focus and method of
gathering information. Individuals learn more quickly in their preferred element. Clients will be inclined to feel enthusiastic with a treatment that is compatible with their self-concept. This enthusiasm can be used to garner effort and support for the work of therapy. Success in therapy, through the use of a client's abilities and preferences, will aid in the development of self-efficacy. Counselors can use a client's gifts and preferences to help clients work with their weaknesses. This information could possibly add to the ease with which clients and counselors work together for positive change.

In chapter two, imagery, its definition and cognitive function is discussed first. Next, the function of imagery and its use by various theoretical orientations will be explored. Several therapeutic uses will be described, and the categories and qualities of imagery will be described. The historical uses and the effectiveness of these interventions are established. The utility of temperament sorters will be surveyed, and the association between imaging ability and other factors will be probed. The instruments used in the study will be evaluated in terms of validity, reliability and historical use. In chapter three, the sample will be described, and statistical methods stated.

**Definition of Terms**

Imagination – An internal process, which creates a sensory experience (Menzies, 2004), as demonstrated on the Shortened Form of Betts' Questionnaire Upon Mental Imagery.

Intuitions and Introversion – As defined by and demonstrated on the Kiersey Temperament Sorter. Introversion - reserved, quiet energized by solitary activity.
Intuition - a tendency towards introspection, making inferences, imagining, daydreaming, musing and wondering (Kiersey, 1998.)

**Problem Statement**

Interventions incorporating imagery are widely used across theoretical orientations. They have a significant place in the history of traditional psychotherapy, and are used to intervene in a wide variety of diagnoses and environments. These techniques have shown themselves to be effective, however they are only effective for individuals who are able to create vivid images. In contrast, some individuals have more successful outcomes through the use of interventions that feature imagery. There is a movement to tailor treatment to the client. Means to predict suitability of interventions are valuable. The literature suggests that personality type might be related to preference for counseling interventions. Imagery has been used to predict personality dimensions. Several descriptions of the characteristics of introversion and intuition suggest that they may predict imagery ability, but there has yet to be an actual study investigating this relationship.

It is conjectured that individuals with the combined personality factors of introversion and intuition will have higher imaging ability, and that there is a positive relationship between the factors of introversion and intuition with imaging ability.

Chapter 3 will describe in detail the quasi-experimental between group design, chosen for its ability to find differences between naturally occurring groups such as those who are introverted and intuiting in contrast to those who are extroverted and sensing. It will discuss the reasoning for drawing the sample from the population of students and 4-
H leaders, and explain the sample size chosen sample selection. It will describe the means by which the Betts Questionnaire on Mental Imagery (QMI) measures vividness of imagery and it will detail the validity and reliability of both the QMI and the Keirsey Temperament Sorter - II (KTS-II). It will explain the processes for obtaining, scoring and displaying the data. The appropriateness of the methods of data analysis to the nature of the collected data will be discussed. Hypothesis will be detailed, and ethical considerations will be discussed.

**Assumptions, Limitations and Scope of Study**

Assumption 1 - It may be difficult to determine the validity of results from a self-report, such as the QMI. Though it has been widely used, there have been concerns about its validity and the effect of supposed social desirability of vivid imaging ability. EEGs have shown a difference in brain wave activity in vivid imagers. This will be discussed in chapter 3. However, there is no way to tell if a participant is lying, or determine their ability to evaluate their images.

Assumption 2 - The determination of intuition and introversion can vary between instruments (Kiersey, 1998). Neurosis can affect the determination of both introversion and imaging ability (Stricklin, 1989).

Limitation 1 - The scope of this study only covers the vividness of imaging ability. It does not assess the control of imaging ability through personality. Control of imaging is another factor in the therapeutic outcomes of interventions that employ imagery.

Limitation 2 – The sample is not randomly chosen, and the conditions of each group cannot be randomly assigned. This makes it challenging to control for confounding
factors (Thomas, 2003).

Limitation 3 – The participants are from New England. The results of this study may not be generalizable to a more heterogeneous population.

**Significance of Study**

If the study reveals that imaging ability can be determined through personality dimensions, it could be a foundation for further research into the utility of these interventions with susceptible populations. These may be necessary interventions with some members of the population. These interventions have been used among therapists with varying theoretical orientations. These interventions have been used throughout history and have been found to be effective. This current study will use two common instruments, the Kiersey Temperament Sorter and the Betts' Questionnaire on Mental Imagery, to determine if there is a relationship between vividness of imagery and the personality characteristics of intuition and imagination.

The problem statement is that some individuals who cannot form mental images easily may not respond well to imaginative interventions. It is hypothesized that people who are both introverted and intuitive will be able to form the necessary mental images.

This study is querying the predictive ability of personality characteristics on imagery ability. Imagery has been frequently used throughout history, in most treatment types and in different settings, to address a diverse set of treatment goals. It is a well-tested intervention method based in the function of this faculty. It has been found that imaging ability affects the outcome of the treatment process, and can be measured by imagery questionnaires. The literature suggests that certain personality types may have
greater imaging ability, and may in fact be more successful with this type of intervention. The predictive ability of personality types has not yet been investigated.

The literature review will summarize articles relevant to these points.
CHAPTER II

REVIEW OF LITERATURE

This section reviews previous research relevant to the definition of imagery, its function, and the role it plays in therapy. The importance and value these techniques have played in history and into the present, across treatment theories, will be demonstrated. In order for these techniques to be effective in treatment, the quality of the imagery must be evaluated. The criterion for evaluating imagery quality based on previous literature will be explained. This will lead to the understanding of the necessity of imagery ability, and its variation in the population. Instrumentation used to measure this ability is described and evaluated, and imagery’s possible relationship to the personality characteristics of introversion and intuition are explored.

The utility of mental images in therapeutic techniques has been well documented. There are many functions and components to mental imagery, which are important to understand in order to apply these interventions diagnostically, skillfully and with informed intention. Individual ability to form mental images is critical for the success of these interventions. These abilities can vary greatly, and with that variation the power and utility of interventions that utilize imagery vary with that ability. Imagery techniques have been shown to be a powerful intervention among philosophical orientations and diagnoses. Despite different functions of use, the ability to create clear images is vital to the successful outcome of the intervention. Therapists who frequently include these interventions in their therapy will assess clients for image creation aptitude. Mental
imagery questionnaires such as the Betts Questionnaire on Mental Imagery have been developed in order to assess image clarity.

**History of Imagery**

The use of imagery in healing and development has been valued throughout history. Native American tribes, Hinduism, and traditional Chinese medicine have used guided imagery. (Utay & Miller, 2006) Investigators have studied mental processes at least since the time of Aristotle. William James was interested in the stream of consciousness. In the 1920's, the behaviorists denied the inner processes of the mind, and the study of mental processes was not revived until the cognitive scientists reopened the question. (Tedford & Penk, 1977)

Alternatively in France, Desoille developed his method of using imagery in therapy called *Methode du Reve Eveille Dirige* (1973). Desoille directed his patients to deep muscle relaxation. After the patient is assessed for imagery potential and level of freedom, Desoille directs his patient to one of six archetypes such as mother, father, infantile fears, conflicts, threatening figures and related Oedipal conflicts. He reports that as the clients experience affective catharsis and abreactions,? the unconscious reveals, changes and rearranges images. The difference between these techniques and daydreaming is that in daydreaming, anxious situations are avoided, whereas in these techniques the patient is encouraged to actively confront threatening images. The point of these exercises is to explore, confront and resolve inner conflict. The role of the therapist is to facilitate the flow of images, assist in consolidating images into themes, interpret themes and symbols and relate internal experiences to everyday life. (Schoettle,
In the industrial age, imagination and fantasy was thought to get in the way of production. In this era, behaviorism was in vogue. (Meier, 1984) In the 1940's, Jacob Moreno developed psychodrama as a way to externalize internal imagery. (Utay & Miller, 2006)

Imagery has been used to create self-awareness, control undesirable behaviors, treat illness, improve learning, reduce stress and enhance creativity and problem solving. (Witmer & Young, 1985a) It is said to connect cognitive, affective and somatic resources. It is used to learn and rehearse skills, problem solve and affect physiological responses. (Utay & Miller, 2006)

**Mental Image Definition and Components**

Understanding imagery’s components and function within the brain is important to understanding its power and utility in therapy, and how these interventions integrate within various treatment modalities. Imagery is defined as “a mental representation of a sensory or perceptual-like experience that occurs in the absence of the stimulus that would produce the genuine experience” (Witmer, 1985 p. 87). Mental imagery has three functions: mnemonic, which aids long term memory; elaborative, which forms an internal representation of the world; and self and creative, which allows the production of representations that do not physically exist (Gay, 2008).

**Function of Imagery**

Gay et al notes three mental functions of imagery: mnemonic, elaborative and creative. The mnemonic function allows perceptions to be stored in long-term memory.
The elaborative function allows internal representations of the world and of personal goals. The creative function combines stored perceptions to create new images (Gay et al., 2008).

