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THE EFFECTS OF EXTRAVERSION AND NEUROTICISM ON SUBJECT'S
GRAPHIC EXPRESSIVE BEHAVIOUR AND PREFERENCES FOR GRAPHIC
STIMULI

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Much research has investigated the possibility of generalised personality dimensions, and two that have been most frequently demonstrated by factor-analytical studies are those of Extraversion-Introversion and Neuroticism-Stability. Physiological and perceptual research have produced evidence suggesting that extraverts have a higher sensory threshold than introverts, which probably causes behavioural differences between individuals at the extremes of the Extraversion-Introversion continuum. Other studies have indicated that Extraversion and Neuroticism may interact to produce overt behaviour that is contradictory to the behaviour that would be expected for an individual's recorded Extraversion level.

It is recognised that artists produce work with an individual "style", and its relationship with personality has been investigated. Also, the effect of works of art as perceived sensory stimuli has been examined and theories have evolved to explain the sensory arousal experienced with different types of stimuli. The level of sensory stimulation required to produce optimum arousal is higher in extraverts than introverts, and personality research has shown that extraverts tend to prefer more complex, angular stimuli, which have more arousal potential, than introverts.

This need for greater sensory stimulation leads to more active, impulsive behaviour being produced by extraverts, and this is demonstrated graphically by more expansive expressive movements. The present study is an attempt to examine the differences between extraverts and introverts in graphic expressive movements and in preference for sensory stimulation. It also attempts to investigate the effect on these differences of higher or lower levels of Neuroticism.

Subjects for the study were patients at the psychiatric unit of a public hospital, who presented varying levels of Neuroticism as measured by the Eysenck Personality Inventory. No significant results were obtained, but trends tended to support previous research that indicated extraverts preferred more complex and angular stimuli than introverts, and that high levels of Neuroticism altered this relationship. Information was also produced which generated hypotheses for future research and indicated improvements in the experimental design which might produce more significant results.

CHAPTER I

TRAITS OR PERSONALITY DIMENSIONS

Regardless of the different emphases of various theorists, there is a core of agreement in considering personality as an integration of traits which can be investigated and described in order to render an account of the unique quality of an individual (Chaplin, 1970).

Theories on the structure of personality have been put forward for centuries. Hippocrates, and later Galen, divided individuals into four types: choleric, melancholic, sanguine and phlegmatic. These groupings he formulated from a supposed predominance of one of the bodily humours: yellow bile, black bile, blood and phlegm (Mischel, 1971).

More recently links were sought between personality and somatic type by such theorists as William Sheldon (1942). He looked for associations between body build and temperament, postulating three types: endomorphic, mesomorphic and ectomorphic.

"Type" theories, however, tend to assume discrete, discontinuous categories, yet it is virtually impossible to classify individual persons into one or another clear-cut category. There seem to be overlaps between an indeterminate number of polar-continuum type personality dimensions. This encouraged certain theorists to develop the idea of personality "traits" which include such dimensions as aggressiveness and dependency.

Guilford (1959, p. 6) defined a trait as "any distinguishable, relatively enduring way in which one individual

varies from another": Allport (1937) defined traits as "determining tendencies" or "predispositions to respond" in an individual, that account for the consistency of his behaviour. He states that a trait is a "generalised and focalised neuropsychic system (peculiar to the individual) with the capacity to render many stimuli functionally equivalent, and to initiate and guide consistent (equivalent) forms of adaptive and expressive behaviour" (Allport, 1937, p. 295). Adaptive behaviour is coping behaviour - the way in which an individual reaches his goals and completes his tasks. Expressive behaviour includes body movements, activity level, and possibly response to stimulation. These may be recorded in such activities as artistic productions and handwriting.

Although Allport emphasises the structure of personality as determining behaviour, he also includes environmental influences. "One person may owe a given trait primarily to inheritance, another person primarily to learning. One person may be reclusive and retiring chiefly because of his temperament, another because of conflict with his environment" (Allport, 1965, p. 69).

Environment, or culture, as Allport uses it, is in part a set of inventions that have arisen in various parts of the world (or with subgroups of population) to make life efficient and intelligible for individuals who have to struggle with the same basic problems of life: birth, growth, and death. The solutions are passed on from one generation to another. Handwriting is a good example of the compromise we all reach between personality structure and the effects

of culture. Traditional letter forms are learned but are adapted to suit the temperament of the individual. No two people have identical handwriting as no two people have identical personalities. However, there appear to be generalised similarities in handwriting, such as size and slope, which would suggest some generalised personality dimensions.

A common trait is, according to Allport (1965, p. 349), "a category for classifying functionally equivalent forms of behaviour in a general population of people. Though influenced by nominal and artifactual considerations, a common trait, to some extent, reflects veridical and comparable dispositions in many personalities, who, because of a common human nature and common culture, develop similar modes of adjusting to their environment, though in varying degrees".

For Cattell (1965) the trait is also a basic unit of personality which is inferred from behaviour, and accounts for behavioural regularity and consistency. He emphasises source traits, or underlying dimensions, that affect variations in behaviour, and he distinguishes between "environmental-mold" traits, which reflect environmental conditions, and "constitutional" traits which reflect constitutional factors.

Eysenck (1947, 1957, 1967) has carried this search for personality dimensions further, to include the area of abnormal behaviour, and has also studied the associations between a person's status on certain personality dimensions and his scores on a variety of other personality and intellectual measures.

In spite of disagreement about basic dimensions, there is some overlap in the findings of different trait theorists.

The two dimensions that seem to be found most consistently involve extraversion-introversion and adjustment and integration as opposed to disorganisation and anxiety (Vernon, 1964). For example, Eysenck puts forward a personality theory that is based on two orthogonal dimensions: Extraversion and Neuroticism, Cattell (Cattell and Scheirer, 1961) has Invia-Exvia as one of his second-order state factors. This appears similar to Extraversion-Introversion and, although Cattell feels that it does not vary in a person over time and from occasion to occasion, a good deal of the interpersonal variability is constitutional.

Trait theories, therefore, fulfill the need for some structure on which to base personality. A structure which gives account of the relative stability of an individual's personality over time in different situational fields. It also indicates a basis for common personality dimensions throughout a general population or culture.

CHAPTER 2

EXTRAVERSION - INTROVERSION

Physiological Research

Constitutional variability has been found between individuals. Lashley (1947) points to research which shows that individuals start life with brains differing enormously in structure. They are dissimilar in number, size and arrangement of neurons, as well as in grosser features. The nervous system appears to be relatively unique in each individual regarding its microscopic structure, whilst alike in its global structure. For example, many people have three sets of splanchnic nerves instead of the more usual two; the patterns of the facial nerves are different; and about fifteen per cent of people have no pyramidal nerve tracts in the spinal cord. (Allport, 1965).

Eysenck has referred to these differences in the nervous system when investigating the most consistently appearing traits of Extraversion and Neuroticism. The latter receives different names from different theorists, but appears to be a dimension of emotional arousal. There are indications (McCleod, 1954, cited in Eysenck, 1973) that Extraversion is based on an inherited disposition. This suggests, according to Eysenck, that a causal factor responsible for Extraversion would probably be found within the central nervous system, and particularly in the cortex. He has suggested the reticular formation as the most likely source of individual

differences between extraverts and introverts (Eysenck, 1971).

This structure receives collaterals from the long ascending sensory pathways which lead to cortical projection areas. Its function is to produce cortical arousal through neurons relaying to the particular projection areas in question, as well as to other parts of the cortex. The link with Extraversion is furnished by the hypothesis that introverts have lower reticular formation thresholds, so that they are characterised by a higher degree of arousal. Also, the synchronising part of the reticular formation possibly exerts an inhibitory influence on cortical activity and it may be supposed that low thresholds of this system characterise the extravert. This is Eysenck's "reactive inhibition"- a concept previously developed by Hull (1943).

Cortical inhibition has been investigated by Cohen and Horn (1974). They maintain that there are two types of cortical inhibition: temporal and spatial. As they are presumably variants of a similar process, Cohen and Horn felt that these should lead to correlated performance on tests which defined them operationally. This hypothesis suggested that extraverts should be more distractible (spacial interference), but it appeared to be introverts who were described as more distractible (Eysenck, 1967). However, there may have been some differences in the definition of the criteria describing distractibility between these researchers.

Cohen and Horn's research investigated the relationship between performance and temporal and spatial inhibition. They used the Necker cube reversal and the spiral after-

effect tests to investigate temporal inhibition. The Stroop Colour Word Test, the Gibson Spiral Maze and a modified Digit Symbol Test were used to examine spatial inhibition. Their results showed no significant correlation either between the behavioural tasks and the questionnaire (MPI) scores, or among the behavioural tasks supposedly dependent on the same underlying process. They maintained, therefore, that the distinction between Extraversion and Introversion is probably an empirically and theoretically meaningful one, but that it did not appear to be based on differences in cortical inhibition.

In reply to a criticism of their research, Cohen and Horn (1974) produced further evidence of conflicting results in the investigation of Extraversion. Costello (1957) found introverts to fluctuate more than extraverts during a one minute exposure to the Necker cube, and Franks and Lindaal (1967) also found introverts to fluctuate more often than extraverts. In their own research they found no differences, although they controlled experimental conditions as much as possible. Even when subjects who were high or low on Extraversion were equated for Neuroticism they did not find any of the predicted relationships between Extraversion and performance.

In summary, according to Eysenck (1971), extraverts should be relatively insensitive to sensory stimuli because they have a reticular formation which requires high sensory input in order to trigger neuronal discharge. Introverts, on the other hand, require small amounts of sensory input to cause cortical arousal. He also suggests that extraverts

develop neuronal inhibition more rapidly than introverts, thereby requiring more frequent changes in sensory stimuli to maintain cortical arousal. However, the research investigating cortical inhibition in extraverts and introverts offers only equivocal support for Eysenck's view.

Perceptual Research

Witkin (1954), talking about field-dependence points out differences between extraverted people and others in perceptual studies. He has shown that people vary markedly in how much their spatial orientation relies on the visual sense, and how much on the kinesthetic. The more visually responsive persons, taking their cues from the outside world, were found to be more generally outer-directed, more dependent on standards of the environment, whereas the more kinesthetically responsive persons, listening to signals from within their bodies, seemed to be more inner-directed, following their own judgement rather than the environmental cues. Others lie between those extremes, thus suggesting a continuum.

Witkin used a number of different tests aimed at measuring subject's methods of space orientation. He found that subject's modes of orientation were consistent and that this characteristic mode was stable over a long period of time. Although developmental changes in space orientation were demonstrated, it is important that at the earliest ages tested there were already marked individual differences. In fact, the greatest variability found in any group occurred in the two youngest groups tested - ages 8-10 years. Consistency

was most marked with adults and at age 13 years. There also appeared to be sex differences: females tended to be more field-dependent than males after the age of 17; before this there was only a slight sex difference.

Witkin felt that these differences between people were not at a sensory level. There did not seem to be any relation between acuity of a given sense and the emphasis assigned in orientation to experiences from that sense. Orientation requires the use of a number of different senses, each of which may differ in acuity. He felt that the way in which a person orientates himself is related to his general psychological functioning and suggested evidence that particular personality patterns occur more often among people who show given signs of orientation. Field-dependent people appeared to be those in whom postural sensations were completely suppressed or inadequate. There was a readiness to ignore, deny or repress body sensations, or at least an inability to integrate such sensations in determining their spatial orientation.

There seem to be some correlations between Field-Dependence and Introversion. There is a tendency for field-dependent subjects to lack insight, to repress impulses, to be passive, to yield to inferiority feelings and to be tense. Field-independent subjects tended to show self-awareness, to express their impulses directly, to be active, to deal with inferiority feelings in a compensatory way, and to show self-assurance. Witkin, by correlating TAT results with mode of orientation, found that field-dependent subjects produced stories in which the central character was unassertive, and

vice-versa independent subjects.

In using his tests with a group of hospitalised subjects he found that amongst the men there were a large number of extremely field-dependent and extremely field-independent subjects, with only a small number of intermediate subjects. The women were mainly field-dependent, and they were considerably more dependent than the men. There was also a tendency for field-dependence to correlate with depression, and there appears to be a correlation between Introversion and depression (Eysenck, 1973).

It would seem that introverts, who need to reduce sensory input, would probably also suppress recognition of internal sensation to prevent overarousal. This would increase their dependence on external cues for orientation. The extravert, on the other hand, who requires high levels of sensory stimulation, would also allow recognition of high levels of internal stimulation. If he has reduced, external sensory stimulation, he is able to rely on internal stimulation for orientation.

There appears to be a relationship between personality and perception, although the relationship is more complex than it would seem at first glance, and cannot be equated solely with one personality dimension. However, a particular way of perceiving usually seems to occur in association with congruent personality characteristics.

Further Research

Many experimental studies have investigated the possible differences between extraverts and introverts. Holmes (1967) offered support to the theory that high levels of acetylcholine are related to environmental awareness, rapid conditioning and to introverted personality characteristics.

Differences between extraverts and introverts have been found on measures of conditioning and figural after-effects (Eysenck, 1973). For example using the eye-blink reflex to a puff of air, as the response, and a tone as the conditional stimulus, Franks (1954) obtained evidence that introverts condition more quickly than extraverts. Eysenck (1965) found that extraverts have shorter after-effects than introverts on spiral after-effect experiments, and they show greater after-effects on figural tests. It has also been found that introverted neurotics tend to have fast EEG activity, whereas extraverted neurotics tend to have exceptionally slow EEG activity (Eysenck, 1967). Hill (1975) showed that extraverts build more variety into their performance at a monotonous task than introverts because of their need for more external stimulation.