Learning is the way that the mind takes in, processes, stores and utilizes information. Imagery is involved in several functions of learning. Imagery is involved in memory processes of encoding, storage and retrieval. Concrete words that can be visualized are easier to memorize than abstract word. Greek orators, who used the ‘method of loci’ to remember their speeches, recognized this fact. This type of encoding improves recall. Concrete word cues also aid in faster recall. It is hypothesized that concrete words provide more information for the formation of associations. Effective imagery techniques purposely focus on sensory data, and so they are similar to external events. Memory recall can be dependent on emotional state, and therefore more easily recalled when the current emotional state of the client matches the emotional state of the memory. (Arbuthnott et al., 2001)

Imagery’s function in the memory process may also help individuals acquire and retain information more effectively. Anderson and Kulhavy found that people learn more from reading a prose passage if they imagine the events in the passage. (Anderson & Kulhavy, 1972)

Because of imagery’s role in cognition, it affects mood. Many modern theorists see a role for imagery in anxiety production. If memories are encoded verbally, they are more malleable, but if they involve sensory images, they may be less easily modified using conscious means. Some researchers have connected sensory images and intrusive memories. (Dadds et al., 2004)
Function in Therapeutic Interventions

Various interventions utilize the imagery function for different purposes: reframing, image substitution, and image modification. Metaphors have been used in the production of mental images and facilitation of associative memories (Gay et al., 2008).

Imagination has been utilized for various functions: learning factual material and processes, mental rehearsal, planning, accessing intuitive models, solving problems and empowering clients. Meiers (????) likens imagery to a control program in software engineering. It determines information processing and output. These programs can be changed through training. He suggests that writing these imagery scripts are better than using a pre-packaged program, and he suggests a process to write these scripts. The first step is to analyze the current program in terms of outputs, processing and inputs. The second step is to determine what outputs, processing and inputs are desired. He says that these programs are image-driven. These images will determine the behavioral outputs. The third step is to create those images through scenarios. He says that the bio-computer must be re-loaded with the new program several times. While loading, effectiveness is increased if the mind is in a relaxed state. He also suggests journal writing as an adjunct to this conditioning. These images will exert an unconscious influence (Meier, 1984).

Witmer and Young list six functions of imagery in psychotherapy. They note that imagining an event is virtually the same as experiencing it. Through these means, the “there and then” can be transmuted to the “here and now.” Secondly, it can provide a source of motivation for behavior. Thirdly, according to Adlerian theory, early memories have created present attitude, beliefs and motives. Imagination is the pathway to these
early memories. Fourth, images are capable of creating affective states. Language is a better means of communication, but often meaning is lost. Fifth, images can control physiological states and may be the only means to control the autonomic nervous system. Sixth, images circumvent defenses and inhibitions and are able to produce behavioral changes without interpretation or insight. (Witmer & Young, 1985a)

There are three classes of imagery involved in counseling: eidetic, which are vivid images experienced in childhood; memory, images of everyday life; and imagination, images which can either occur spontaneously or through directed activity. Images elicited spontaneously can be a source of wisdom, solution for problems or inspirations to creativity. Directed images are consciously chosen. Guided imagery involves both types. The presenter provides the framework and the participant fills in the details (Witmer & Young, 1985b). Knowing how imagery functions in therapy aids in the understanding of its application and versatile use in therapy. This indicates its ubiquitous presence and value in therapy.

**Methods to Promote Quality Images in Therapy**

Imagery quality affects the effectiveness of interventions that employ them. There are four prerequisites for developing imagery ability. The first is readiness. Altered states of consciousness foster imagery development. There are four elements to physical and mental relaxation: a quiet place, comfortable position, a passive attitude and a focal point. The second prerequisite is vividness. The level of vividness is affected by the utilization of several sense modalities in the meditation, and the participant’s imagery ability. Concrete objects are more easily imaged than abstract images. These are likely
to appear spontaneously. Controllability is the third element in image quality. The ability to control and manipulate images is crucial to therapeutic effectiveness. Cueing through instructions will aid the participant in focusing on the process or desired outcome. Once the framework is established, the mind creates the scenario. The forth element is process images. This is the process or story that is to be worked through, such as a social scene for someone who has a social phobia. These elements are necessary for a positive outcome. (Witmer & Young, 1985b)

Method of Utilizing Images in Therapeutic Interventions

Qualitative methods of phenomenology reveal that problems have both content and organization. This orientation focuses on the stable sets of processes that structure human experience. In other words, these researchers observe regular sequences in different contexts. These patterns develop and maintain a worldview. These authors demonstrated that guided imagery can be used to reveal these patterns or cognitive maps. Imagery can be used to access and describe these approaches to acting in the environment. The phenomenological approach is an extension of Rogerian philosophy. Other theories also use imagery, such as the psychodynamic approaches of Freud and Jung. (Koziey & Andersen, 1990).

Imagery involves more than just observing images, but also working with them. These images are described as conative or emotional, and carry meaning. Positron emissions tomography (PET) scans and functional magnetic resonance imaging (fMRI) have shown that the prefrontal cortex, primary motor cortex supplementary motor area and cerebellum are utilized during imagined complex movements. It may also access the
limbic system or emotional center. The limbic system, working with the hypothalamus, affects the autonomic nervous system. This creates a feedback loop, and is able to create physiological and emotional responses. The effectiveness of these responses is dependent on the quality of the images. (Menzies & Taylor, 2004)

Dyckman and Cowan (1978) found that vividness of responses is significantly correlated with improvement in treatment -0.41 (p < 0.05). Imagery inventories are useful for screening out people with low image ability, but did not predict the success of people with other levels of ability.

**Evaluation of Images**

Understanding the types and quality of images can aid in focusing on the aspects of imagery that are integral in therapy, and in knowing how to evaluate images. Imagery can fall into several categories, as noted above. It can be either realistic or metaphorical (Dyckman & Cowan, 1978). It can also be spatial or iconic. Educational researchers have tended to categorize people as visualizers or verbalizers. Visualizers are said to process information through images, while verbalizers process information through words. There has been no evidence found to support those categories. Rather, it appears that there are two types of visualizers. The first group focuses on spatial information, such as spatial relationships between parts of an object and their location in space. Visual images refer to an object’s physical appearance, such as shape, size, color or brightness. People who primarily focus on visual images are iconic type visualizers. People who focus on spatial information are spatial type visualizers. (Kozhevnikov, Hegarty, & Mayer, 2002) The type of visualization that is used in imagery interventions is the iconic
or visual type. The meanings are more important than the spatial relationships. There is a temptation by some researchers to use instruments that measure spatial ability, because those instruments are more objective than self-assessed questionnaires, however they measure the wrong component of visual ability. (Hiscock, 1978) Analogue scales can be quicker to use, but less detailed in their results. (Quilter, Band, & Miller, 1999)

Control of imagery is the measure of an individual’s ability to manipulate images. One example of this is the ability to turn a three dimensional object in space. The most common test to evaluate this ability is the Gordon-Richardson test. Control of imagery is another factor that impacts the effectiveness of interventions (Tedford & Penk, 1977).

Vividness of imagery is the last and most important quality for this study. This quality is usually measured by the use of Betts' Questionnaire on Mental Imagery. Absorption is one measure of vividness of imagery. Absorption is the ability to immerse the self into an event. Vividness of imagery was found to be positively correlated with aversion learning. (Dadds et al., 2004).

**Power and Necessity of Images in Therapy**

Imagery is indeed a very powerful and possibly necessary intervention. These characteristics make this aspect of therapy valuable to study. In recent articles, the emphasis has been on its use in physical healing, in such maladies as cancer and chronic pain. (Arbuthnott et al., 2001) Meier says that imagery is the language of the deeper mind, and that it is an important function for the retrieval of information. It functions on many levels of experience simultaneously, and is the highest form of mental energy. He suggests that imagery is what binds the personality together, and has many uses. (Meier,
Gunnison suggests that therapies that are only working with the verbal rational functions are incomplete, and that effective counseling must involve both hemispheres. Some clients are unable to respond to verbal and linearly oriented therapies such as Rational Emotive Therapy (RET.) (Gunnison & Renick, 1985)

Investigators have found that techniques involving imagery can alter memories. This could be serious in the case of imagined abuse, and is contraindicated for cases in which a client may have to give legal testimony. The use of fantasy or metaphoric imagery is suggested in order to avoid these complications, because people use reality checking to formulate a hypothesis of reality based on the likelihood of an event actually happening. If imagery uses fantasy elements, such as dragons, clients are not likely to confuse the imagined event with a realistic event. (Arbuthnott et al., 2001)

The power of these techniques can present a danger, and understanding how they function in the mind can aid in understanding that power. In one study, subjects were asked to imagine breaking a toothpick several times. The subjects were asked to come back after several weeks and were asked if they had broken toothpicks. Some of the respondents believed that they had actually broken toothpicks rather than having imagined breaking toothpicks. The fantasy does not replace the actual memory, but is a competing memory. (Arbuthnott et al., 2001) This has led researchers to urge caution when using imaginal techniques with clients. People who are prone to absent-mindedness, fantasy and depersonalization are more easily affected by these techniques. These authors note the power of these interventions, and do not discourage their use, but caution respect for their potential danger. (Paddock et al., 1998)

Clients can use metaphorical events to explore experiences, without having to be
concerned about consequences. (Arbuthnott et al., 2001) Imagery can be used in place of *in vivo* experiences to produce strong conditioned responses (Dadds, Hawes, Schaefer, & Vaka, 2004). These aspects of imagination combine to form powerful interventions. Other researchers suggested that imagery is powerful because it allows us to explore ideas and situations. (Myrick & Myrick, 1993)

As with all powerful tools, there are some precautions to their use. First, imagery evokes sensory and emotional arousal. These feelings can overwhelm a client. Second, if the counselor tries to dictate images, or does not allow for the client to create images, these can inhibit the process of imagery. Third, clients may not be able to create images or may have a recurrent unmalleable image. These indicate areas of resistance. Lastly, hallucinating clients and children may not be able to be helped with imagery (Witmer & Young, 1985a).

Some psychotherapists warn that not only are these interventions powerful, but they are sometimes necessary. In order to confront emotions, counselors must be able to aid clients in accessing meaning of the emotions. This can be done through imagery, memories and dreams as well as emotions. They note that mental imagery is a parallel process to the verbal system. Clients with alexithymia have difficulty identifying feelings, describing feelings, imagining, and are literal, utilitarian and externally oriented. They think in terms of the daily usefulness of situations and are not drawn to meaning. It was found that alexithymics responded well to treatments involving a hypnotic imagery intervention. The researchers were not certain of the cause of the response, but posited that emotions may have been activated by the interventions. (Gay, Hanin, & Luminet, 2008)
These articles highlight the power, and sometimes the necessity of these interventions. Because of the power of these interventions, they have been utilized throughout history and are prevalent in therapies of diverse underlying philosophies. Several researchers have tried to trace the function and mechanisms of this powerful mental faculty

**Individual Differences in Imaging Ability**

Application of these techniques requires an understanding of when these treatment modalities are contraindicated. The ability to create vivid images is not uniform throughout the population, but significantly impacts the effectiveness of interventions that employ imagery. Women and older people tend to have more vivid imagery. However, men have greater ability in auditory imaging (White, Ashton, & Brown, 1977). It may be important to control for sex and age when looking at the effects of imaging ability.

The differences of imaging ability affect the outcome of interventions that use these modalities. In a study of the effective of imaging ability on the outcome of an intervention designed to reduce speech anxiety, researchers found that imagery ability did have a significant effect. They suggested that assessing this ability is critical to the success of therapy when considering these interventions. (Ayres, Hopf, & Ayres, 1994) Similarly, another study looked at two abilities’ effect on aversion, the vividness of imagery and absorption. Absorption is the ability to immerse the self into an event. Vividness of imagery was found to be positively correlated with aversion learning. (Dadds et al., 2004)
Modern Therapeutic Uses of Imagery

Interventions using imagery have been found useful throughout theoretical orientations. Along with Psychodynamic and Person-Centered therapies, Gestalt, behavioral and Cognitive therapies use imagery extensively in their interventions. Cognitive behaviorists use imagery to conceptualize problems for further change in life situations. (Tedford & Penk, 1977)

Imagery is used in almost every type of psychotherapy, because it is so effective. It has been used to treat stress, panic attacks, PTSD and bulimia. Brief psychodynamic therapies have used it to produce attainment of goals. Imagery has also been effective in altering moods and improving performance in motor skill tasks. Behaviorists use imagery to treat phobias and anxiety disorders. Cognitive therapists use it to treat stress, depression, phobias and chronic pain by accessing key beliefs and encouraging reformulations of experience. Imagery is used to segregate actors in internal conflicts by Gestalt therapists. They also use it to explore and access emotional themes and meanings of conflicts. These techniques have various purposes. Imagery is used to project and elaborate thoughts and feelings. This is particularly useful when a client exhibits kinesthetic symptoms. Secondly, it can be used to identify goals for change, such as when using the “miracle question” in solution focused therapy. The third function is to develop solutions or alter experiences. One means to doing that is though manipulation of imaginary objects or scenes. (Arbuthnott et al., 2001)

Psychodynamic/Experiential

Analytical Psychology has a particular focus on imagery. One of the main
interventions of Analytical Psychology is active imagination. Active imagination is both reflective of, and influenced by transference. This distinguishes it from expressive forms of therapy. Active imagination is “a means of mobilizing the psyche through an image or a chain of images and their related associations.” (Schaverien, 2006, p.128) In this type of intervention, one part of the mind is an active participant in fantasy, and the other is an observer. It was developed from the free association methods of psychoanalysis. The difference in the active imagination technique is that the patient is asked to select material and to follow it. The patient is then instructed to elaborate on the material. A myth or fairy tale may be used to amplify the material. This requires a willing suspension of disbelief. Active imagination may both express and embody transference. The depth of the metaphor is derived from the meaning. Active imagination provides lived mental events and is different from the surface activity of daydreaming. They are capable of activating the psyche to mobilizing. This material cannot be approached from direct verbal means, but must be enhanced by stories to amplify the metaphorical content of the dream. (Schaverien, 2006) This process has been used to treat several pathologies.

Laura Hill uses imagery in the form of fairy tales to treat bulimia. Hill points to Jung’s theories, and suggests that the use of nature in fairy tales is symbolic of the unconscious, and the animals represent unconscious instinct that obeys inner wisdom rather than reason. The counselor initiates the process of bringing the fairy tale into the present situation, by talking about the characters, having the client role play the character or using Gestalt interventions. (Hill, 1992)
Gunnison and Renick also use fantasy-imagery and relaxation techniques to treat bulimia. They see the source of effectiveness of these techniques as a connection to the right hemisphere of the brain. They observe that oftentimes, clients can recognize the irrationality of exaggerated negative thoughts and beliefs yet are not able to control them. They suggest that the difference between these clients and those for whom cognitive therapies are effective is that “part of the problem might be locked into the symbolic, nonlinear, nonverbal system often attributed to the right cerebral hemisphere.” (Gunnison & Renick, 1985, p. 79) Clients with bulimia often sense a loss of control. The Fantasy Relaxation Technique (FRT) developed by Gunnison allows the client to regain control. In this technique, the client opens a door to find a metaphorical image of a block, fear, self-image or worldview that is in association with the bulimia. The counselor avoids direction in this technique in order to allow the client to make her own meaning. The client describes the block in terms of the five senses. This creates a path to the symbolic mental systems. The next step is to manipulate the symbol. (Gunnison & Renick, 1985)

FRT contains the hazard mentioned above, the potential to create competing memories. By the fantastic and symbolic nature of FDT, it is not prone to this danger. Imagery is used to treat bulimia, because it enables the client to externalize problems and thereby avoid defenses and to reach the nonverbal, nonlinear systems of the mind (Gunnison & Renick, 1985).

Metaphoric imagery has also been used to promote weight control. In this procedure, the metaphor is used to access the symbolic meaning of fat to the client. These metaphors enable the client to take control of the situation, both consciously and
unconsciously, and are less threatening than overt methods. It is an effective method to confront resistance to weight loss. Often, clients do not experience themselves as thinner after weight loss. The new image of self can be affected through mental imagery. (Adams & Chadbourne, 1982)

Imagery was not found to be effective on mood change in one study. However, this study contained only ten subjects and lasted only three weeks. The other possibility is that subjects did not have sufficient control of imagery to manipulate the image sufficiently. (Gold, Jarvinen, & Teague, 1982)

Cognitive Behavioral Therapy

Though CBT has avoided discussions of the unconscious in the past, recently researchers have held that no successful therapy can ignore the unconscious. Several CBT techniques have used imagery, and may in fact utilize imagery to communicate with the unconscious. (Brink, 2006) CBT theorists hypothesize that the power of imagery results from the feeling of control in rehearsal of behaviors. It is a common intervention in cognitive behavioral therapies such as biofeedback, neurolinguistic programming, desensitization and counter conditioning, rational emotive behavior therapy, gestalt therapy and hypnosis. Imagery is used in these therapies to communicate, motivate, problem solve, or elicit intensified awareness. These functions can be further divided into three categories: evaluation or diagnostic, mental rehearsal, and therapeutic intervention. Images have been found to be an effective avenue to the discovery of core beliefs. Mental rehearsal can be used to reduce anxiety and also to reframe potentially painful and fear evoking medical procedures. Unfortunately protocols are unavailable
As stated above, imagery is commonly used in the behavioral technique of desensitization. It has been used with phobia of snakes. (Dyckman & Cowan, 1978) It has also been used in grief resolution therapy. In grief resolution therapy, guided imagery functions in allowing the client to relive, revise and revisit. (Melges & DeMaso, 1980)

Arnold Lazarus endorses the use of imagery in his Multimodal Behavioral approach in treating performance anxiety. In presented case study, Lazurus found that all of the props which a violinist utilized were iconic for the conflict involved in playing the violin. Lazarus was able to use these images to successively desensitize the concert violinist. (Lazarus & Abramovitz, 2004)

It has been used in smoking cessation programs. This was termed guided health imagery. Its purpose is to promote relaxation and behavioral changes. These techniques have been used before to promote exercise. One theory posits that molar imagery acts through a process.