These studies, and many others, seem to point to a definite personality dimension which has an effect on a wide variety of behavioural, physiological and perceptual variables.

CHAPTER 3

NEUROTICISM

Neuroticism appears to involve the autonomic nervous system. Differences between people in emotionality, or neuroticism, are mediated by inherited differences in the lability or excitability of the autonomic nervous system (Eysenck, 1965). Some people react strongly with their sympathetic nervous system towards incoming stimuli of various kinds, whereas other people react less strongly. These reactions are experienced as emotional arousal: fear, anger, joy etc. Eysenck's single-factor theory of neuroticism includes many of the factors found by Cattell to account for clinically judged neuroticism (Cattell and Scheirer, 1961). Cattell suggests that one can have a neurotic person - a person who all his life is characteristically operating at a higher anxiety level - and also a typically non-anxious person who may temporarily be in a highly anxious state.

Eysenck (1967) suggests that the development of Extraversion or Introversion in a personality is due to the functioning of the cortico-reticular loop, whereas the development of Neuroticism is due to the functioning of the visceral-reticular loop. Messages from the visceral brain (hippocampus, amygdala, cingulum, septum and hypothalamus) reach the reticular formation via collaterals and have arousing effects on the cortex. This loop is concerned with emotional arousal.

Cortical arousal can, therefore, be produced along two distinct and separate pathways. Firstly by sensory stimulation on the problem-solving activity of the brain. There is, then, no autonomic arousal, but possibly high cortical arousal. Secondly by emotion, through the reticular formation via ascending and descending pathways connecting it with the hypothalamus, leading to autonomic and cortical arousal.

The suggested differences in physical constitution, when acted upon by the environment or culture, produce an individual's observable behaviour. It is obvious that all individuals cannot be divided into two clear-cut groups, but that they would lie along a continuum, many falling in between the two extremes.

CHAPTER 4

INTERACTION OF EXTRAVERSION, NEUROTICISM & ENVIRONMENT

Foulds (1959) and Eysenck and Claridge (1962) have studied the interaction of constitution and environment. They felt that certain factors may have contradictory effects on Extraversion and Neuroticism. For example, old age possibly alters the constitutional balance in the direction of greater Extraversion, and the behavioural balance in the direction of greater Introversion. Neurosis, whilst leaving the constitutional basis of Extraversion unaffected, may shift the behavioural basis in the direction of greater Introversion - withdrawal and decreased activity.

To take one example, normal extraverts are supposedly more sociable than normal introverts. It is not inconceivable that the presence of some neurotic symptoms may interfere with social intercourse, thus shifting the behavioural balance towards greater Introversion in both extraverts and introverts.

Eysenck and Claridge defined hysterics as individuals high on Neuroticism and relatively high on Extraversion; dysthymics as individuals high on Neuroticism and low on Extraversion. One question arises, whether hysteria and dysthymia are more closely related to constitutional or behavioural Extraversion. Eysenck and Claridge suggest that their results indicate a relationship to constitutional Extraversion.

The typical extreme, stable introvert is quiet and

retiring, introspective, fond of books rather than people. He tends to plan ahead and distrusts impulse. He is serious, has a well-ordered mode of life, is not aggressive, and places value on high ethical standards. The typical extreme, stable extravert is sociable, likes parties, has many friends, needs people and does not like to be alone. He craves excitement, takes risks and is generally impulsive. He likes frequent change and activity and tends to be aggressive (Eysenck, 1965).

These behaviours could represent attitudes towards life. It has been suggested by Allport (1965) that it is often difficult to distinguish between a trait, or personality dimension, and an attitude. For example, is Extraversion a trait or an attitude?

There seem to be two distinctions between the two concepts: an attitude has one object reference, a dimension, or trait, is aroused by many objects and is, therefore, more general; an attitude is usually a value judgement for or against the object reference, but a dimension does not express value. Also, an attitude, whilst affecting "adaptive" behaviour, would not be expected to affect "expressive" behaviour, which is not consciously produced, and it would seem that constitutionally based personality dimensions may most accurately be determined by the expressive behaviour of an individual. Questionnaires appear to be measures of behavioural Extraversion, and physiological measures or projective tests, of constitutional Extraversion (Eysenck and Claridge, 1962).

Because of the unity of personality functioning it has been assumed, therefore, that some traits can be inferred from expressive movement (Taft, 1967). If an individual is emotionally stable his expressive movement should demonstrate the same personality traits as his reported overt behaviour. If an individual is emotionally unstable, however, it is possible that expressive movement and overt behaviour may be contradictory or less clearly related.

CHAPTER 5

EXPRESSIVE BEHAVIOUR

The definition of expressive behaviour involves a contrast with what Allport (1965) calls "coping behaviour". The latter refers to actions, mainly within a person's conscious control and awareness, that are purposive, goal-directed and orientated towards the solving of a problem. Expressive behaviour, by contrast, is characterised by exactly opposite qualities: it is not goal-directed, not problem-orientated, not adaptive, and it mainly proceeds outside of a person's awareness or control. It could be defined as one's manner of performing adaptive acts.

Allport and Vernon (1933) studied expressive movement by examining individual differences in the manner of performing adaptive acts, and considered this less dependent upon external and temporary conditions than upon enduring qualities of personality. However, they pointed out that external conditions must be considered, and as many as possible were eliminated from their experimental study.

They administered over thirty tests to a group of subjects. These tests included such tasks as writing on paper and on a blackboard, drawing with the foot in sand, reading aloud, walking, drawing, making check marks and estimating differences. They were examined for such measures as size, direction of movement, time taken, muscular pressure etc. Results indicated that subjects were noticeably consistent.

For example, they showed throughout the experiment, a characteristic level of emphaticness, expansiveness or constriction, and of centrifugal or centripetal movement. Their results lend support to the personalistic contentions that there is some degree of unity in personality, that this unity is reflected in expression, and that, for this reason, acts and habits of expression show a certain consistency among themselves.

Expressive consistency can be demonstrated by a simple experiment. A subject is asked to write his name three times as he normally writes it. He is then asked to copy the third signature. The first two signatures are invariably more alike than the last two. The deliberately controlled act of copying has suppressed the freedom of individual expression.

However, lack of complete consistency indicates that there is probably some environmental influence on expressive behaviour, or that personality dimensions may interact with one another to produce some variability.

As Allport and Vernon (1933, p. 465) state, "if we are to perceive the individuality of expressive behaviour, we must look beyond the specific intent of an act, beyond the conscious control and beyond the conventions and skills employed in coping. An individual's expressive behaviour departs from convention in ways that are individual to him. He betrays his energy, aggressiveness, hostility, fear, ambition, or rigidity in his manner of departure. His own vital style of life (his temperament and personal characteristics) surges into his performance".

This would suggest that expressive behaviour which is demonstrated graphically, may also indicate dimensions of personality. This hypothesis has affected the study of art since early times.

CHAPTER 6

PSYCHOLOGY OF ART AND EXPERIMENTAL AESTHETICS

Historical Overview

Aesthetics were once discussed by the philosophers of Ancient Greece, and it has been a subject that has interested mankind down through the ages, in most of the major civilisations of the world. Psychological questions were frequently involved and were answered mainly by generalisation from the artist's introspections.

Berlyne (1971) presents an historical overview of the development of a psychology of art. He suggests that the founder of "experimental aesthetics", which involved psychology and art, was G. T. Fechner, who carried out his studies over one hundred years ago. He proposed three methods for experimentation: the method of choice, where subjects made a choice between works of art presented to them; the method of production, where subjects produced an expressive art work; and the method of use.

Fechner's interest in experimentation was continued and expanded. For example, Fere (1900 cited in Valentine) demonstrated the effects of colour on human beings using the recorded handgrip of subjects under the influence of different coloured light. The strength of handgrip varied most noticeably in the case of an hysterical patient. He also found that the circulation of the blood was affected - red proving to be the most stimulating and blue the least stimulating colour.

Martin (1906, Cited in Valentine) performed a long series of experiments demonstrating the effect of form on subjects. Individuals can be markedly affected even with simple lines and curves, although the size of these is also important: generally larger lines and circles are preferred, but there also appears to be an optimum size, beyond which, the perception becomes less pleasing.

Psychoanalytic theories.

Freud considered expressive behaviour, including art, to be important in the understanding of personality. According to his psychoanalytic theory, art was an expression of the unconscious and was to be examined with an emphasis on the "latent" content, rather than the manifest content which was produced consciously. He postulated (Freud, 1938) that the fulfillment of wishes, particularly towards emotional ends such as sexual and aggressive behaviour, can be displaced into other activities that are more acceptable to society.

This substitution of behaviour has also been revealed by different lines of research (Lewin, 1935; Miller, 1944; Tinbergen, 1951; cited in Berlyne, 1971). Active displacement consists of the performance of one type of behaviour in place of another. In "passive displacement" the organism reacts outwardly or inwardly to some other object, as it would the normal goal object. In art appreciation, passive displacement may be involved; but in the creative act which produces a work of art, active displacement may be involved.

Gestalt Theories.

Early interest in art and psychology was shown also by the Gestalt theorists. They discounted traditional theories

explaining the ability to judge expression as being based on associationism: that certain behaviours or changes in movement, colour or shape accompany known emotional reactions and have, therefore, become related to them through learning (Darwin, 1896; Berkeley, 1934; cited in Arnheim, 1943). Gestalt theories exclude the use of past experience from the interpretation of perceptual observations in the field of expression.

Arnheim (1943) states that the meaning of expression - physical pattern, movement or sound - is perceived directly by means of what has been termed the "tertiary qualities" of sensory phenomena. Emotion is expressed in the curves of physical movement (or traces of movements) which accompany such mental attitudes. The underlying idea is that dynamic characteristics of an emotion or personality characteristic are identical whether they are traced in the movements of an individual or in a graph of the succession of psychological impulses leading towards a specific behavioural goal.

Arnheim suggests that this theory of isomorphism, or identity of form, between psychological and physical processes corroborates the common observation that we call the movements of a dancer mournful, not because we have often seen sad persons behave in a similar manner, but because the dynamic features of mourning are physically present in these movements and can be directly perceived.

Gestalt theories hold that expressive behaviour reveals its meaning directly in perception. The forces which determine bodily behaviour are structurally similar to those which characterise the corresponding mental states.

As the human organism, according to Gestalt theory, always functions as a whole, physically and psychologically, learning and content are acknowledged as being involved in the interpretation of perceived expression, but to a lesser degree. Knowledge does not interfere with expression itself, it simply modifies its interpretation. For example, an object will look big or small depending on whether it is seen spacially in the company of larger or smaller objects. The situation is similar for temporal context - the art of previous centuries is perceived differently by modern viewers, to viewers in its own time.

Information Theory.

Berlyne (1971) suggests that modern interest in art has evolved from Information Theory, the study of motivation, novelty and complexity, and the concepts of arousal. Information theory, in relation to art, is concerned with the amount and location of information contained in a picture. Information is transmitted through the perception of a work of art. Processes going on within the artist are reflected in the work and this is transmitted as "expressive information" to the viewer. Silver, Landis and Messick (1966) suggest that different individuals attend to different aspects of various visual forms in a variety of ways. Individual differences in perception and judgement affect this attention.

Arousal and Complexity

In theories on aesthetics, the concept of arousal during perception and creation is considered important. Arousal can

be raised by properties of the stimulus pattern such as complexity, novelty and ambiguity. "A pattern is considered more complex the larger the number of independently selected elements it contains. In two patterns that consist of the same number of elements, one will be less complex that has a greater degree of similarity among its elements or, more generally, a greater degree of redundancy of interdependence" (Berlyne, 1971, p. 149). Increased complexity will raise arousal, whereas "unity" or "order" - similarity of elements - tends to lower arousal or keep it within bounds.

Following the theory that reticular formation thresholds differ in extraverts and introverts, this would suggest that extraverts would prefer more complex patterns and that introverts would prefer simpler patterns, according to Berlyne's theory of complexity.

Arousal potential is low at times of sensory deprivation or boredom, when complexity, novelty, and ambiguity are at a minimum. However, this in itself can produce frightened arousal, apparently due to the release of lower brain centres from cortical inhibition. Likewise, extremely high arousal can lead to an abrupt drop in arousal (Berlyne, 1971), and it is probable that the inverted U relationship which is found between arousal and performance also applies to arousal and preference for stimulus complexity. There is probably an optimum level of preferred stimulus complexity, and although this may be higher in extraverts than introverts, preference will drop beyond a certain level of complexity. Therefore the effect of arousal on expressive behaviour is complex.

Berlyne (1970) found, by means of a series of experiments, that subject's liking for complex patterns rose and then fell after reaching a maximum. Their liking for simpler patterns fell from the beginning of presentation, with a final flattening. There was no investigation of personality variables, but this generalised phenomena could have some affect on subjects' choices between complex and simple patterns.

In painting, the objects depicted can be made more numerous and more dissimilar. Meyer (1956), in discussing music, states that many ornaments tend to create doubt and uncertainty, however momentary, about which tone is a structural and which a subsidiary one. The same may be claimed for elements of a design or pattern, and this doubt and uncertainty could raise arousal to an uncomfortable level.