As people become more aware of the image, they enter into a 'subjective transformation' and the image begins to possess higher-order cognitive, affective and somatic characteristics (molar imagery). Stored memories of past experiences and subsequent learning combine to aid interpretation and provide meaning to the entire imagery experience. As a result imagery affects physiological and psychological pathways between the cerebral cortex, autonomic nervous system and the reticular activating system (the seat of awareness and emotions.) (Wynd, 2005 pg.246).
These molar images create behavioral changes. This method induced behavior change in smoking. More than twice the number of people in the intervention group stopped smoking as opposed to the control group. (Wynd, 2005)

**Versatile Use in Various Settings and with Varying Diagnoses**

The technique of guided imagery has also been used in a school guidance counseling setting to address school challenges. It was found to be particularly useful with students who tend to daydream. These interventions can aid in academic achievement. (Myrick & Myrick, 1993) Another area that imagery has been effectively used is in the treatment of alexithymia. This study used fairy tales in hypnosis. Researchers found this intervention effective in lowering alexithymic scores. (Gay et al., 2008).

Imagery is used in numerous ways with different functions. Most theoretical orientations use some type of imagery thought their understanding, and use of this technique may differ. Some researchers suggest that imagery may provide a hinge between the various theories of psychotherapy. Imagery is used in various settings and to treat multiple mental diagnoses. The effectiveness of imagery in psychotherapy is dependent upon the type and quality of image. Imagery differs from hypnosis on several points. Guided imagery differs from hypnosis in that one's own will is not lessened. It does not rely on suggestion. It does not involve hallucination, dissociation, delusions or post hypnotic amnesia. (Joseph, 2004). Vividness of imagery and susceptibility to hypnosis is not related linearly (Perry, 1973).
Measurement

Betts Questionnaire

Vivid imagery ability has been found to have an effect on interventions that employ the use of imagery. For some people, the use of imagery may be more effective or even essential in therapy. Several researchers have called for more research on assessing the needs of clients.

The shortened version of Betts' Questionnaire on Mental Imagery (QMI) is so widely used that few researchers bother to report reliability and validity. Betts' QMI was a 150 question instrument developed in 1909. It was shortened by Sheehan, through the use of factor analysis, to 35 questions. Seven sensory type images are covered: visual, auditory, olfactory, tactile, gustatory, kinesthetic and organic. Subjects evaluate their subjective vividness of imagery on a seven point Likert scale. This allows a possible range of scores from five to thirty five on each of seven modalities. Total imagery scores range from 35 to 245. (Tedford & Penk, 1977) Quilter reports the internal consistency of the QMI at coefficient alpha 0.92. (Quilter et al., 1999) Ayres evaluates the QMI as the best available instrument to measure vividness of imagery with a reported coefficient alpha for reliability at 0.89. Sheehan found a 0.92 correlation between the shortened form and the original. He used this as a test of validity (SHEEHAN, 1967). It has also been found that perceived social desirability can contaminate the results of this self report. (Ashton & White, 1975)

Keirsey Temperament Sorter

The present study seeks to correlate the personality characteristics of introversion and intuition as measured on the Kiersey Temperament Sorter with level of imagery vividness
as found on the Shortened Betts' Questionnaire on Mental Imagery (QMI). The QMI, like the MBTI, is based on Jung's personality theories. The types on these instruments refer to autonomic versus controlled processes. The judging function indicates rational, controlled and effortful functions. Perceiving in contrast represents a tendency to manifest the autonomic functions. These are manifest most often in social interactions. Thinking and feeling are rational and reflective functions. Sensing and intuition are irrational autonomic functions. If a person is a judger, he will exhibit the functions of thinking and feeling. Yet if he is a perceiver, he will manifest the irrational functions of sensing and intuition. Intuition indicates an ability to go beyond the obvious and to explore possibilities. Thinking is related to analytical rather than holistic thought. Personality inventories try to predict social behavior. Social hypothesis are made using the irrational functions first, and then the rational functions are utilized. Judgers are less prone to rely on the first process than the second. These dimensions describe the way people process information. (Edwards, Lanning, & Hooker, 2002)

The Kiersey Temperament Sorter (KTSII) is available in paper form or on the Internet, it has been used by Francis (2008), and Varlami (2007). It has 70 items and takes about 15 minutes to administer. The correlation between the MBTI and the KTSII is between 0.60 and 0.78. Career counselors use both instruments for assessment. The reliability for the individual dimension scales are 0.78 EI, 0.79 SN, 0.70 TF and 0.73 JP. (Varlami & Bayne, 2007) Francis found a number of studies that supported the validity and reliability of the KTSII (Francis & Robbins, 2008; Francis, Craig, & Robbins, 2008)
Intuition and Imagination

Intuition and introversion affect the way that the mind focuses on, receives, and processes information. These mental processes in turn have an effect on the way individuals learn to make decisions and change the course of their lives.

Several studies have shown that these mental processes affect the functioning of individuals, such as a scientist's hypothesis, a cleric's preferred prayer style or a therapist's preferred theoretical orientation. Individuals tend to choose a way of investigating and integrating information that is more natural to them.

Personality Characteristics Influence Preferences in Thinking and Relating

Scientists

Reisberg et al found that scientists rely on intuition to form hypothesis before a preponderance of evidence is available. Scientists must form intuitive guesses called hypothesis as part of the scientific process. In this process, scientists take information from different realms of thought and experience to come up with their best guesses. The authors suggest that the scientist's different experiences account for their varying positions (Reisberg, Pearson, & Kosslyn, 2003).

Clergy

Francis and Robbins (2008) found a significant correlation between preferred prayer type and certain aspects of the psychological type, as found by the Kiersey temperament sorter. These researchers sought to extend the work of Michael and Norissey (1984) as found in their book *Prayer Temperament: Different Prayer Forms for Different Personality Types*. They utilized the four Keirsey Temperaments: Sensing Judging (SJ), Intuiting Feeling (NF), Sensing Perceiving (SP) and Intuiting Thinking
Keirsey categorized people first by how they gather information, observation (S) or abstraction (N). He further categorized each of these groups by the means which they make decisions rationally (T) or emotionally (F). Michael and Norissey intuitively applied the combinations of SJ, NF, SP and NT to traditional Christian forms of prayer. These types of prayer were categorized as (SJ), structured traditional prayers, (NF), application of Biblical reading to the individual’s life; (SP), praying through acts of service; and (NT), prayer through studying and striving for the truth. When these applications were tested by Ware, it was found that the only correlation significant was that NT’s preferred contemplative prayer. In contrast, Francis and Robbins investigated each dimension on the Kiersey Type Indicator individually. They found that there are predictable prayer preferences. Intuitives seek to immerse themselves in the Divine, through open ended types of prayer such as contemplation, rather than concrete types of prayer as embodied by concrete forms of prayer that utilize the senses, such as hymns, body movement and incense. Sensors focus on senses such as music or incense, and they prefer concrete forms of prayer. Thinkers pray through logical well-thought-out ideas. Feelers desire to be embraced by God. Judging types need structured prayer done within the structure of the day, whereas perceiving types pray when the mood strikes them. The developed scale needs to be improved, and the samples used need to be diversified. The alpha levels for reliability were not as strong for intuitive, sensing and thinking prayer. The alpha levels were below the recommended. By improving the items on the scale, the predictive ability for these preferences will be more reliable. However the categories found in this study were predictable from the temperament type as found on the Kiersey Temperament Sorter (Francis & Robbins,
The KTS-II has predictive quality for a personal lifestyle choice.

Counselors

Both the Kiersey Temperament Sorter and the MBTI have been correlated to counselor's preferred theoretical orientation. The first study done in 1993 by Erickson used the MBTI to predict counselor's preferred theoretical orientation. They found that counselors with a T preference endorsed a cognitive orientation. Counselors with a preference for feeling adopted the more affective orientations of Client-Centered and Gestalt therapies. The authors express concern that the counselor's preference may not be the client's preference, and that recent moves to a more eclectic stance recommend tailoring treatments to the client's preferences and needs (Erickson, 1993; Francis & Robbins, 2008).

The purpose of Erickson's study was to compare personality type with preferred counseling mode. This study was a development from a previous study that used descriptive percentages, rather than statistical significance. Erickson focused on the Thinking-Feeling dimension of the Myers-Briggs Type Inventory. Erickson's study used 23 subjects, who were administered the sort form of the MBTI and a survey ranking preferred counseling orientation. Erickson categorized the theories featured on the survey into two categories: those emphasizing the thinking function and those emphasizing the feeling function. Subjects were placed in one of the categories, based on their preference of theoretical orientation. A 2x2 chi-square was performed with MBTI scores. In a second analysis, the authors created a category for tied scores and performed a 3x2 chi-square. In the last analysis, psychoanalytic theory was removed from the rank order and a new weighted score was assigned. A further 3x2 chi-square analysis was
performed. Each analysis demonstrated that counselors scoring higher in the thinking function preferred cognitive counseling orientations, and counselors scoring higher in the feeling function preferred affective counseling orientations. Chi-square analysis is a non-parametric technique that is less powerful than parametric analysis. Further, it is based on rank ordering of counseling orientations rather than on scores from psychological instruments. The present study seeks to use parametric measures to achieve greater power and certainty in the findings.