Pavlov (1927) induced "experimental neuroses" in dogs by exposing them to a stimulus which resembled both the stimulus indicating that food was available, and the stimulus indicating that there would be no food. The dog was unable to determine which response to make to this ambiguous stimulus. Neurotic breakdown was an extreme reaction obtainable in dogs with what Pavlov called "weak" nervous systems; but it suggests that arousal caused by ambiguity, which can also be found in elements of pattern or design, is extremely disturbing for the organism.

Berlyne (1971) summarises many of the experiments on complexity in particular, and the general trend appears to be a preference for more complex, over less complex, stimuli. However, there is a great deal of conflicting information, and strong evidence of individual differences within the general trends (Vilz, 1966; Lane, 1968).

Art Therapy.

The arousal associated with viewing works of art, does not produce responses, especially motor responses, that are characteristic of comparable emotional states. Vigotski (1965) suggested that "neural energy" could be discharged centrally or peripherally, and the greater the discharge in one area, the less there would be in the other. Whilst viewing artistic productions, the energy is discharged centrally inducing fantasy and contemplation rather than a physical response.

This theory is given little support by present-day neurophysiological knowledge, although it is reminiscent of Pavlov's idea of "negative induction" - the inhibition of processes occurring in other parts of the brain when particularly strong excitation occurs in one area. This inhibition within the brain itself is more in keeping with what is now known about the nervous system (Berlyne, 1971).

A need for homeostasis, or maintenance of arousal at a level comfortable to the organism, may be involved in expressive behaviour. Aristotle suggested that the motivating arousal, or disturbance of homeostasis, that preceded "catharsis", came from the content of a tragedy. In a similar way, disturbance results from the initial encounter with any unfamiliar pattern, from the uncertainties and conflicts that have to be resolved by perceptual processing. The relief that is felt when processing is successfully completed is probably the major source of pleasure. Art, by inducing strong emotions,

has some sort of psychotherapeutic effect that releases human beings from the consequences of inappropriate and uncontrollable emotions (Berlyne, 1971).

Rogers (1942) suggested that a patient would be released from incapacitating emotions if he became aware of the nature of his motives and emotional attitudes. Some experts feel that art enables us to examine our own emotional processes and therefore understand them better (Dewey, 1934; Collingwood, 1938; Langes, 1942; Vigotski, 1965).

Other experts feel that art integrates elements into unitary patterns, and that exposure to art will promote harmonious relations or equilibrium amongst divergent psychological forces (Schleirmacher, cited by Gilbert and Kuhn, 1954; Richards, 1924).

Art has, therefore, been used in therapy for a variety of reasons. Fagan and Shepherd (1970) state that everyone has a preverbal language, which is unique to themselves and which is expressing how they really feel, whilst they are using verbal communication. It can be used to increase self-awareness through expressive movement; handwriting indicates how one feels; doodles are a way of saying something; tone of voice, gestures and body movements all communicate emotions. Naumberg (1966) maintains that art therapy, allows a patient to express feelings and inner experience that he is afraid, or unable, to express verbally. These inner feelings may include constitutional Extraversion or Introversion which is not being expressed in overt behaviour. However, the method of introducing an individual to art materials seems to be

vitally important. If aversion develops towards the means of expression, it is difficult to overcome it (Lowenfold, 1957). This may be important for research, as some subjects may earlier have developed an aversion to the materials provided and therefore not be motivated to cooperate fully with the tasks involved.

As Munro (1963) indicates, the therapeutic effects of art work are still unsure, and little understood; but it would seem that any object-focused activity may have some therapeutic value in releasing internal anxieties. Art may offer a promising means of helping the disturbed individual to become more conscious of his own unconscious conflicts, and thus of being able to adjust to them intelligently. It may also indicate, when used with measures of overt behaviour, when an individual's constitutional personality dimensions conflict with his behaviour.

Common human traits and tendencies often appear in the neurotic or psychotic personality in a magnified form. As the artist presents certain aspects of his personality in his art, so must similar aspects be reflected in productions of the non-artist. In the neurotic or psychotic personality these aspects may also be magnified. If Extraversion or Introversion affect expressive movement, then this aspect of personality would be expected to show up, in some way, in the drawings of any individual.

CHAPTER 7

ARTISTIC EXPRESSION AND PERSONALITY

There has been much research into the expression of personality in art, much of it subjective and with dubious validity. As Abt and Bellak (1950, p. 257) have stated, "the technique of analysing drawings is without sufficient experimental validation, rarely yields unequivocal information, and frequently misleads the unwary into plausible misstatements about the personality of the person whose drawings are being studied". However, the drawing procedure may be regarded as a situational test in which the subject is presented with a problem, and in his efforts to solve it he engages in verbal, expressive, and motor behaviour. According to the theory of the unity of personality, the drawing should express some aspects of his personality through his expressive behaviour.

Witkin et al (1954) found, in a figure-drawing test, that correlations between certain drawing scores and perceptual test scores were generally high and significant. They suggest that each individual has a more or less crystallised view of a "person" that in fact, or fantasy, represents himself, and is the subtle product of experiences with himself and with others. Therefore, when he is asked to "draw a person", the resulting drawing can be regarded as a rough representation of his image of himself in relation to his environment. "He projects himself by means of particular kinds of lines on a

certain part of the page, in characteristic dimensions, proportions and perspective, and with a peculiar configuration, all expressive of his temperament and self-view. It is a projective technique eliciting a psychological "photograph" of the individual's body image" (Witkin et al, 1954, p.235).

Abt and Bellak (1950) suggest that the relationship between the size of the drawing and the available space may parallel the dynamic relationship between the subject and his environment. Therefore, if the drawing is a self-concept, then the size is suggestive of the way the subject is responding to the environment. If the drawing is small, the subject is responding with feelings of inferiority and withdrawal; if the drawing is large, he is responding with feelings of expansion and aggression. These two modes of response are similar to the postulated introverted and extraverted personalities. However, they also point out that the drawing may not be a self-concept. Two other possible interpretations of size can be made: the drawing could either be a projection of an ideal self-image, or of a parent image. In these cases the drawing size would have to be interpreted differently, and this possibility would have to be taken into consideration if using size of a subjects drawing of a person to judge dimensions of personality such as Extraversion and Introversion.

This illustrates the difficulty of backing theories relating to personality and art into a tight empirical corner. Alternative interpretations are often possible.

However, if the theory of the unity of personality is taken into consideration, the "small" drawing produced by an individual who tends to be graphically expansive should be relatively larger than the "small" drawing produced by an individual who tends to be graphically constrictive.

A great deal of research relating painting and personality has been carried out by Alschuler and Hattwick (1969) with children. They have studied the paintings of children and discovered certain aspects of creative quality. Each child had his own preferred colours and ways of combining them, as well as his own individual pattern of expression, characterised not by any realistic pictorial representation, but rather by his characteristic and unique abstract use of colour, line, form and space. Colour appeared to give the clearest clues as to the nature and degree of intensity of the child's emotional life. Line and form appeared to give the most clues to energy expended, degree of control and direction of control.

It appeared that warm colours represented free emotional behaviour, warm, affectionate relations and self-centred orientation. Cold colours indicated highly controlled, overadaptive behaviour and repression of inner feelings. Straight lines indicated assertive, outgoing behaviour; curvilinear lines indicated dependent, compliant, emotional behaviour. Expansiveness also seemed to express an outgoing, assertive, self-reliant personality, whilst constriction expressed a withdrawing, emotionally dependent personality. These behaviours described by Alschuler and

and Hattwick are very similar to those described in extraverts and introverts.

Constriction Versus Expansiveness

A prominent dimension of variation in expressive behaviour, and one included by Alschuler and Hattwick is that of relative constriction or expansiveness of an individual's movement pattern. Considering the Introversion - Extraversion dimension of personality, one would expect expansiveness to correlate with Extraversion because of the extravert's tendency to impulsive, outgoing activity. Likewise the introvert would be expected to produce constricted movements because of his lack of impulsivity, and his well-ordered, retiring lifestyle. This has, in fact, been demonstrated (Allport and Vernon, 1933; Allport, 1937; Elbisch, 1945; Precker, 1950; Wallach and Gahm, 1960; Wallach and Thomas, 1963).

Although graphic expansiveness usually correlates with Extraversion and constriction with Introversion, it has been shown that the reverse can occur (Alschuler and Hattwick, 1947). Wallach and Gahm (1960) hypothesised that this is caused by a high anxiety level in certain individuals who have a fear of direct expression of their constitutional Extraversion or Introversion. They can only express it covertly in expressive behaviour where it contrasts markedly with their "socially acceptable" overt behaviour. Subjects either "reflect" or "displace" their constitutional Extraversion. Neuroticism seems to interfere with the relation-

ship between constitutional and behavioural Extraversion as demonstrated by graphic expansiveness.

Wallach and Gahm used doodles drawn to "interpret" various pieces of music, to test their hypothesis that the productions of highly anxious introverts would be more expansive than that of extraverts and non-anxious introverts. Their results showed that when overt Extraversion, is unaccompanied by high anxiety, expressive graphic behaviour is consistent with previous theories - extraverts are more expansive than introverts. When a high anxiety level was present, however, introverts were more expansive than non-anxious introverts and anxious extraverts. However, non-anxious extraverts were still the most expansive.

It is possible that the use of music to accompany the drawings could have had some effect on the results. Subjects were asked to doodle in the manner that they thought would best express the music; and they were asked to repeat the task twice more. The experiment was designed carefully in an attempt to increase motivation and to avoid random variability from shortrun practice effects. However, music itself can have an effect on motivation and emotion in some individuals, and also some subjects may have had more understanding of "interpreting" music in doodles than others. Learning may have interfered with some subjects results.

Taft (1967) followed this by using handwriting to investigate the same personality dimensions. He was concerned with Extraversion and expansiveness and speed of writing, but included Neuroticism in order to study its interactive effects

with Extraversion. He gave his subjects a series of different tasks to perform, including writing, printing, the Maudsley Personality Inventory (MPI) and an introspective report on their own reactions to tasks.

He found that expansiveness was a comparatively consistent characteristic, but did not correlate significantly with Extraversion. However, when considered in interaction with Neuroticism there were definite trends and some significant results. The major effects of Neuroticism appeared to involve Extraversion rather than Introversion. This was contradictory to Wallach and Gahm's prediction, because they considered Extraversion to be a more socially normal form of behaviour than Introversion. Taft found that low neurotic Extraverts were more expansive than high neurotic introverts and low neurotic introverts; high neurotic introverts were more expansive than low neurotic introverts; and the high neurotic extraverts were the most constrictive. Taft also found that the fastest writers were the high neurotic extraverts.

Wallach et al (1962) suggested that "defensiveness" may affect the relationship between expansiveness and overt personality variables. Their definition of defensiveness, which was measured by questionnaire, appeared to relate to that of Neuroticism and anxiety suggested by other theorists. They reviewed a considerable amount of research on expansiveness and constriction as related to overt personality variables, particularly social isolation, and found no apparent relationship occurring. However, their own investigation indicated

that "defensive" subjects with extensive social ties were graphically more constricted, while defensive subjects who were socially isolated and non-defensive subjects who had extensive social ties, were more graphically expansive. Measures of social isolation were assessed through sociometric ratings. These results appear to support the interaction effect of Neuroticism, and that normal extraverts tend to be more graphically expansive than normal introverts.

Complexity and Simplicity

Another variable which has been investigated in relationship to Extraversion is a subject's preference for complex or simple stimuli. Munsinger and Kessen (1964) found that, in general, moderate levels of complexity are preferred to extremes. There are two major approaches to an explanation of preference for complexity. One deals with the external qualities of the stimulus, the other with the internal effects of the stimulus, as discussed earlier. Recent approaches have investigated the internal effects of the stimulus and are based on the hypothesis that moderate levels of arousal are optimal and preferred organismic states (Berlyne, 1960; 1966). Therefore, the stimulus selected, or preferred, by an individual should yield a moderate level of arousal. Research has demonstrated that arousal, as measured by the galvanic skin response, (GSR), increases with stimulus complexity (Berlyne, 1961; Bryson and Driver, 1969).

Bryson and Driver (1969, cited in Bryson and Driver, 1972) investigated complexity, and found that persons classified as cognitively complex manifested a higher level of arousal (as measured by GSR) to a given stimulus than persons classified as cognitively simple. It could be predicted, on the basis of the moderate arousal theories, that cognitively complex individuals, because they exhibit greater arousal to the stimuli, should prefer simpler stimuli than the cognitively simple individuals, if it is assumed that approximately the same level of change of arousal is considered optimal in both complex and simple subjects. It may be that extraverts tend to be cognitively simple and introverts cognitively complex.

Extraverts and introverts differ in arousal levels caused by external stimulation and Burt (1937) and Eysenck (1947) have reported a tendency for introverts to prefer more complex, and extraverts simpler, stimuli. Lynn & Butler (1962) hypothesised that if introverts exhibit a higher level of arousal to external stimuli, they should prefer less complex stimuli. Their results, however, corresponded to those of Burt and Eysenck. It is not stated whether these studies considered Neuroticism as an interacting factor.

More recently, Bartol and Martin (1974), using polygons differing in degree of complexity, showed that extraverts preferred more complexity than introverts. Neuroticism did not seem to be a significant factor, but this finding may stem from the lack of adequate stress generated by the experimental situation. Although Bartol and Martin's research

would seem to support the hypothesis of Lynn and Butler, there is obviously considerable conflicting evidence and it would seem that interaction of other personality variables are probably involved. Although the earlier research conflicts with the findings of Bartol and Martin (1974), their outcome has been used as the basis for a hypothesis in this study as it follows more logically from the physiological evidence.