The second study, done in 2007, used the Kiersey Temperament Sorter and noted that a discrepancy between orientation and philosophy lead to poor practice and dissatisfaction with the profession. This study indicates that people who score high on the SJ dimensions also prefer a Cognitive Behavioral Therapy orientation. People who score high on the N or ENFJ dimension prefer a psychodynamic orientation. Counselors who score high on the IP and particularly those whose type is INFP prefer a person-centered orientation. (Varlami & Bayne, 2007) Both of the articles recommend more research into the preferences of clients and the effect on treatment outcome.

Both the Kiersey Type Indicator and the MBTI have been used to predict preferences in prayer types and in counseling orientation. There needs to be some caution taken when trying to predict a large and complex preference, such as philosophical orientation or prayer style. More than natural preference can influence practice in either of the two realms. The four dimensions can interact to either enhance or diminish a natural attraction for a particular philosophy or practice. Along with the interaction of the four dimensions, acquired training is also a factor. In the case of the counselors, this takes the form of training and supervision, often influenced a counselor’s
philosophical orientation. The authors of the article on prayer styles noted that their sample was composed of newly ordained Anglican ministers. They noted that training probably was the biggest influence on practice, and that could have influenced preferred prayer styles more than a natural inclination.

**Levels of Imagery Predict Personality Characteristics.**

Several studies have used the Temperament scales to predict preferences. In one article, levels of imagery were used to predict personality on a Minnesota Multiphasic Personality Inventory (MMPI) in a female prison population. Previous attempts to correlate imagery with IQ or personality have not succeeded, because they failed to take gender into account. It was found that subjects who reported that they could control their visual imagery were found to score low in neurosis. These authors found that subjects who scored low on neurosis and high on extroversion had weak imagery. Subjects who scored low on neurosis and high on introversion experienced vivid imagery. The most vivid imagery was observed in subjects who scored high in extroversion and high in neurosis. These people also were diagnosed with hysteria. Subjects with high neurosis and high introversion had weak imagery and were found to have a diagnosis of Dysthymia. The people with a diagnosis of hysteria had the best imaging ability, followed by introverts with low neurosis, followed by dysthymsics and lastly extroverts with low neurosis.

In their study, Stricklin and Penk, strove to discover the relationship between imagery types and two personality dimensions: extroversion v. introversion and level of neurosis. The instruments used in their study were the Test of Visual Imagery Control,
the Vividness of Imagery Questionnaire and the MMPI (Minnesota Multiphasic Personality Inventory. The method of analysis used was Pearson r correlation between the three neurotic scales on the MMPI and control of imagery. A significant correlation was found between the Depression scale and the control of imagery score. ANOVA on unequaled cells were performed for the difference of vividness scores.

Next, subjects were divided into two groups based on their Social Introversion scores on the MMPI. ANOVA was used for total vividness and the seven vividness scores. Pearson r was done to find the correlation between the SI scale and total vividness, and each the seven modality scores of vividness. This was done for two groups of subjects based on their D scores.

Thirdly, four cells were created based on high and low scores on the Social Introversion and the Depression scales of the MMPI. This was done so that t statistics and LSD differences could be found for the four personality groups and vividness of imagery scores.

These methods are similar to the present study. However, the present study focuses on the basic personality components of Introversion and Intuition rather than on pathological characteristics of personality.

Given the information found in their study, Stricklin and Penk suggested that level of imagery can be used as an assessment tool to track change over time, and that content of imagery may be used to investigate the source of inner conflicts. Further, they denote that these findings support the work of Jung, who suggested that introversion was related to vivid thought processes while extroversion was linked to weak imagery. (Stricklin & Penk, 1980; Varlami & Bayne, 2007)
Introversion Associated With Vivid Imagery

Tedford and Penk also note that Jung described introverts as oriented towards internal images and would be expected to have more vivid images while extroverts are oriented towards objective conditions. They report that both people with dysthymia and hysteria have uncontrolled imagery or are unable to manipulate internal images. They found that dysthymics had vivid uncontrolled imagery and hysterics had weak uncontrolled imagery... This seems to contradict the first study, however they have added the element of imagery control, and that possibly affected the outcome of the study (Tedford and Penk, 1977).

These authors focus on the three variables of intelligence, vivid imagery and control of imagery. They focused on intelligence, because they noted that in mental deterioration, the capacity for abstract thinking declines. The authors thought that individuals with below average intelligence would have uncontrolled imagery. They found this to be true. In their article, Intelligence and Imagery in Personality, they combine IQ score and measures of imagery to try to predict personality. They administered the Shipley Hartford IQ test, Vividness of Imagery Scale and the Test of Visual Imagery to 100 subjects. They divided the subjects into two by their IQ scores; the first group (20 subjects) scored 100 or above and the second group scored 100 or below. One-way ANOVAs were applied to the control scores and each of the eight vividness scores. Using Pearson’s r the three sub-scores of the IQ test were correlated with each of the vividness scores and the control score. The subjects were also divided into three groups according to their control scores.

The authors found that control was positively correlated with higher IQ and
particularly with higher verbal IQ. They also found that subjects scoring low in control had weaker tactile imagery. In addition, the high control group also demonstrated higher vividness. MANOVA was performed on the seven vividness scores and the control scores using the IQ scores as the independent variable. A second MANOVA was done. In this analysis the seven vividness scores, verbal IQ and abstract IQ were used as the dependent variable and the control score was used for the independent or treatment variable. Neither of these was found to be significant. The authors suggest that the differences were masked by other variables. They found that individuals who had high vocabulary scores also tended to have higher control of imagery scores. These authors suggest that images could be used as agents of behavioral change. They posit that images may be some final common pathway of behavioral change, functioning as a way to alter internal imagery. They note that therapies as dissimilar as psychoanalysis, Gestalt and CBT use imagery. (Tedford & Penk, 1977)

They point out that “All hinge to a very great degree on the generation of some type of imaginal experience by the patient” (p. 412). They further suggest that the category types might be used to replace current diagnostic labels. They suggest reconstructing conceptualizations through the use of imagery content, and that imagery is a type of cognitive-affective interface implying that imagery may be a means to identifying the most effective type of therapy for an individual. (Tedford & Penk, 1977)

This study is similar to the present study, in that it endeavors to compare results from two different types of psychological testing in order to find a relationship. It is based on previous work that seeks qualities of individuals, which could both predict vulnerabilities to mental illness and the most effective means to treat those illnesses. The
cognitive processes focused on in the Tedford and Penk article are vividness and control of imagery and IQ scores. The present study returns to the questions of previous research, how does the cognitive processes of imagery vividness relate to personality traits. Similar analytical methods will be used to discover the possibility of a relationship between these factors.

Interventions that use imagery have been used over a long period of time, within different theoretical orientation and in different environments to attain a host of treatment goals. Its power is derived from its central functioning within the mind. Some researchers have suggested that this faculty unites many psychological theories. The value of these interventions, and their vulnerability to imaging ability, merit further query into evaluations and methods to predict with which client they will be successful. Several studies point out that the degree to which these interventions are successful is dependent upon the client’s ability to form vivid images. If the findings of this study are significant, it can contribute to the process of choosing which methods will be most successful for which clients. The literature record indicates that researchers have been investigating the correlation between personality and cognitive functions such as intelligence and imaging ability. This study seeks to add knowledge to this body of research.
CHAPTER III

PROCEDURES OF THE STUDY

Research Design

This is a quantitative study utilizing two instruments, a questionnaire and a temperament sorter. Data derived from these two instruments are used in a quasi-experimental between-groups design. The purpose of this study is to investigate whether individuals who are intuitive and introverted have better abilities to form mental images than those who are sensing and extroverted. The subjects are all adults from either the graduate population of a northern New England university or 4-H leaders. These participants completed the Kiersey Temperament Sorter to determine their types on the dimensions of Introverted-Extroverted and Intuitive-Sensing. They also took the Shortened Form of Betts' Questionnaire on Mental Imagery in order to contrast the vividness of imagery scores between extroverted sensing types and introverted intuiting types.

Stricklin (1980) used a similar design to find the relationship between vividness of imagery and two personality dimensions, extroversion/introversion and depression as measured on the MMPI. In the first, one-way ANOVA s were computed comparing the extroversion/introversion scale, total vividness and each of the seven vividness dimensions. Next, subjects were divided into high and low scoring groups on both the extroversion/introversion scale and on the depression scale. This created four cells.
Third, Pearson r was correlated between the introversion scale and total vividness and each modality of vividness was analyzed for the two groups of high and low scorers on the depression scale. Results indicated a positive correlation between low scorers on the depression scale and olfactory vividness. They also found that for subjects scoring high on the depression scale there was a negative correlation between introversion and tactual, gustatory, olfactory, organic and total imagery. ANOVA was applied with two groups, divided by high and low scores on the depression scale. The purpose of using the ANOVA was to find the differences between personality groups' ability to form images. They found that introverts had better imaging ability than extroverts. The gustatory and olfactory modalities showed greater than expected differences (Stricklin, 1980). The method of presentation used in this journal article was used as a model for the presentation of data in this study.