CHAPTER 8

EXTRAVERSION & INTERACTION WITH NEUROTICISM

Allport (1965), as previously stated, pointed out that one person may owe a trait primarily to inheritance, another person to learning during interaction with the environment. Therefore, an individual may produce introverted behaviour because he is constitutionally introverted, or because he has been reinforced for introverted behaviour. The latter would be expected to produce some conflict within the individual if the inherited disposition was nearer the opposite extreme of the Extraversion dimension.

The same principles may apply to the Neuroticism dimension. An individual may be easily emotionally aroused because of his constitution, but if his socialisation is compatible with expression of this emotion, there should be little conflict and consequent excessive over-arousal. If, however, his constitution conflicts with socially accepted norms and his conditioned behaviour, then uncomfortable over-arousal would be expected, which could not be expressed.

Under these conditions one could assume that there would be some differences in drawings produced by individuals who are high on Neuroticism, and without acceptable modes of discharge of emotional energy to those produced by individuals low on Neuroticism. This has been demonstrated for the variable of graphic expansiveness (Wallach and Gahm, 1960; Toft, 1967). The conflicting evidence produced in research

on preference for complexity and the indication that increased anxiety leads to preference for simplicity (McReynolds, 1958; McReynolds, Archer and Pietela, 1961; Zuckerman, Kohn, Price and Zoob, 1964; Penney, 1965) would also suggest that there will be differences between stable introverts and extraverts and those high on Neuroticism.

Results indicating the interaction of neuroticism were obtained in other areas also. Di Scipio (1971), investigating verbal fluency in extraverts and introverts, found that stable extraverts were more fluent than stable introverts. However, Neuroticism appeared to decrease the fluency of extraverts and increase the fluency of introverts, bringing both towards the overall mean of stable extraverts and introverts. This, he maintained, may explain why Rim (1953) was unable to find a significant word fluency difference between his two criterion groups of hysterics and dysthymics. Both of Rim's clinical groups represent extremes in Extraversion and Introversion, but both are clinical conditions of high Neuroticism.

Behaviour such as verbal fluency is manifested in extreme forms in opposite directions for extraverts and introverts, if both groups are stable. Di Scipio (1971) suggested that defining Neuroticism as a disturbance in normal functioning, the mechanism that would normally maintain traits at upper and lower limits can no longer be assumed to function at these limits consistently. Consequently the behaviour would regress towards the mean of the stable group. It would appear that high neuroticism affects verbal fluency on a constitutional level and produces a different behavioural

verbal fluency as compared with stable extraverts and introverts.

Eysenck's (1967) theory of arousal and personality states that extraverts function with minimal levels of cortical inhibition of the central nervous system, whilst introverts function with maximal levels. Neuroticism introduces a weakening of higher cortical functioning and consequently would bring about a change in personality traits usually manifested by Extraversion and Introversion in stable individuals. Di Scipio (1971) also suggests that the study has implications for clinical research in so far as divergent thinking tests may prove to be a useful diagnostic instrument in assessing the influence of Neuroticism on spontaneous verbal output. Changes during the course of therapy might be monitored by assessing the rate at which the individual approaches a verbal fluency score appropriate to sex, intellectual level and stable personality type.

Colour

Colour preferences have also been investigated. Rorschach (cited in Arnheim, 1974) asserts that difference in reaction to colour is related to personality. He found that a cheerful mood results in colour responses, whereas depressed people more often react to shape. Colour dominance indicated an openness to external stimuli. Such people are said to be sensitive, easily influenced, disorganised and given to emotional outbursts. A preference for shape reactions goes with an introverted disposition, strong control over impulses, a pedantic and unemotional attitude. The behaviour of these

two personality types is similar in description to that of extraverts and introverts.

Birren (1963), also referring to colour, suggests that human beings tend to fall into two distinct groups: those who prefer clear, distinct hues, usually warm in tone, and those who prefer hues and tones of less saturation. Robinson (1975) states that these two groups are extraverts and introverts. His research indicated a significant relationship between colour preference and degree of Extraversion. Introverts preferred cooler and calmer colours over warmer and more intense colours, and vice versa for extraverts. Changourian(1967) also showed that extraverts preferred warmer colours and introverts cool colours.

The semi-subjective method of determining cool and warm colours makes this difference in colour preferences difficult to test. However, considering Rorschach's suggestion that extraverts prefer colour to form, it could be hypothesised that extraverts would prefer a greater variety of distinct colours than introverts.

The Present Study

It would seem from research findings that there are other differences between stimulus preferences for extraverts and introverts. There is an indication from Alschuler and Hattwick's (1969) investigations with children that extraverts may prefer straight lines as opposed to introverts preference for curvilinear lines. This has also been suggested by the

results of research carried out by Schmidl-Waehner (1946) on college girls. He found that curved forms were preferred by introverts.

It may be that an angular line could be considered more complex than a curved line of similar length and direction. The angle and relatively sudden direction change may require more deliberate eye movement than a curve which they eye can follow smoothly, consequently causing more sensory arousal. It may also be, following Gestalt theories, that an angular line contains dynamic features of aggressiveness and energy, which would be more arousing than the smooth, restful curved line. Therefore, angularity may have similar arousal properties to those suggested for complexity.

Various studies have produced conflicting results regarding preference for stimulus complexity; but these may be caused by an interaction effect with Neuroticism which has not yet been clearly demonstrated in research. As stated earlier, several studies have revealed negative correlations between measures of anxiety and the tendency to seek out novel or variable stimulation. If stable extraverts tend to prefer more complex stimuli, and stable introverts simpler stimuli, then one would expect that both extraverts and introverts high on Neuroticism would prefer less complex stimuli than extraverts and introverts low on Neuroticism.

In the same way, Neuroticism level appears to have some effect on graphic expansiveness. Whilst stable extraverts appear to produce more expansive graphic work than stable introverts, a high level of Neuroticism has been shown to reverse this phenomena, tending to shift the results for high

neurotic introverts and extraverts towards the mean for stable individuals. High neurotic introverts tend to be more graphically expansive than low neurotic introverts, and high neurotic extraverts tend to be less graphically expansive than low neurotic extraverts.

Finally, there is some indication that extraverts may work faster, or spend less time on a task than introverts (Toft, 1967). This was given some support by Bryson and Driver's (1972) research which indicated that introverts took a longer time viewing stimuli than extraverts. Also it is suggested that extraverts prefer colour to form (Arnheim, 1974) and may, therefore, use more colours than introverts. This could also be part of the extravert's suggested preference for complexity, as the more colours used, the more complex a graphic stimulus will become.

At this stage it could be hypothesised that stable extraverts would produce expansive, highly coloured drawings and prefer complex, angular stimuli. Stable introverts would produce constrictive, less colourful drawings, and prefer simple, curvilinear forms. Stable extraverts would also take less time over a task than stable introverts. Neuroticism level seems to have an interaction effect with Extraversion and to affect the variables of graphic expansiveness and preference for complexity. As individuals admitted to a psychiatric unit would tend to be high on Neuroticism it is suggested that many of them would produce expressive behaviour that was incompatible with their overt extraversive-intraversive behaviour, suggesting constitutional Extraversion incompatible with their behavioural Extraversion.

The following hypotheses are therefore proposed:

- 1) That Neuroticism level will interact with extraversion level so that:
 - a) less neurotic extraverts (LNE) will produce more expansive drawings than less neurotic introverts (LNI).
 - b) high neurotic introverts (HNI) will produce more expansive drawings than less neurotic introverts (LNI).
 - c) LNE will produce more expansive drawings than high neurotic extraverts (HNE).
- 2) That neuroticism level will interact with extraversion level so that:
 - a) LNE will prefer more complex stimuli than LNI.
 - b) LNI will prefer more complex stimuli than HNI.
 - c) LNE will prefer more complex stimuli than HNE.
- 3) As Neuroticism has not been shown to interact with Extraversion in preference for angular stimuli, there will be a significant correlation between Extraversion and preference for angularity.
- 4) There will be a significant positive correlation between Extraversion and the number of colours used.
- 5) There will be a significant positive correlation between Introversion and the length of time taken over a task.

CHAPTER 9

METHOD

Design

In order to test the first two hypotheses a control group of normal subjects would have been desirable. To test the hypotheses using the subjects in this study, the following design was used. Subjects were divided into four groups: less neurotic introverts (LNI), less neurotic extraverts (LNE), high neurotic introverts (HNI) and high neurotic extraverts (HNE), and analyses of variance with unequal numbers was used. The remaining hypotheses did not predict interaction effects and were tested using a correlational design.

Apparatus

Extraversion and Neuroticism

In order to divide subjects into extraverted and introverted groups, and to establish their level of Neuroticism, the Eysenck Personality Inventory (EPI) was administered. This instrument is a yes-no inventory with two parallel forms, each consisting of a 24-item Extraversion (E) scale, a 24-item Neuroticism (N) scale, and a 9-item Lie (L) scale. It has been used extensively for research purposes and claims to measure the subjects level of behavioural Extraversion and Neuroticism as described by H.J. Eysenck. Eysenck and Eysenck (1963) suggest that N is similar to the description of anxiety given by Taylor in her Manifest Anxiety Scale (Taylor, 1953), and

this may indicate that N level could fluctuate slightly according to environmental stress, despite the subject's constitutional level of N, as suggested by Cattell and Scheirer (1961).

The normal standardisation sample for the EP1 was composed of 2,000 British subjects from various social groups including students, apprentices, professional and managerial personnel, and skilled working-class. Eysenck (1968) also presents an abnormal standardisation group composed of various neurotic and psychotic subjects. The mean E and N scores for mixed neurotics on form A were 9.951 and 14.869 with SD of 4.345 and 5.557. Eysenck's results for separate psychiatric groups are presented in Table II.

Test-retest reliability was investigated on two groups of normal subjects, with time elapsing between tests of approximately one year. Reliability was between 0.84 and 0.94 for the complete test, and 0.80 and 0.97 for the separate forms. Results for split-half reliability tests from 1,655 normal subjects, 210 neurotic subjects and 90 psychotic subjects range from 0.74 to 0.91 and reliabilities for the whole scales, using the Spearman-Brown prophecy formula ranged between 0.85 and 0.95. Eysenck (1964) suggests that this indicates that for making individual decisions based on EPI, both forms should be used but for experimental studies, one form alone is sufficient.

In the present research form A only was used in order to prevent the experimental tasks from becoming too numerous and lengthy, thereby reducing the motivation and co-operation of

the already rather anxious psychiatric patients.

Validity of the EPI

Sybil Eysenck (1962) and Eysenck & Eysenck (1963b.) used the method of "nominated groups" to investigate the validity of the EPI. They found that there were clear and predictable differences on the scales between the respective extreme groups.

Vingoe (1966) investigating the validity of the EPI, asked subjects to rate themselves on a seven-point extraversion-introversion scale, and to complete the EPI. A correlation of 0.63 was obtained. Results appeared to support the validity of the EPI, but indicated that introverts as defined by self-ratings were somewhat more aware of their position on an extraversion-introversion continuum than extraverts.

Gibson (1971) also used the method of nominated groups with 38 undergraduate students to investigate the validity of the EPI. Each subject completed the EPI himself and also used it to rate another person, in the group, who was well-known to him. Gibson also collected sociometric data produced by individuals well-known to each subject. His results supported previous work on E and N. The major finding was that the rating made by another person on the E and N scales produced scores which significantly correlated with the scores that the individual obtained himself. The correlation was slightly higher on the E than the N scale. The sociometric data indicated that E was positively correlated with social popularity.

It is possible that the validity of the EPI is affected by cross-cultural use (Buros, 1972), as the norms have been

produced for British subjects. Eysenck and Eysenck (1963c) suggest that results with the Maudsley Personality Inventory (MPI), which preceded the EPI, from comparable American groups do not differ from British groups.

Vingoe (1966) tested a sample group of 58 normal American adult students on the EPI and found that the mean and SD of the E scale was 12.08 and 4.37, and of the N scale was 9.04 and 4.8. These lend support to the theory that the EPI is valid for use with the American population as suggested for the MPI, as the results are comparable with those of Eysenck for British subjects. Results are compared in Table I. Research by Harrison and McLaughlin (1969) with American students also supports this. The results of the present sample of New Zealand subjects also tentatively support this cross-cultural validity and are presented in Table II.

Table I
British Norms for EPI compared with mean scores of American sample

Extraversion	British	American
\bar{X}	12.07	12.08
SD	(4.37)	(4.37)
Neuroticism		
\bar{X}	9.065	9.04
SD	(4.78)	(4.8)

Response Sets

Reponse sets have been investigated as they concern the EPI. Acquiescence response set has been found to play a small

role, and should be borne in mind with certain groups of subjects (Eysenck and Eysenck, 1963(a), 1964). Also "desirability" response set appears to play a part when the EPI is used for selection purposes, but can be detected by the L scale (Eysenck and Eysenck, 1963(b)).

Gibson (1971) points to his own research which indicated that there was an insignificant correlation between how a person scored on the L scale and the score given to him by another subject. He suggested that there appeared to be a tendency for a subject to project his own level of L onto the person that he was rating.

Gibson (1962) investigated the L scale items to see if they measured any consistent response tendency of the subject, and whether the L score had any bearing on the measures of E and N in research with normal people. He found that the L score had no significant correlation with E but that it was significantly and negatively related to how a person scored on the Neuroticism scale: high L scores were associated with lower N scores.