Tedford (1977) also used ANOVAs to compare intelligence scores with the seven vividness scores of the Shortened Betts Questionnaire. These researchers were looking for the difference in imagery ability between high and low IQ scorers. They also found that individuals might have a proneness to extroversion, introversion or neuroticism based on their IQ and imagery scores.

ANOVA was used to determine the differences in scores on life satisfaction instruments between extroverted and introverted, sensing and intuiting, thinking and feeling, and judging and perceiving type individuals (Harrington, 2001).

These three studies are the most similar in the literature to the present study, and appear to be sound methods for addressing the research question. Thomas (2003) suggests that this is the type of design used when experimental factors cannot be
Manipulated, such as personality characteristics (i.e. intuition, introversion).

Individuals cannot be randomly assigned to personality characteristics. Quasi-experimental design seems to be the best fit for this type of investigation.

**Participants**

All participants were recruited from graduate counseling classes at a Northern New England university and from Northern New England 4-H leaders. The participants are all 18 and above. Their professors were requested to allow the students to take the instruments at the beginning of classes. The 4-H leaders were invited to take the questionnaires at a 4-H event. Taking the instruments was an optional activity offered at the event.

University students are the standard subjects that have been tested in the previous studies in the area of image ability and personality (Harrington, 2001, Stricklin, 1980, Tedford, 1977.) In using this population, continuity is provided and generalizations are more easily made between the findings of studies. College students were the group with which the Betts was developed (Betts, 1909). The 4-H Leader population was used in order to broaden out the population to which the study may be generalized.

The sample was self-selected in order to get the largest sample. The sample could have been more random if every other participant was chosen, but there would be fewer members in the sample. The goal sample size was 120 participants because there are four possible outcomes E-S, E-N, I-S and I-N. By having 120 subjects there would have been more opportunities to capture the various types. The chosen pool of subjects was exhausted and the final sample population was 61. This is close to the sample size used
Tedford (1977) used 100 subjects and Betts (1909) used 145 for similar types of studies.
Harrington (2001) found that his sample contained more extroverts (61) than introverts
(36) and more feeling types (69) than thinking types (28). In choosing a larger sample
size it would have been more likely that there would have been a larger number of
introverts, however the statistical power was still sufficient at 0.80. Because the cells
were uneven, unweighted means were calculated. It was determined that no adjustment
was necessary.

In using graduate and 4-H leaders, the age range was widened. This population of
graduate students tends to be under age 30. It is also homogenous in education, culture,
etnicity, and social background. In using 4-H leaders, the population was more varied in
terms of background, age and education. The Betts took about 10 min. to administer, and
the Kiersey Temperament Sorter about 15 min.

**Instrumentation**

Sheehan's Betts Questionnaire on Mental Imagery

Originally developed in 1909 by George Betts, it is a questionnaire that assesses
the quality of an individual's mental imagery. In its initial form, it was comprised of 150
questions. These questions invite participants to imagine certain sensations and report on
the clarity of their imaginations on a scale of one to seven, one being perfectly clear and
seven being no image at all. It examines imagery in seven modalities: visual, auditory,
tactile, kinesthetic, gustatory, olfactory and organic.

In 1967, Sheehan shortened the test to 35 questions. Five questions in each
modality were selected through factorization. The new instrument was cross-validated
with the original. This new test takes ten minutes to administer, an improvement over the original, which took 55 minutes, while at the same time producing the same reliability. Participants answer the 35 questions. Scores can be totaled for each modality and the overall score. Modality scores range from one to five, one being clear imagery and five being no imagery. Range for the overall imagery assessment will range from 35 to 245. Low scores equal clearer imagery.

Assessing validity in questionnaires is difficult, because it is difficult to evaluate what a subject experiences in their mind. It has been suggested by Ashton (1975) that the Betts' QMI may be testing the social valuation of vivid imagery. Hiscock (1978) questioned what imagery questionnaires measured, and was able to find a correlation between imagery questionnaires. Morris (1974) and Marks (1995) investigated EEG reading of individuals taking questionnaires. The results of the EEG showed activation in the left posterior quarter of the posterior quadrant of the cortex. It has been found that suppression of the alpha rhythm indicates vividness of imagery. Patterns of occipital and sensory motor alpha activity indicate that the area in the brain associated with perception is activated during imagery formation. They found that vivid imagers had brain activity that differed from spatial thinkers. These researchers report, “there can be little doubt that such reports are valid descriptors of different mental experiences” (Marks, 1995).

Betts' QMI is commonly used when investigating personality characteristics (Striklin, 1980, Perry, 1973). It is commonly used to investigate other areas of imagery, such as differing abilities in women and men and by age (White, 1977). It is also used in clinical practice (Dadds, 2004 and Hopf, 1994, Dykman, 1978). Using an instrument that has been used in past temperament studies allow this new information to extend past
research. The participant will answer the 35 questions and the results will be tabulated for each modality and the overall imagery score.

Kersey Temperament Sorter

The Kersey Temperament Sorter (KTS) is a questionnaire that is available online and in paper and pencil form. It has 70 forced choice questions. Ten questions distinguish the orientation functions extroversion/introversion and 20 questions distinguish the two judging functions (sensing and intuition). Another twenty questions each assess thinking/feeling and judging/perceiving. Because there are even, it is possible that an individual could fall in the center of a score. In the online version, the test is scored and interpreted by computer. The category that a majority of the participant’s responses fall in is the descriptor for that participant. For example, if a person has made 11 choices in the intuitive category, that person will be described as intuitive.

Participants’ results were recorded in aggregate as means in table 1 and 2 in the results.

The purpose of KTS scores is to operationalize Jung's theory of types. Like the Myers-Briggs type indicator, it seeks to uncover the subject’s orientation to the world: extroversion/introversion, perceiving function sensing/intuiting, judging function thinking/feeling and attitude toward the outside world judging/perceiving. The KTS has good internal consistency. The Cronbach's alpha were reported as E-I(0.74), S-N (0.89), T-F(0.87), and J-P(0.88) (Waskel, 1991). Kelly (2001) found strong positive correlations between the KTS-II and the MBTI. The KTS-II has been shown to be compatible with the Eysenk Personality Questionnaire (Francis, 2008). The KTS-II has been used to study personality type and prayer type preference (Francis, 2008) and psychological type and counseling preferences (Varlami, 2007).
Procedures

The researcher proposed the study to the professors of several classes, as well as to the County Extension Educators and the organizers of the 4-H event. The study was conducted until all available subjects were tested. An informed consent notice was handed out to students with instruments. The students consent to participating by taking the instruments. The education students and 4-H leaders were asked to participate in the study. Those who were interested were given the instrument as well as an informed consent notice. Informed consent was defined and there was an opportunity for participants to ask questions. Participants were not told the purpose of the study, in order not to influence responses. They were told that the study concerns imagery ability and personality. Those who took the instrument were consenting to be a part of the study. Directions were given on taking the Betts QMI and the Kiersey. Participants took both instruments. The instruments did not have participants’ identifying information. Answer sheets were stored in a locked box. Scores were collated into a chart, which matched participants KTS-II with their Betts QMI scores.

Data Collection and Analysis

The Betts and the KTS-II both yielded normally distributed scale data. This allows parametric statistics to be considered in the analysis of the data. Parametric analyses are more powerful and precise than non-parametric analyses. In using parametric methods, the data was not compressed into groups. This allowed for more precision.

Two-way ANOVA is used when groups are compared based on two independent variables. The two independent variables in this study are degree of extroversion/
introversion and degree of sensing/intuititing compared with scores on the Betts QMI. ANOVAs were calculated, comparing these two independent variables and the overall Betts QMI score and these two independent variables and the scores for each modality of the Betts (Morgan, 2007).

Pearson correlation is commonly used to determine if there is a linear relation between two variables and the nature of that relationship. Correlations range from +1, indicating a positive relationship, and -1 indicating a negative relationship. Scatter plots are done to insure that the relationship between the data is linear. A box and whisker plot will be generated to identify outliers as possible influence on the correlation (Morgan, 2007). The relationship between variables was not linear and thus Pearson correlation is inappropriate.

**Statements of Hypothesis**

The following study is concerned with these three hypotheses.

**Hypothesis 1** - The group scoring above average on both introversion and intuition will have a different mean for imagery scores.

**Hypothesis 2** - Introversion and intuition are positively correlated with imagery ability.

**Hypothesis 3** - The group scoring higher on intuition will have a mean indicating greater ability to image on the Betts than the group which scores higher than average on sensing.
Procedures for Analyzing the Data

Step 1 - The participants completed both the Betts QMI and the KTS-II. The score sheets were collected in an envelope.