In their research with a group of 107 depressive patients, Bailey and Metcalfe (1969) found that the mean L score on the EPI was 4.3. Research by Knowles and Kreitman (1965) also produced high L scores amongst neurotic patients. This would seem contradictory to the negative relationship between N and L found by Gibson, although the non-linearity of this relationship may indicate that with very high levels of N, as found in many neurotic patients, the relationship between N and L may change.

Various reviewers (Buros, 1972) indicate that for research into Eysenck's personality theory, the validity of the EPI is unquestioned and it is probably the best instrument now available, although it is suggested that it's adequacy for other than research purposes has yet to be verified. There is also some question of deficiencies in the American norms which should be taken into consideration when used with American subjects.

Expansiveness and Colour.

In order to examine the subjects' graphic expansiveness and their colour preferences, two coloured drawings were obtained from each subject. Two sheets of white cartridge paper 21 x 16½ inches were given to each subject, and a box of oil pastels containing twelve different colours.

Oil pastels were chosen because they produce clear, bright colours which do not mix together easily when applied, thereby making it easier to count the number of different colours used. Despite this tendency for the colours to remain discrete, the pastels can still be used freely, easily covering large areas and yet enabling the subject to draw fine lines if he so wishes.

Subjects were asked to do two drawings. They were given a topic for the first drawing and had a free choice for the second. Expansiveness was measured by means of a sheet of transparent paper, the same size as the subjects' cartridge paper, which was divided into one inch squares to form a grid. This was placed over the drawing and adjusted to fit the drawing into the smallest possible number of squares: i.e. the bottom edge and left edge of the actual drawing were placed on

the edge of the nearest appropriate row of the grid. The number of squares containing some part, however small, of the drawing, were then counted and recorded.

The correlation between the size of drawings 1 and 2 was $r = .424$, $p < .01$, whilst the correlation between the number of colours used in the two drawings was $r = .28$, $p .05$. This provides a limited reliability measure between the two drawings.

Time

In order to test hypothesis 5, that introverts will take longer over a task than extraverts, the length of time taken to complete the EPI and each separate drawing was recorded. This produced three separate measures of time taken to fulfill a task. For the analyses the times taken for the two drawings were grouped, but the time taken to do the EPI was kept separate. The correlation between the times taken over the two drawings was $r = .46$, $p < .001$.

Complexity and angularity

In order to investigate subjects' preference for complexity and angularity of graphic stimuli, a set of twelve black and white designs was generated. The three-inch square designs were glued onto cards $7 \times 3\frac{1}{2}$ inches.

The twelve designs comprised six angular and six curved designs. Each angular design was matched to a curved design for complexity and maintained the same general shape, number of elements and direction of "movement" as the other. The six pairs of angular and curved designs became increasingly more complex from design one to design six. Berlyne's (1958)

levels of complexity for designs were followed as closely as possible. These six pairs of cards matched for complexity were used to test the subject's preference for angularity. The pairs were presented twice, reversing the left and right hand position of each card on the second presentation, to give a possible maximum score for angularity of twelve.

Each angular design was paired with every other curved design. This gave 15 pairs of each from which 10 were picked at random to test subject's preference for complexity. A full paired comparisons exercise was not used because the additional time needed to present 30 rather than 20 pairs was considered undesirable for the present subjects. The total maximum complexity score possible was thus 20.

Every effort was made to keep the designs completely non-representational, as associations with known objects could change a subject's preference. However, several subjects remarked that certain designs reminded them of objects, so that this was not entirely successful.

An effort was also made to keep the designs as similar as possible in aesthetic appeal. There are "good" and "bad" technical points to be observed when creating designs, such as balance and contrast. If these vary in appeal from one design to the next, then choices will be made, not according to personality preference, but according to aesthetic appeal. (Eysenck (1968) and Eysenck and Castle (1970) demonstrated, by factorial studies of polygonal figure preferences, that there is a strongly marked general factor indicating that judgements are based on a common aesthetic ability predisposing

subjects to agree, to a greater or lesser extent, with the "correct" choices. Although some subjects may have more ability at judging aesthetic objects, the general trend from all subjects would be to choose the more aesthetically pleasing one.

For the present set of designs, although aesthetic appeal was considered, any difference between the designs was not checked out. It would probably have been best to present the twelve designs to a selected group of art "experts" with instructions to sort them into more or less aesthetically pleasing. If there were any definite discrepancies, these could have been corrected. As this was not done there is a slight possibility that some of the designs may be more aesthetically pleasing than others, regardless of complexity or angularity. Designs, in order of presentation, are shown in Appendix VII.

Subjects

The subjects in the present study were 51 patients admitted to day-care or in-care at the psychiatric unit of a public hospital, during the months of October, November and December, 1976. All patients admitted were asked to participate, although it was explained that participation was entirely voluntary. Only 4 patients refused. 12 others were excluded for a variety of reasons: physical disabilities, senility, inability to understand instructions and incapacitating psychosis. All of the subjects were able to follow the instructions and carry out the tasks required, but levels of motivation varied considerably. Some subjects required a great

deal of encouragement to continue with the tasks. This encouragement was given with as little interference to basic instructions as possible but as a result, those instructions cannot be considered standardised for all subjects.

Testing was undertaken as soon after admission as possible, to prevent "practice effects" resulting from possible participation in occupational therapy programmes. However the Unit functions as a Crisis Intervention Centre, and most subjects were under considerable stress on admission; therefore, many were unable to participate for several days after admission. Because of this difference in length of stay at the Unit before testing, some subjects may have become more comfortable with the environment than others, and this may have affected their motivation and performance.

Out-patients were not included in the study for several reasons. Some have previously been through the day-programme and could have been practiced at the expressive work required by the study. Also, out-patients have other commitments on their time and tend to be reluctant to agree to extra sessions outside their normal therapeutic interviews.

The mean E and N scores of the present sample are similar to those of Eysenck's mixed neurotic group, although SDs are slightly smaller. The mean E score was 9.71 with SD of 3.49. The mean N score was 16.41 with SD of 4.67, and is slightly higher than that obtained by Eysenck (1964). This may reflect the crisis intervention orientation of the Unit, as most subjects would be under considerable stress on admission and anxiety level would be expected to be at its highest point. Eysenck does not elaborate on the composition of

his mixed neurotic group, but it could be that they were longer term patients at a psychiatric hospital, whose anxiety or N level would be relatively stabilised.

Alternatively they could include out-patients who were able to function reasonably well in society, suggesting that their N level had not yet become incapacitating. The EPI results of a group of out-patients from the present Unit would be useful in investigating this possibility, but as yet this has not been followed through.

Table II presents a comparison of the EPI scores for separate psychiatric groups in Eysenck's (1964) and in the present study. Again, the N scores are higher than those of Eysenck, but the trends remain the same. N scores of the schizophrenic group are lower than the scores of the other three groups which are relatively similar. On the E scale, trends also tend to be the same for both samples, but scores

Table II

EPI score for Eysenck's (1964) psychiatric groups and the present sample.				
	Eysenck (1964)		Present Study	
	E	N	E	N
Anxiety	\bar{X} 9.45	15.79	6.66	19.33
Obsessional	\bar{X} 8.69	15.17	7.00	10.50
Hysteric	\bar{X} 11.74	15.16	10.33	19.00
Schizophrenic	\bar{X} 9.63	10.35	9.66	11.00

are generally lower than Eysenck's. This may again reflect the orientation of the Unit from which the subjects were taken. Bailey and Metcalfe (1969) have demonstrated, that the mean E score of patients increases between admission and discharge for depressive patients. As the bulk of the present sample would fall into the depressive category, and Eysenck does not include this category in his grouping it seems possible that the present subjects are reflecting this lower E score present on admission.

The mean L score in the present sample was 3.5, and high L scores were also associated with lower N scores as suggested by Gibson (1962), $r = - 0.3472$, $p < .02$.

Division into groups.

In order to divide the sample into the four required groups LNI, LNE, HNI and HNE, subjects with an N score of 15 and below were formed into a less neurotic group, whilst those with a score of 16 and above were formed into a high neurotic group. The cutting point was chosen on the basis of a break in the distribution of N scores, which occurred around the mean score of the present sample.

These groups were further divided into extraverted and introverted groups. Those with E score of 9 and below formed the Introverted group and those with E score of 10 and above formed the extraverted group. A true median split would have involved some subjects with a score of 9 falling into the extraverted groups, whilst others would have fallen into the introverted groups. Eysenck (1964) quotes a mean of 9.95 on the E scale in his standardisation sample which suggests that

classifying those who scored 9 and below in the introverted group accords with his data.

this division of subjects produced 4 unequal-sized groups. There were 6 subjects in LNI, 13 in LNE, 21 in HNI, and 11 in HNE. The largest number of less neurotic subjects, fell into the extraverted group, and the largest number of high neurotic subjects fell into the introverted group. The mean N and E scores for each group are presented in Table III.

The mean age of the subjects for each group was also calculated and results are also presented in Table III. The HNE group was composed of younger subjects than either of the other groups, all three of which had a mean age of approximately 40. Age was not controlled in the present study and this could have been a confounding variable accounting for some of the trends in the data presented.

Within the total sample there were 16 males and 35 females. 5 males were in the introverted group and 11 were in the extraverted group. Only 2 male subjects fell into the 30-50 age group.

TABLE III

Mean and SD of N and E scores, and age, for present groups				
	LNI	LNE	HNI	HNE
Extraversion				
\bar{X}	5.5	14.38	6.38	13.64
SD	(2.43)	(3.28)	(1.66)	(2.84)
Neuroticism				
\bar{X}	12	1.92	19.38	19.36
SD	(2.28)	(3.04)	(2.18)	(4.09)
Age				
\bar{X}	42.66	40.50	38.9	28.18
SD	(11.78)	(22.83)	(15.1)	(6.9)
Sex males	2	7	3	4
Total no. Ss.	6	13	21	11

Procedure

Subjects were told that the tasks they would be asked to do were being used for a research project studying personality and drawing. It was emphasised that it did not matter if they could not "draw", as artistic merit was not being considered, and also that the results would not affect in any way, their own treatment whilst at the Unit.

Each subject was tested individually in a small room, with the experimenter present throughout. Tasks were presented one after the other, in the same order for each subject. Instructions were standardised as much as possible.

Subjects were told that the project would consist of three separate tasks and the following instructions were given for

task 1 after presentation of 2 sheets of white paper:

"I would like you to do two drawings, one on each sheet of paper. They do not have to be realistic, they can be abstract designs or patterns if you wish. Anything that is meaningful to you yourself. You can use as few or as many colours as you like. The first drawing I would like you to try is your impression of yourself - how you see yourself. Remember, it need not be realistic. There is no time limit for these drawings."

Before the second drawing was undertaken, these instructions were given:

"I now want you to draw anything you like. You have a free choice."

Subjects were timed for each drawing.

Using standard instructions, the EPI was administered after the completion of both drawings. Again each subject was timed.

The final task presented was the choice of paired designs. The angular-curvilinear set were presented first, and the complex-simple set were presented immediately after. There was no break between the two sets. Instructions given for this task were:

"I want you to tell me which of each pair of designs you prefer. You may not like either, but I want to know which one you prefer to the other."

The designs were placed in front of the subject the correct way up, and he did not handle or move them.

Scoring

Standard scoring was used for the EPI, and scoring for

expansiveness, time and number of colours has been explained previously.

In order to obtain scores for preference of angular and complex stimuli, the designs chosen by each subject were checked on a scoring sheet (Appendix VI) and total scores for angular and complex preferences were recorded. As the scores for angularity-curvilinearity and those for complexity-simplicity are reciprocals, only the total angular and complex scores chosen are reported.

During scoring a distinction was made on the scoring between angular and curved stimuli when testing for preference for complexity. As this did not produce any useful information, the data for all angular scores has been grouped into one total complexity score.

CHAPTER 10

RESULTS

The raw data for each subject, plus means and standard deviations for the four groups LNI, LNE, HNI and HNE is presented in Appendix I. The mean and SD for the two introverted and extraverted groups, ignoring N, was calculated for the variables of time, colour and angularity. These are presented in Appendix II. Correlations and partial Correlations were obtained using Omnitab (National Bureau of Standards, 1971) and these results are presented in Appendices III and IV.

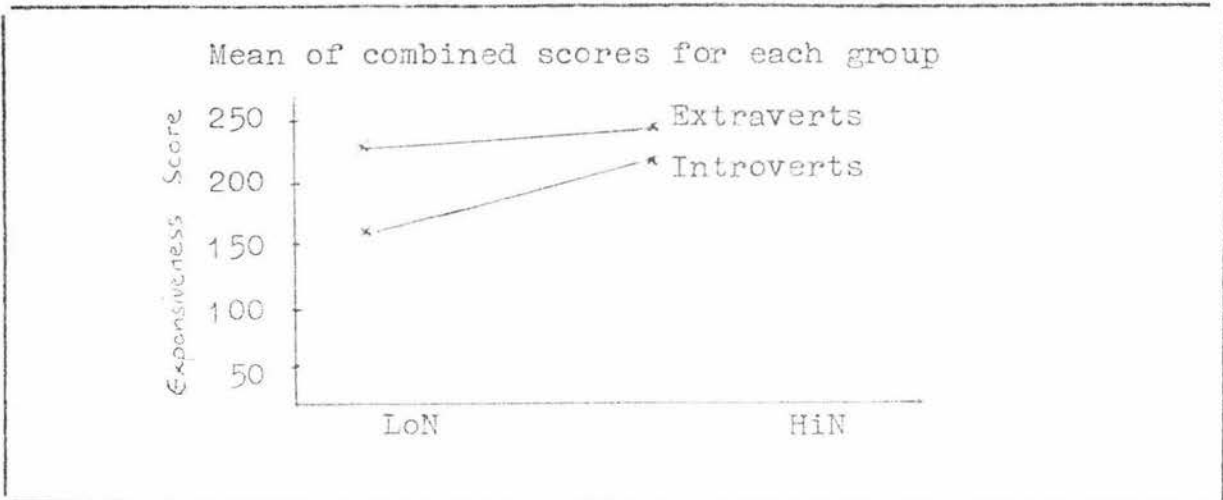
Graphic expansiveness.

In order to test hypothesis 1, that N will interact with E in the production of graphic expansiveness or constriction, ANOVA was applied to the subjects' combined scores for the four groups LNI, LNE, HNI, and HNE. The results are presented in Table IV, and mean scores for each group are represented in Table V.

Table IV

ANOVA of expansiveness combined scores					
Source	df	SS	MS	F	P
Extraversion	1	880.39	880.30	0.0463	NS
Neuroticism	1	14634.13	14634.13	0.7704	NS
E x N	1	9195.27	9195.27	0.4841	NS
SS within	47	892717.0	18994.0		
Total	50	910539.75			

Table V



The results of ANCOVA were not significant and did not support the hypothesis that less neurotic extraverts would be more graphically expansive than less neurotic introverts, or that N would interact with E to reverse this in the high N groups. Although no significant results were obtained, some trends are suggested by the data.

Extraverts tended to be slightly more graphically expansive than introverts when N level was lower. On all three measures of expansiveness, LNI obtained the lowest mean score. On drawing 1 LNE obtained the highest mean score, but on drawing 2 and on the combined scores HNE obtained the highest mean score, and HNI the next highest mean score. N level may have had some effect on graphic expansiveness. The correlation between E and graphic expansiveness was not significant ($r = .06$, $p < .66$). Partialling out age and age and Neuroticism does not increase this correlation (Appendix IV).

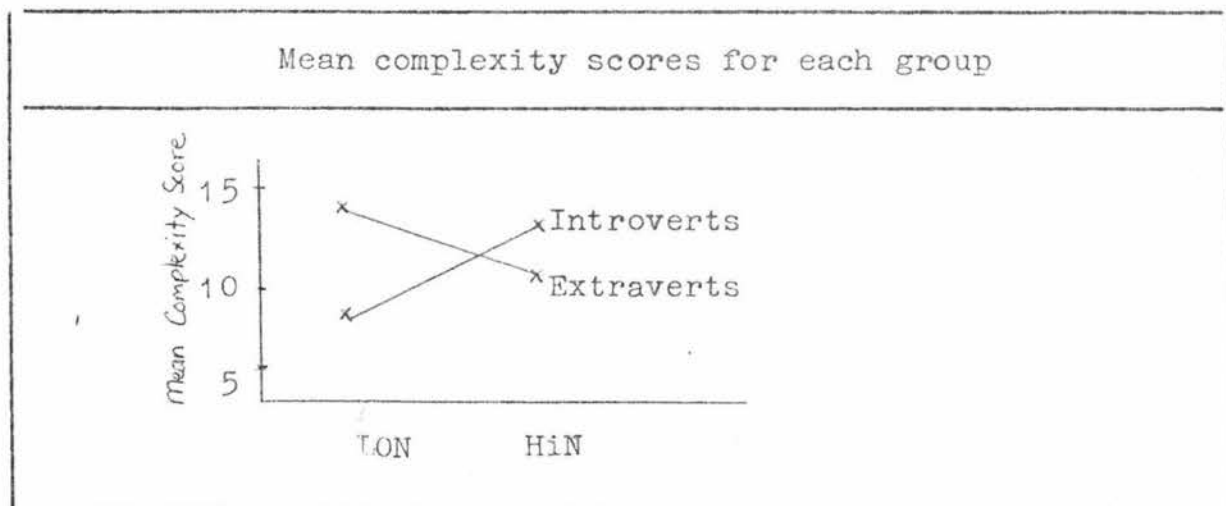
Preference for complexity.

In order to test hypothesis 2, that N level will interact with E level in preference for complex or simple stimuli, ANOVA was applied to mean complexity scores for the four groups. Results are presented in Table VI, and mean scores for each group are presented in graphic form in Table VII.

Table VI

ANOVA of complexity scores for each group					
Source	df	SS	MS	F	P
Extraversion	1	16.48	16.48	0.5442	N.S.
Neuroticism	1	6.35	6.35	0.2096	N.S.
EXN	1	111.71	111.71	3.6894	N.S.
SS within	47	1423.11	30.29		
Total	50	1557.65			

Table VII



Again the results of ANOVA are not significant and do not support the hypothesis. However, there is a positive correlation ($r = 0.28$, $p < .04$) between E and preference for complexity, and this remains the same when age is partialled out. When both age and N level are partialled out the significance increases ($r = 0.31$, $p < .03$) (Appendix IV).

There appeared to be some interaction effects from increased N level, but this trend was not in the direction predicted, that both extraverts and introverts with high N level would prefer less complex stimuli. High N level appeared to be related to a reversal of preference for complexity as shown by less neurotic subjects. HNE tended to choose less complex stimuli and HNI tended to choose more complex stimuli than the respective less neurotic groups.

Angularity, Colour and Time

Hypotheses 3, 4 and 5, that extraverts will prefer more angular stimuli, use more colours and take less time over a task than introverts, were tested through correlational analyses. Intercorrelations of relevant data are presented in Appendix IV. There were no significant correlations between E and any of the three variables under observation to support the hypotheses proposed. Partialling out age increased the level of correlation between E and the number of colours used, graphic time and angularity, and reduced the level of correlation between E and EPI time. Partialling out age and N made little difference to the correlations between E and these three dependent variables.

Supplementary Analyses.

Despite the lack of significant results in support of the hypotheses proposed, the data collected has produced information on possible trends and relationships between the variables which had not previously been considered.

Age.

The age of the subjects appeared to be a significant variable. There is a positive correlation ($r = 0.36$, $p < .01$) between age and the time taken on the EPI. However there is no significant correlation between age and time taken over two drawings. There is a negative correlation between age and graphic expansiveness ($r = -0.37$, $p < .01$) and between age and number of colours used ($r = -.36$, $p < .01$). Age does not correlate significantly with E, N, angularity or complexity. Data is presented in Table VIII. Although partialling out age in the correlations between E and the various dependent variables does not result in any significant relationships, it does affect the level of correlation, indicating the need to control for this (Appendix IV).

The negative correlation between age and graphic expansiveness may indicate that results from the HNE group may have been affected by the younger mean age of the subjects in that group: the graphic expansiveness score would be expected to be greater than that for the other groups. This was so for drawing 2 and for the combined scores, but graphic expansiveness for drawing 1 was less than that for both LNE and HNI groups.

Table VIII

Correlations between Age and dependent variables		
	Age	
	Correlation	Significant level
Neuroticism	- .14	N.S.
Extraversion	- .2	N.S.
Time EPI	.36	.01
Time (total)	- .25	N.S.
Colours (total)	- .36	.01
Expansiveness (total)	- .37	.01
Angularity	.21	N.S.
Complexity	- .03	N.S.

Sex

There was a significant difference between scores on the E scale for males and females ($t = 2.6689$, $p < .02$). Of the 51 subjects, 16 were males, and of these, 11 were in the extraverted groups. This supports the suggestion that males tend to be more extraverted than females, or at least tend to rate themselves more highly on the extraversion dimension.

Additional ANOVA.

Despite the lack of correlation between E and preference for angularity, the results for this variable presented some possibly interesting information. There appeared to be little difference between extraverts and introverts on choice of angular stimuli, but when N level was taken into consideration,

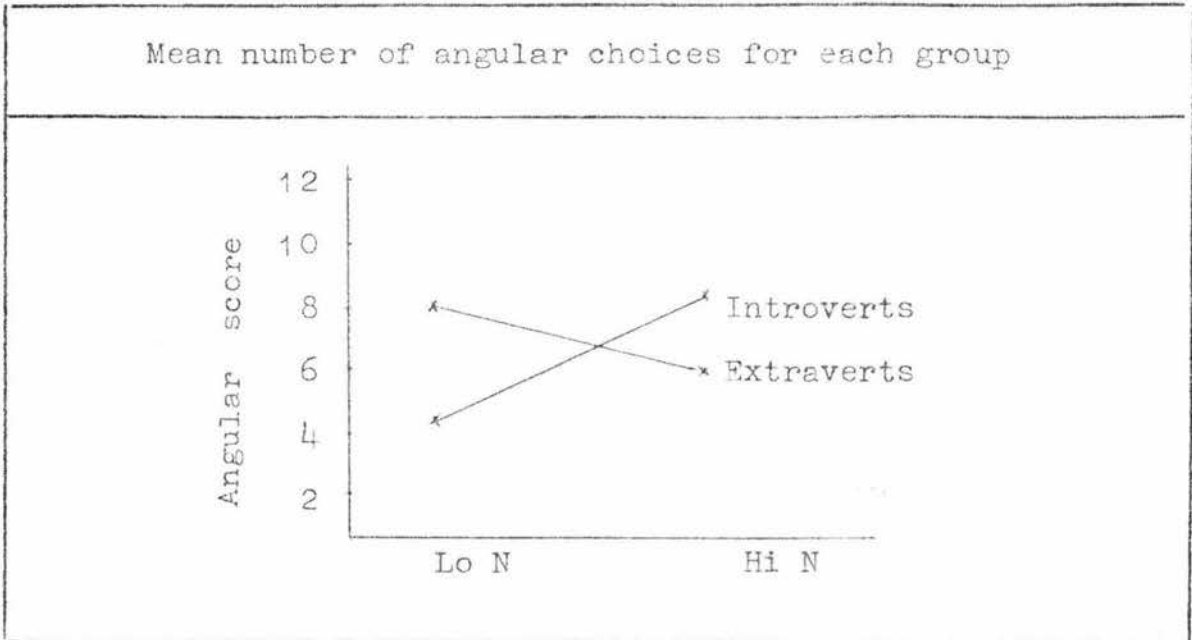
differences appeared between the mean scores of the four experimental groups. An ANOVA was applied to those four groups and results are presented in Table IX. The means for each group are presented graphically in Table X. The results showed no significant differences but there appeared to be a trend toward interaction between E and N.

Table IX

ANOVA results for preference for angularity scores					
Source	df	SS	MS	F	P
Extraversion	1	1.26	1.26	0.6578	N.S.
Neuroticism	1	2.39	2.39	0.1095	N.S.
E x N	1	46.31	46.31	2.127	N.S.
SS within	47	1023.38	21.77		
Total	50	1073.33	21.47		

LNI appeared to choose the lowest mean number of angular stimuli and HNI chose the highest mean number of angular stimuli. LNE chose more angular stimuli than LNI, but less than HNI. HNE chose less angular stimuli than LNE. There again appeared to be some reversal of preferences for angular stimuli when a high level of N was present, as was found with preferences for complexity.

Table X



Intercorrelation of dependent variables.

The intercorrelation matrix in Appendix III provides information on the intercorrelation of the dependent variables in addition to the correlations already discussed.

Most of the relevant correlations have been presented earlier. As might have been expected, there was a positive correlation between the time taken over the drawings and the size of the drawings ($r = .38$, $p < .01$), time taken and the number of colours used ($r = .38$, $p < .01$) and between the number of colours used and the size of the drawings ($r = .6$, $p < .001$). EPI time correlated negatively with size of drawings ($r = -.33$, $p < .05$). This, together with the insignificant correlation between EPI time and graphic time, indicates that there was probably no relationship between the time spent on a verbal task and the time taken over a non-verbal task.

Preference for angularity correlated positively with preference for complexity ($r = .29$, $p < .05$).

CHAPTER 11

DISCUSSION AND CONCLUSION

Expansiveness.

Although no significant results were obtained from the measures of graphic expansiveness, there were trends which followed the predicted direction in hypothesis 1. The mean graphic expansiveness score for LNE on each drawing was larger than that for LNI. HNI produced a larger mean expansiveness score than LNI on both drawings, and LNE produced higher mean expansiveness scores than HNE on drawing 1, but not on drawing 2. When both scores are combined LNI maintain the lowest mean score, HNI and LNE producing larger mean expansiveness scores. However, LNE do not produce larger mean scores than HNE, the latter producing the largest mean score of any group.

These trends, although not statistically significant, are in a similar direction to those found by Wallach and Gahm (1960) and Taft (1967) in their research with doodling and handwriting.

Although there is a significant correlation, $p < .01$, between the size of drawing 1 and drawing 2, a larger number of measures may have given a more accurate result. As the mean size increased between drawing 1 and 2 for all groups, there is an indication that some other variable may have been interfering with one of the two measurements. It is possible that anxiety level would have been higher for drawing 1 as it was the first task undertaken and subjects were unfamiliar with what was required. Most of them were introduced to a new environment, a room that they had not visited before, and a staff member that

they may not have previously met. This postulated increased anxiety level during the first drawing appears to have had a more marked effect on the HNE group, or alternatively this group may have overcome their anxiety more rapidly suggesting that anxiety level may affect expressive movement temporarily in some subjects. Extraversion has been suggested as a more "normal" adaptation than introversion (Wallach and Greenberg, 1960) and as the LNE group showed little difference between the expansiveness of drawings 1 and 2, this hypothesis seems possible. Féré, (1900, Cited in Valentine) when investigating the effects of colour on subjects, using a recorded handgrip, found that an hysterical patient produced the greatest variability. Eysenck (1965) has suggested that hysteria is characterised by a high level of Extraversion and Neuroticism, as demonstrated in the subjects of the present HNE group. Although these subjects were not all diagnosed as hysterical patients, it may be that high Extraversion and Neuroticism produces a tendency towards more variability in behaviour. This was also shown in the present study in the other repeated measure of number of colours used.