Step 2 - Data was coded according to the scores received on the Betts QMI 1-7 and the scores were reversed to reflect higher codes meaning more clear images. This would have enabled the correlation to be positive with higher scores on the E-I and S-N scales. A scoring group was coded from those who score better than average on introversion and intuition. A second group was coded for those who scored lower than average on the E-I and S-N scale. The average score on the Betts overall and seven modalities was calculated.

Step 3 - The results of the two instruments were entered onto a table, which included participant's KTS-II scores for E-I and S-N and the participant's scores for each to the Betts QMI.

Step 4 - Data were entered into the data editor of SPSS.

Step 5 - Two-way ANOVA was done to determine if there was a difference between the scores on the Betts of the group that scores more highly on introversion and intuition.

Step 6 - A scatter plot was generated in order to determine if the relationship between the E-I scale and the S-N scale was linear.

Step 7 - Pearson r was found for the E-I score and Betts total score and E-I with each modality score in order to assess the correlation between the E-I dimension and the overall imagery ability and imagery ability in each modality.
Ethical Considerations

Neither of the instruments are designed to assess pathology. None of the items on either instrument are inherently disturbing. The Betts QMI invites participants to imagine mundane experiences such as walking up the stairs or eating oranges. The KTS-II is online; the general public may take it without professional supervision or interpretation. The risk of participating in this study is no more than that found in general. No identifying information will be connected with gathered data and none of the data is potentially damaging. The data was reported in aggregate through means. The participants were informed about consent and given an opportunity to choose to participate. This project was reviewed by the Institutional Review Board of UNH and the letter of approval can be found in the appendix.

The defined research question of the imaging ability of introverted intuiting individuals versus that of extroverted sensing individuals merits further investigation based on the widespread use of interventions employing this faculty. The outcome of these powerful and valuable interventions is vulnerable to the client's ability to form images. By knowing the relationship between the personality dimensions of introversion and intuition with imaging ability, counselors will more effectively be able to use this tool with clients.
CHAPTER IV

RESULTS

Total imagination scores, and each of seven modal scores (Visual, auditory, tactile, gustatory, olfactory, kinesthetic and organic) on Sheehan's shortened form of the Bett's Questionnaire on Mental Imagery were subjected to a two-way analysis of variance, having two levels of introversion (high and low), and two levels of intuition (high and low). The total effects, and the effects for tactile, gustatory, olfactory, kinesthetic and organic were found to be statistically insignificant at an alpha level of 0.05 (see table 1 and 2.) The interactional effects of introversion and intuition on the visual modality were significant at the .05 level.

Table 1:

Total Vividness (Sheehan, 1967)

Mean Scores for Introversion, Extroversion, Intuition and Sensing

<table>
<thead>
<tr>
<th>Measure</th>
<th>Introversion</th>
<th>Extroversion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Scores</td>
<td>Mean Scores</td>
</tr>
<tr>
<td></td>
<td>(N=11, SD=27.59)</td>
<td>(N=16, SD=20.65)</td>
</tr>
<tr>
<td>Intuitive</td>
<td>201.36</td>
<td>194.31</td>
</tr>
<tr>
<td>Sensing</td>
<td>201.80</td>
<td>195.47</td>
</tr>
<tr>
<td></td>
<td>(N=15, SD=18.75)</td>
<td>(N=15, SD=38.83)</td>
</tr>
</tbody>
</table>
Table 2:
Analysis of Variance of Vividness (Sheehan, 1967) by Modality

<table>
<thead>
<tr>
<th>Measure</th>
<th>F (1, 53)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Vividness</td>
<td>0.002, P = 0.961 Interaction, NS</td>
</tr>
<tr>
<td>Visual</td>
<td>6.59, P = 0.013 Interaction, ( \eta^2 = 0.111 )</td>
</tr>
<tr>
<td>Auditory</td>
<td>0.638, P = 0.428 Interaction, NS</td>
</tr>
<tr>
<td>Tactile</td>
<td>0.248, P = 0.620 Interaction, NS</td>
</tr>
<tr>
<td>Gustatory</td>
<td>1.952, P = 0.168 Interaction, NS</td>
</tr>
<tr>
<td>Olfactory</td>
<td>0.544, P = 0.465 Interaction, NS</td>
</tr>
<tr>
<td>Kinesthetic</td>
<td>0.050, P = 0.824, Interaction, NS</td>
</tr>
<tr>
<td>Organic</td>
<td>0.002, P = 0.963 Interaction, NS</td>
</tr>
</tbody>
</table>

The main effect of Introversion on the total score yielded an F ratio of \( F(1, 53) = 0.002, P = .961 \). The strength of the relationship, as indexed by \( \eta^2 \), was 0.000.

The main effect of Intuition on the total score yielded an F ratio of \( F(1, 53) = 0.012, P = .914 \). The strength of the relationship as indexed by \( \eta^2 \), was 0.001.

The interaction effect on the total score yielded an F ratio of, \( F(1, 53) = 0.827, P = .367 \). The strength of the relationship as indexed by \( \eta^2 \), was 0.015.

The main effect of introversion on the visual score yielded an F ratio of \( F(1, 53) = 0.686, P = .411 \). The strength of the relationship as indexed by \( \eta^2 \), was 0.013.

The main effect for intuition on the visual score yielded an F ratio of \( F(1, 53) = 0.532, P = .470 \). The strength of the relationship as indexed by \( \eta^2 \), was 0.017.

The interaction effect on the visual score yielded an F ratio of \( F(1, 53) = 6.60, \)
The strength of the relationship as indexed by $\eta^2$, was 0.087. The strength of the relationship, as measured by $\eta^2$, was 0.111 (a small effect), and Adjusted R squared was 0.090. This indicates that only 9% of the variance in means of imagination is accounted for by an interactional difference in intuition and imagination scores. The profile plots intersect, indicating an interaction, even though it is small. The means were compared to establish the nature of the relationship (Jacquard, 2002.) The mean of the interactional effect introversion-intuition was compared with introversion-sensing, 29.7-28=1.7. The interaction of introversion and intuition predicts a small amount of difference in visual imagination ability scores. The interaction of introversion and intuition was compared to extroversion and intuition, 29.7-26.1=3.8. This indicates a slightly greater ability to predict visual imagination ability. However, when the means for introversion and intuition are compared against extroversion and sensing, there is a slightly negative effect. 27.9-29.7=-1.8. This indicates that as these two personality factors combine and become more extreme, they are more predictive of visual imagination ability. Indeed, when the graph is observed it is u shaped. As the two personality characteristics combine in a more extreme way, the means on visual imagination ability increases. As the score on the two characteristics become more even, the ability decreases. This interaction was significant; the means on the visual scores were observed (Table 3.) It appears that as introversion and intuition increase together, there is a slight increase in the score for visual imagination ability.
Table 3:
Means on Visual Scores (Sheehan, 1967)

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 3 Sum of Square</th>
<th>Df</th>
<th>F</th>
<th>Sig</th>
<th>Partial eta²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introvert Level</td>
<td>11.12</td>
<td>1,53</td>
<td>0.686</td>
<td>0.411</td>
<td>0.013</td>
</tr>
<tr>
<td>Intuitive Level</td>
<td>15.00</td>
<td>1,53</td>
<td>0.932</td>
<td>0.339</td>
<td>0.017</td>
</tr>
<tr>
<td>Introvert * Intuitive Level</td>
<td>106.87</td>
<td>1,53</td>
<td>6.595</td>
<td>0.013</td>
<td>0.111</td>
</tr>
</tbody>
</table>

Demographics

Out of 61 subjects administered the instrument, 4 didn’t complete them. In total data from 57 subjects was used. Of the 31 subjects that were found to be extroverted, 15 were found to be sensing and 16 were found to be intuitive. Introverted subjects numbered 26. Of those, 15 were sensing and 11 were intuitive. Uneven cells violate the assumption of a two-way between subjects univariate ANOVA. In order to ameliorate the situation, Estimated Marginal Means were calculated. These tests indicated that no adjustment was needed.

Hypothesis

Hypothesis 1- The group scoring above average on intuition and extroversion did not have a different mean for imagery scores. The F needed to reach 4.03, for an alpha level of .05 and a sample size of 57. This group’s calculated F was .827, this was not significant.
Hypothesis 2 - The hypothesis that Introversion and Intuition are positively correlated with imagery ability was not able to be tested, because when the scatter plot was generated, the relationship was not linear so there was no significant correlation.

Hypothesis 3 – The group scoring higher on intuition will have a mean indicating greater ability to image on the Betts than the group which scores higher than average on sensing. No significant difference was found between the average on the Betts of individuals scoring higher in intuition than in sensing.
CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

Summary

The purpose of this study was to investigate the ability of the personality factors intuition and introversion to predict ability to imagine. These personality factors, introversion and intuition, were measured using the KTS, and the measures on the ability to imagine were generated on Sheehan’s Shortened Form of Bett’s Questionnaire on Mental Imagery. The derived data was analyzed through the use of two-way between subjects univariate analysis of variance. The main effects of intuition and introversion on the imagination scores and the combined interactional effects of introversion and intuition on the imagination scores were observed through the use of two-way between subjects ANOVA. In addition, the differences between means on the imagination score for those scoring highly on intuition were observed.