Preference for complexity.

Despite Bartol and Martin's (1974) results suggesting that extraverts prefer more complexity, evidence cited earlier showed that there was a negative correlation between levels of anxiety and preference for more complex stimuli. (McReynolds, 1958; McReynolds, Acker and Pietiler, 1961; Zuckerman, Kohn, Price and Zoob, 1964; Penney, 1965). It could be expected, therefore, that a high level of N would alter both introvert's and extravert's preferences towards less complex stimuli: HNI would choose less complex stimuli than LNI, and HNE would choose less complex stimuli than LNE.

Results in the present study indicated that there was a positive correlation between E and preference for complexity, but interaction with N did not produce the predicted results. Partial correlation keeping age constant did not affect the significance, but when age and N were partialled out, the significance between E and preference for complexity increased slightly. This suggested that N level may be interacting with E level and affecting the relationship between E and preference for complexity.

ANOVA also showed that there was a trend towards interaction between E and N, although this did not reach significance level. Results for the less neurotic groups followed that predicted by Bartol and Martin (1974), LNI had a lower mean score for preference for complexity than LNE. However, in the high neurotic groups, HNI had a higher mean score for preference for complexity than HNE.

This trend follows that predicted for graphic expansiveness, and a possible explanation for this could be that preference for complex stimuli is bound to a constitutional threshold level of cortical arousal, as postulated by Eysenck (1967), which may not be congruent with overt or reported behaviour in high neurotic subjects. It is also possible that this perceptual behaviour may be less under conscious control than such expressive behaviour as drawing.

According to Allport (1960) the overt responses of the neurotic individual cannot always be taken at face value. He suggests that their "true motives" are hidden and can only be detected by projective techniques. It is the neurotic personality that reveals himself in projective tests whereas the

"well-adjusted" subject does not give significantly different responses to objective and projective tests. In the present study, measures of graphic expansiveness, preference for complex and angular stimuli can be considered the equivalent of projective tests in that the subjects do not have complete conscious control over their responses unless they are aware of the experimenter's intentions. Although a subject may sabotage a test by not co-operating with instructions, it is almost impossible for him to "fake" the test in a predicted direction unless he knows what the experimenter is looking for.

Angularity.

Although the results for preference for angular stimuli were not significant, the trends were almost identical to those for preference for complexity and again followed Bartol and Martin's (1974) predictions for complexity. LNI chose a lower mean number of angular stimuli than LNE. In the high neurotic groups there was again a reversal: LNI chose a lower mean number of angular stimuli than HNI, and HNE chose a lower mean number of angular stimuli than LNE. The significant correlation, $p < .05$, between complexity and angularity also supported the possibility that both variables may be related to similar personality dimensions and the interaction of these. Therefore what has already been discussed concerning preference for complexity may also relate to preference for angularity; but there may be other variables influencing trends.

Colour and Time.

Results from the two remaining hypotheses, that extraverts will use more colours and take less time over a task, than introverts, do not show trends in any direction: results for each

group are very similar.

However, as stated previously, one trend which did appear in the results for number of colours used, and also showed up in the other repeated measure, graphic expansiveness, was the relative consistency of LNE and inconsistency of HNE. On the graphic expansiveness scores, the mean size of HNE's second drawing is double that of the first. LNE produced a second drawing only slightly larger than the first. Also HNE tended to use twice as many colours on their second drawing, whereas LNE used the same number.

As the mean age for the HNE group was younger than that for all of the other groups, this trend of inconsistency may be related to that variable. However, the relative consistency of the LNE group as compared with both introverted groups, which all have a similar mean age, suggests that interaction of Neuroticism with extraversion may also play a part. Further investigation could clarify this area.

Neuroticism and division of sample.

The present study has produced very few statistically significant results relating to the hypotheses proposed, but the actual division of subjects into the four groups of high and less neurotic introverts and extraverts did itself produce some interesting information.

The largest group consisted of high neurotic introverts. It was almost four times as large as the LNI group and approximately twice as large as each extraverted group. This follows the suggested trend (Eysenck, 1959) that introverts tend to be more neurotic than extraverts. As the present sample

consisted of many subjects with N level above the "normal" mean, it could also be expected to consist of a larger number of introverted subjects if Eysenck's suggestion was correct.

Another possible explanation of this distribution may be that extraverted behaviour tends to result in more positive reinforcement and rewards through increased interaction with the environment. The extravert may, therefore, be able to deal with his high N level for a longer period before he requires professional help, or he may more readily find significant others within his environment who can help him to cope.

Age.

As stated previously, age of subjects in the present study may be related to the results obtained. There was a significant positive correlation between age and time taken on the EPI, $p < .01$, and a negative correlation between age and graphic expansiveness, and age and number of colours used, $p < .01$.

There was a tendency for larger, more colourful drawings to be produced by younger subjects. However, as pointed out earlier, the mean age for the HNE group was considerably lower than that for the other three groups and it would be expected that the mean graphic expansiveness score could be larger for this group than for the other three groups. In fact, there is little difference in mean graphic expansiveness scores of HNI and HNE groups on the combined scores. Although this is probably due in part, to the very low mean score on drawing 1 and the very high mean score on drawing 2 for the HNE group, the HNI group also has an increase in mean graphic expansiveness score for drawing 2.

Partial correlations, holding age constant, have little effect on the significance levels of correlations between E and the various dependent variables. There remains a significant positive correlation between E and preference for complexity, $p < .04$. Correlation between E and number of colours used, graphic time and angularity is increased, but does not reach significance.

Foulds (1959) and Eysenck and Claridge (1962) have studied the interaction of constitution and environment, and suggest that certain factors such as age may have contradictory effects on N and E. The possibility exists that the results for older subjects may not necessarily always reflect an introverted personality, but may be the result of the increasing incapacity of advancing age. The movements of some older subjects may be slower, less expansive and simpler, because of physical and mental ageing processes.

Age is, therefore, a variable which could have been controlled in the present study. Subjects between the ages of 30 and 50, having passed the developmental crises of adolescence and not yet having reached the deterioration of old age, may be somewhat more "stable" in the area of personality dimensions, and provide a more reliable group to test the present hypotheses.

In fact, the majority of the subjects in the present study lay outside this group, only 12 of the 51 subjects lying within it. Distribution of ages of subjects is presented in Appendix V, and may reflect periods of development when stress is at its greatest, namely adolescence, early adulthood and old age. Alternatively, it may reflect the responsibilities of the 30-50 age group in the area of family-rearing and employment, and the

tendency for these individuals to try and cope with emotional stress for as long as possible before seeking professional help.

Sex.

The present study has shown a significant difference between extraversion scores for males and females. Males tend to be more extraverted than females. If, however, extraversion is bound in part to constitution one would expect extraversion and introversion to be spread fairly equally throughout the population regardless of sex. This tendency for males to be extraverted and females introverted may reflect the socialisation process of western culture. Both sexes tend to be conditioned towards a certain type of "appropriate" behaviour, regardless of how they "feel" they want to behave.

Therefore, in western society men are expected to be more aggressive, outgoing and active. They are allowed to give in to impulse and take chances more frequently and are expected to be sociable and have many friends. This is a relatively good description of Eysenck's typical extravert (Eysenck, 1965). If this socialisation process is in contradiction with a man's or woman's, constitutional extraversion level, he may learn the required behaviours but also increase his emotional arousal level to an uncomfortable degree. This could place him higher on the neuroticism scale and thus under stress, lead to some form of emotional breakdown or psychiatric illness. This may explain the distribution of the present sample and it would be of further interest to compare it with a sample of very low N level subjects.

Improvements in design and possibilities for future research.

The lack of control groups of extraverted and introverted subjects with very low N scores, 7 and below, prevented a

comparison of extreme groups which would have shown more clearly any differences between extraverts and introverts when there is interaction with the neuroticism dimension. It is also possible that the low N of some of the present subjects may not have been a true reflection of their actual N level. There is a correlation, $p < .02$, between low N scores and high L scores which suggests that the N level for some subjects may have been higher than that presented in the results. As Dicken (1959) has suggested, some of these subjects may have given a response in forms of an "ideal" self-image, or in forms of an "honest", but un insightful self-assessment.

In fact, during testing, several subjects required encouragement to finish the EPI, and it was noted subsequently that some answers given to N scale questions were contradictory to the subject's attitudes as expressed in general conversation and behaviour. No effort was made to persuade subjects' to re-read or re-consider their answers, and EPI results were scored strictly as presented on first answering.

The division of the present sample into high and low N groups, may not, therefore be strictly reliable. An extraverted group, with E scores of 15 and above, and an introverted group with E scores of 6 and below, would have been more suitable for testing the differences between extraverts and introverts. A high N group with N scores of 16 and above, and a low N group with N scores of 7 and below - all with L scores of 4 and below - would have given a more reliable neurotic and non-neurotic groups. Also, equal-sized groups would have made statistical analyses simpler, and from a design point of view would have been better.

Cattell (1965) has suggested that there are different forms of anxiety or emotional arousal. If this is correct, then the N scale of the EPI may only be measuring one type. Thus some subjects may experience arousal in the experimental situation and others may not, despite the fact that they obtain the same score on the EPI. To ensure a more reliable measure of this dimension, it could be profitable to include only subjects who obtained similar results on one or two different tests purporting to measure anxiety level. For example, the Taylor Manifest Anxiety Scale (Taylor, 1953), or possibly a physiological measure such as the galvanic skin response recorded in a specific situation.

Partial correlational analysis has shown that age probably has had some effect on the present results, and it is also possible that sex of subjects may be involved in some interaction with extraversion. Further studies holding these variables constant, and also controlling certain environmental variables such as length of time after admission before testing, and time of day that tests were administered, would improve the validity and reliability of results.

Although control groups of very low neurotic subjects would have provided a better comparison for testing hypotheses 1 and 2, it may be that lengthening the whole experimental situation and spreading it over several days would also help to obtain accurate measures of the dependent variables. This was not originally considered as it was felt that a subject's motivation and mood could change from one day to the next and lead to some subjects refusing to continue with the experimental programme. However,

it is possible that the reverse effect could happen, and subjects may welcome a break from the general programme in the Unit and also become quite involved in the experimental tasks as a relationship developed with the experimenter.

This relationship may be quite important in obtaining the type of results that the present study requires. Trust in the experimenter and acceptance of the tasks is essential in obtaining the full co-operation of the subject. The study may have been more effective if the experimenter had been able to develop a trusting relationship with each subject and introduce him to the experimental tasks by having him produce one or two drawings prior to the experiment proper. Following this, three or four more drawings could have been collected for measurement and scoring, giving more accurate measures of the dependent variables. Wallach and Gahm (1960) felt that random variability could occur from short-run practice effects, this could be avoided by accustoming the subjects to the task beforehand. In the present study, if all subjects followed the same practice sequence, these short-run practice effects, which may have interfered with the results, would have been avoided. The type of expressive movement required by the present research is that produced when a subject is familiar with the task. Taft (1967) maintained that handwriting was a well-practiced task and therefore indicative of true expressive behaviour.

Similar improvements could be applied to the preference for designs tasks. Designs could have been generated which may have measured subject's preferences for complexity and angularity more accurately. A larger number of designs would have avoided

repetition of designs for both tasks. Designs could have been tested for increasing complexity, optimum size, aesthetic appeal and lack of realistic interpretation. Designs testing preference for angularity and complexity could have been presented randomly, rather than as two separate tests, and a full-paired-comparisons exercise would have been preferable.

According to Martin (1906) and Brown and Farhar (1966) size plays an important part in preference for designs. Larger polygons were found to be viewed longer than identical polygons of one quarter the size. Also they found that up to a certain size, the liking for circles increased with size, but beyond that size the liking for them decreased. The present designs were, therefore, produced on the same sized cards, but the necessity of increasing the number and heterogeneity of elements in order to increase complexity, tended to make the more complex designs appear somewhat larger than the simpler designs. The optimum size for preference of the present designs was not investigated, although this could have been done by generating a number of identical designs in varying sizes and asking a group of subjects to place them in order of preference. The size chosen most frequently could then have been used for the experimental task.

Further studies incorporating these improvements and investigating variables not originally considered such as age and sex, could produce information of value in describing differences between extraverts and introverts, and the possible interaction effects of neuroticism.

Quite apart from Eysenck's personality dimensions, questions have been raised which further research may help to answer. How

is the age and sex distribution of psychiatric patients related to that of the general population? Are there any differences between age and sex distribution of Crisis Intervention Units as compared with traditional psychiatric hospitals? Are males less susceptible to psychiatric illness than females? Does age affect expressive movement? Do personality dimensions also have some effect on these questions?

Conclusion.