Subjects were 4-H leaders from Rockingham County, and graduate students in the Education Department of the University of New Hampshire. Several factors may have contributed to the ambiguity of the results. First, the F test is robust in regards to violations of normality and homogeneity of variance. Levine’s test was not significant for inequality of variance $p=.799$. If the sample size in each cell had been 20 or greater, the F test would become robust to violations of the assumptions (Jacquard, 2002). In addition, had each of the cell sizes been equal, the unweighted means would not have had
to been relied upon. When sample sizes are unequal it causes a relationship between variables, because some of the variability in the dependent variable may be attributed to the wrong factor. This occurs, because the probability of an individual occurring in one category versus another is greater. The least squares analysis of variance did not indicate that unequal cells had an effect on the outcome.

**Limitations**

Increased sample size could have provided a test more robust to violations of the normality and variance assumptions. In a future study, cells could be made equal through elimination of additional subjects in areas of Extraversion and Sensing. The subjects could have been chosen more randomly, which would increase the validity of the test. Perhaps one could take every third subject, for example. If the $\eta^2$ for the interactional effect were 0.15 in the population and 0.15 in each of the independent variables, and the desired power is 0.80 according to Jacquard (2002), the least cell size needs to be 11. This is the cell size of Introversion-Intuition. These fortifications in the research design would make a clearer outcome. There did not appear to be any significant findings in any of the proposed hypothesis.

**Supplemental Findings**

The researcher investigated the interactional effects of introversion and intuition upon the seven modalities individually. When one of the imagination modalities was observed singly, a statistically significant yet weak effect appeared. As intuition and introversion increases together, it appears that the visual imaging ability increases slightly. The other modalities were not significant. This is a possible area for further
investigation with a stronger sample size and equal cell samples. However, it would not fit the purpose of this investigation, because the focus of this investigation is the ability to predict ability to imagine for the purpose of counseling interventions. The results of this study found that the interactional effect of introversion and intuition were only responsible for 11% of the variance, this is not enough effect to predict ability to imagine even in the visual domain through these personality characteristics. This may be a confound with age. Age was not an investigated factor. Other studies have found that neuroticism, and depression, have an effect on imagination scores (Stricklin, 1976 & 1980, Costello, 1957). This study did not control for these factors. Perhaps the observed effect is the result of co-occurring maladaption with more extreme scores on the personality characteristics. Jung (1990) suggested that as individuals mature and become whole, they develop more personality characteristics.

In addition, the factors of age, gender and neuroticism were not taken into account in this study. These factors have been found to confound effects on the ability to imagine (Tedford, 1977 & Stricklin 1978.) Future studies may find it instructive to control for these factors. It appears that other factors influence the ability to visually imagine more than Introversion and Intuition.

**Implications**

Personality is a complex construct that is difficult to reliably capture in statistics. Past studies have tried to correlate personality characteristics and ability to imagine with mixed results (Tedford, 1977 & Stricklin, 1978). From the present study, it seems relatively clear that the personality characteristics measured in the KTS do not
have an effect on overall ability to measure iconic images. They may have an
effect on other abilities to imagine. It appears that there may be a small effect on the
ability to create visual images. It may be worthwhile for further investigation for
purposes other than the usefulness of counseling imagination interventions with clients.
Perhaps a better question for future study would be, does higher scores on introversion
and intuition as measured on the KTS indicate a preference for interventions that employ
imagination?

Other investigators may be interested in further studying the weak interactional
effect found on visual imagination ability. This may have implications in explaining
propensity to dissociate or to experience visual hallucinations. It may be part of the
equation in finding factors that increase the likelihood that individuals may experience
this phenomenon. Other researchers have investigated the propensity to believe an
imagined experience was a real experience (Paddock, 1998.)

The present study was the first study to investigate the effects of these personality
characteristics on the ability to imagine. Future researchers will be able to use this study
as a framework to further investigation.

**Recommendations for Future Studies**

The recommendations that follow would further future research in this area and
use the present study as a foundation.

1. A replication of this study focusing on the interaction effects of intuition
   and introversion on the ability of visual imagination. The sample would
   be randomized to increase reliability. Sample cell sizes would be 20 or
greater and the cells would remain equal. Controlling for confounding variables of age, gender and neuroticism, might aid in developing a clearer picture of the interaction effect of introversion and intuition on the ability to create visual images.

2. A study that investigates the likelihood of experiencing dissociation or visual hallucinations as correlated to the personality characteristics of intuition and introversion.

3. An additional study investigating the interaction effect of introversion and intuition on the preference for counseling interventions that employ the imagination.

4. A study that investigates the effectiveness of counseling interventions with individuals scoring high on introversion and intuition as compared to those scoring high in extroversion and sensing.

5. The interaction effect of more extreme scores on the personality characteristics Introversion-Extroversion and Intuition-Sensing on visual imagination ability scores may prove valuable to understanding the effects of these characteristics on visual imagination ability.

6. A study might be devised to investigate the relationship between extreme scores on the KTS and maladaptation.
LIST OF REFERENCES


INSTITUTIONAL REVIEW BOARD APPROVAL

University of New Hampshire
Research Integrity Services, Office of Sponsored Research
Service Building, 51 College Road, Durham, NH 03824-3883
Fax: 603-862-3564

05-Nov-2009

Barlow, Bonnie A.
Education, Morrill Hall
107 Fordway Ext.
Derry, NH 03038

IRB #: 4702
Study: The Effects of Intuition and Introversion on Imagery
Approval Date: 05-Nov-2009

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study as Exempt as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 101(b). Approval is granted to conduct your study as described in your protocol.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, Responsibilities of Directors of Research Studies Involving Human Subjects. (This document is also available at http://www.unh.edu/osr/compliance/irb.html.) Please read this document carefully before commencing your work involving human subjects.

Upon completion of your study, please complete the enclosed Exempt Study Final Report form and return it to this office along with a report of your findings.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,
Julie F. Simpson
Manager

cc: File
Hebert, David
APPENDIX B

INFORMED CONSENT LETTER

My name is Bonnie A. Barlow. I am a graduate student in the Counseling program of the UNH Education Department.

In participating in this study, you will be given two psychological instruments. The Bett’s Questionnaire on Mental Imagery investigates an individual’s ability to create mental images, and the Kiersey Temperament Sorter determines personality types. Neither of the instruments determines mental illness, but instead explores the normal variability in personality and the ability to create images. Risks of participating in this study are minimal.

You will be given these two instruments. It will take approximately 25 minutes to complete both instruments. The results will remain anonymous, and all data collected will be kept confidential. Please do not write your name on the answer sheet. The two instruments will be linked through a participant number. The data will be reported in aggregate.

Participation in this study is voluntary. If you do not wish to participate, simply do not fill out the forms. You may refuse to answer any questions or stop participating at any time. By filling out the answer sheet you are giving your consent to participate.

By participating in this study you are adding to the educational field of knowledge. The knowledge gained from this study could potentially be used to develop educational
and counseling programs.

In the event that you have any questions about the study, please contact me through my email bbarlow@blackbear.biz or through the Counseling program in the Education Department at UNH.

If you have any questions about your rights as a research subject you may contact Julie Simpson in the UNH Office of Sponsored Research at 603-862-2003 or julie.simpson@unh.edu to discuss them.
APPENDIX C

LETTER TO PROFESSORS

Dear Professor/Instructor,

I am a Master of Arts degree student in the education department. I am currently working on my thesis and am in need of subjects. I am requesting to use students in your class. My thesis will explore the connection between the personality characteristics of intuition and introversion and their effects on a person’s ability to create mental images. I would administer two instruments: the Kiersey Temperament Sorter and the Bett’s Questionnaire on Mental Imagery. The Kiersey Temperament sorter is a Myers-Briggs style personality scale and the Questionnaire on Mental Imagery asks students about the vividness of their images, such as eating an orange. Neither of the scales investigates pathology or disturbing issues. The Kiersey can be taken on line without professional interpretation or supervision.

I estimate that the administration of the two instruments will take between 25-30 minutes. My email is bbarlow@blackbear.biz. Please contact me to let me know if it would be possible to use your students.

Thanks,

Bonnie A. Barlow
APPENDIX D

ANNOUNCEMENT TO 4-H LEADERS

Come help a long-time 4-H leader gather data for her thesis, and be involved in science. Bonnie Barlow-Turner is doing research for her thesis, and needs participants to volunteer for her study. She invites all adult 4-H leaders to participate in the study investigating imagination and personality. If you would like to participate, it will take about 25 minutes. You will be asked to take two questionnaires, one that investigates personality and one that tests your ability to form images.

Bonnie will be available this Friday Feb. 12 at the favorite foods festival at 6:30p.

Bonnie appreciates your help. - Thanks