Although no significant results, in relation to the stated hypotheses, have been obtained in the present study, and therefore none of these hypotheses can be accepted, trends have appeared which tend to support previous research, and several new areas have appeared which might benefit from investigation. The present study suggests that N does tend to interact with other personality variables to produce apparently contradictory or inconsistent behaviour in the area of expressive movement and preference for visual stimuli. Further research examining each of these variables is required to provide more acceptable evidence of the hypotheses proposed.

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APPENDIX I

GROUP I LNI

N=6

No.	Age	Sex	N	E	Time	Drawing 1			Drawing 2			Comb. Size	Ang.	Comp.	Comb. time	Comb. col.
						Time	Col.	Size	Time	Col.	Size					
30	58	M	13	2	10	9	3	28	4	4	103	131	8	14	13	7
6	33	F	8	4	13.6	5	9	187	16	10	166	353	4	4	21	19
10	45	F	11	5	11	11	7	85	10	9	94	179	6	8	21	16
41	53	F	12	6	23	6	3	28	5	3	69	97	0	0	11	6
39	40	M	14	7	18	20	1	18	7	1	99	117	10	6	27	2
1	27	F	14	9	6	2	6	41	10	11	145	186	4	19	12	17
\bar{X}	42.66		12	5.5	13.6	8.83	4.8	64.5	8.67	6.33	112.67	117.17	5.33	8.5	17.5	11.16
SD	11.78		2.28	2.43	6.09	6.31	2.99	64.51	4.37	4.18	35.85	72.82	7.45	6.9	6.44	3.06

Raw Scores for each S and Means and SDs for each group LNI,
LNE, HNI and HNE

GROUP II LNE

N=13

No.	Age	Sex	N	E	Time	Drawing 1			Drawing 2			Comb. Size	Ang.	Comp.	Comb. time	Comb. col.
						Time	Col.	Size	Time	Col.	Size					
34	58	F	13	10	8	6	1	17	9	6	87	104	12	14	15	7
29	19	M	15	10	14	13	3	27	18	5	144	171	8	5	31	8
21	63	F	10	10	11	7	6	77	13	6	153	230	0	11	20	12
5	17	M	14	11	10	8	4	158	5	7	122	280	0	19	13	11
49	56	F	7	13	19	4	8	102	5	1	94	196	10	6	9	9
37	25	F	7	14	10	2	1	92	3	3	72	164	5	14	5	4
13	67	M	11	15	15	11	2	198	6	1	36	234	12	20	17	3
46	69	F	14	16	18	4	1	23	5	2	77	100	12	13	9	3
51	22	M	7	17	7	6	6	87	8	7	71	158	6	19	14	13
33	28	M	9	17	18	15	11	141	4	4	107	248	4	8	19	15
26	14	F	9	17	5	34	10	343	25	8	351	694	10	17	59	18
16	69	M	11	18	10	5	2	44	2	1	62	106	11	13	7	3
17	20	M	15	19	5	4	1	35	5	6	217	252	12	20	9	7
\bar{X}	405		10.92	14.38	11.54	9.15	4.31	103.38	8.31	4.39	122.5	225.92	7.85	13.76	17.46	8.69
SD	22.83		3.04	3.28	4.86	8.39	3.57	91.21	6.65	2.53	26.12	152.95	4.45	5.18	14.03	4.89

No.	Age	Sex	N	E	Time	Drawing 1			Drawing 2			Comb. Size	Ang.	Comp.	Comb. time	Comb. col.
						Time	Col.	Size	Time	Col.	Size					
11	42	F	19	9	9	2	3	99	5	3	154	253	10	5	7	6
50	47	F	19	9	7	7	6	102	6	9	226	328	6	19	13	15
7	63	M	18	9	11	9	1	35	3	1	49	84	0	3	12	2
19	20	F	17	9	4	8	7	133	8	6	112	245	12	12	16	13
20	29	F	22	9	8	10	4	39	14	8	107	146	8	13	24	12
18	23	F	22	8	5	2	2	144	6	9	80	224	0	19	8	11
25	56	F	17	8	10	9	7	78	10	8	109	187	12	19	19	15
2	23	M	17	7	10	30	10	161	12	3	115	276	8	5	42	13
22	62	F	22	7	9	5	2	8	9	3	54	62	12	14	14	5
36	22	F	22	7	8	11	3	175	13	9	357	532	0	10	24	12
12	28	F	20	7	14	2	5	8	8	1	127	135	12	10	10	6
23	23	M	16	6	10	7	5	165	5	5	27	192	10	15	12	10
40	36	F	21	6	5	9	6	294	9	4	179	473	12	14	18	15
4	29	F	22	6	33	7	5	43	17	6	148	191	12	17	24	11
27	48	F	19	5	13	5	5	64	9	8	161	225	5	11	14	13
32	29	F	19	5	8	5	1	60	6	9	275	335	12	14	11	10
3	59	F	22	4	15	10	4	44	18	10	152	196	8	17	28	14
35	48	F	21	4	12	6	7	231	21	9	355	586	12	6	27	16
47	23	F	17	4	4	12	4	79	9	6	185	264	0	3	21	10
38	53	F	16	3	15	7	3	3	8	2	89	92	7	9	15	5
24	54	F	19	2	16	8	1	42	6	1	41	83	12	14	14	2
✱	38.9		19.38	6.38	10.76	8.14	4.33	95.57	9.62	5.71	147.71	243.29	8.1	11.86	17.76	10.29
SD	15.1		2.18	1.66	6.24	5.76	2.35	77.08	4.68	3.12	92.24	143.22	4.59	9.8	2.88	4.31

GROUP IV HNE

N = 11

No.	Age	Sex	N	E	Time	Drawing 1 Time Col. Size			Drawing 2 Time Col. Size			Comb. Size	Ang.	Comp.	Comb. time	Comb. vol.
45	25	F	21	11	12	18	3	44	12	3	116	160	0	1	30	6
15	26	F	17	11	5	5	4	56	13	10	176	232	0	4	18	14
8	29	M	22	11	4	6	5	244	5	8	229	473	12	4	11	13
42	27	F	20	12	12	3	1	98	6	8	203	301	0	14	9	9
31	35	F	18	12	10	2	1	65	4	4	128	193	10	14	6	5
28	39	M	19	13	11	9	2	38	11	3	21	59	12	7	20	5
9	19	F	16	13	3	5	5	125	10	3	143	268	0	9	15	8
48	30	F	18	15	13	3	6	59	5	4	263	332	10	12	8	10
44	36	F	22	16	8	8	8	77	6	9	342	419	4	16	14	17
43	16	M	20	16	7	10	1	37	14	9	70	107	10	15	24	10
14	28	M	23	20	7	8	5	142	6	7	108	250	12	19	14	12
X	28.18		19.36	13.64	8.36	7.0	3.73	89.54	8.36	6.18	163.54	254	6.36	10.45	15.36	9.9
SD	6.9		4.09	2.84	3.47	4.49	2.33	61.84	3.67	3.56	91.56	125.05	5.5	5.82	7.27	3.86

APPENDIX II

Mean and SD of Angularity, colour and time for
introverted and extraverted groups

	I	E
Angularity		
\bar{X}	9.48	9.17
SD	(4.19)	(4.9)
Colour 1		
\bar{X}	4.44	4.04
SD	(2.45)	(3.01)
Colour 2		
\bar{X}	5.85	5.21
SD	(3.26)	(2.62)
Time EPI		
\bar{X}	11.39	10.08
SD	(6.2)	(4.49)
Time 1		
\bar{X}	8.22	8.17
	(2.45)	(6.83)
Time 2		
\bar{X}	9.41	8.33
SD	(4.55)	(5.38)

APPENDIX III

	Age	N	E	EPI time	total colours	total time	total size	Angularity	Complexity
Age	-								
N	-0.1366								
E	-0.1999	-0.2399							
EPI time	0.3578 * *	-0.1345	-0.1948						
total colours	-0.3626 * *	0.0121	-0.0427	-0.2505					
total time	-0.2517	-0.0129	-0.0870	0.0141	0.3787 * *				
total size	-0.3700 * *	0.1236	0.0615	-0.3270 *	0.6040 * *	0.3805 * *			
Angularity	0.2111	0.1118	0.0820	0.1173	-0.1873	0.0089	-0.0412		
Complexity	-0.0267	0.0536	0.2835 *	-0.1669	0.1419	-0.1516	0.0449	0.2866 *	

Correlational Matrix

* Significant at the .05 level

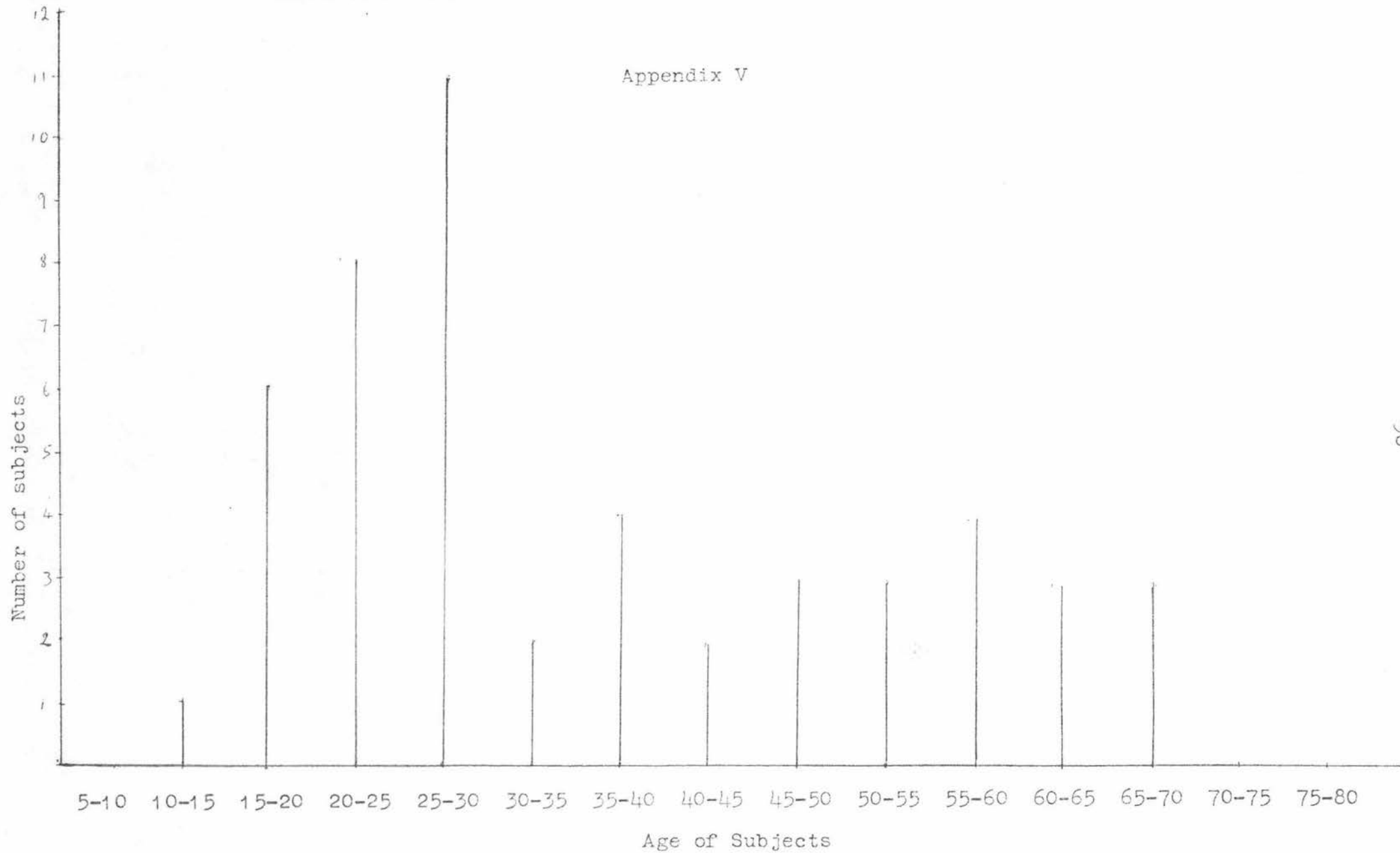
** Significant at the .01 level

Appendix IV

Correlations and partial correlations between Extraversion
and the various dependent variables

Dependent V's	Extraversion		Extraversion with Age fixed		Extraversion with Age & Neuroticism fixed	
	Corr.	Sig. level	Corr.	Sig. level	Corr.	Sig. level
EPI time	-.2	.17	-.14	.35	-.17	.25
No. of Colours Drawing 1 & 2	-.04	.77	-.13	.38	-.14	.33
Graphic time Drawing 1 & 2	-.09	.54	-.15	.32	-.17	.25
Expansiveness Drawing 1 & 2	.06	.66	-.01	.95	.01	.95
Angularity	.08	.57	.13	.37	.18	.22
Complexity	.28	.04	.28	.04	.31	.03

Appendix V



Graph of frequency of ages of subjects

S C O R I N G S H E E T

B NAME	AGE	SEX	DIAGNOSIS

EP1

N =

E =

L =

DRAWINGS	1	2
Time		
No. of Colours		
No. of Squares		
No. of Squares (adjusted)		

DESIGNS Pairings	A	C		C O M P L E X		S I M P L E	
				A	C	A	C
1			1				
2			2				
3			3				
4			4				
5			5				
6			6				
7			7				
8			8				
9			9				
10			10				
11			11				
12			12				
TOTAL			13				
			14				
			15				
			16				
			17				
			18				
			19				
			20				
			TOTAL				

Appendix VII

Paired designs in order of presentation

