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LA THÈSE A ÉTÉ
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A RELATIONSHIP BETWEEN PSYCHOLOGICAL
DIFFERENTIATION AND EXTRAVERSION.

by

Tuntufye S. Mwamwenda

Thesis presented to the School of Graduate
Studies of the University of Ottawa in partial
fulfilment of the requirements for the Degree
of Master of Arts in Education

Ottawa, Canada, 1980

T.S. Mwamwenda, Ottawa, Canada, 1980

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CURRICULUM STUDIORUM

Tuntufye S. Mwamwenda was born in Mbeya, Tanzania, East Africa, on April 14, 1945. He graduated with a Bachelor of Arts Degree from Spicer Memorial College, Poona, India, in 1971 and obtained the Degree of Master of Science in Education from the State University of New York, Plattsburgh, U.S.A., in 1976.

ABSTRACT

of

A Relationship Between Psychological Differentiation and Extraversion

A review of the theoretical literature suggests that there is a relationship between Witkin's psychological differentiation construct and Eysenck's extraversion-introversion construct. Although they appear to be related conceptually, some anomalies exist in the research findings concerning their relationship. Despite this, and in view of the theoretical similarity between the two constructs, the present study was designed to investigate this relationship. It was hypothesized that a linear relationship exists between the two variables; specifically, it was predicted that field dependents are more extraverted than field independents.

The sample consisted of 192 (109 females) grade eleven and grade twelve students from a private school and a public school located in Oshawa and Ottawa, respectively. The subjects' mean age was 17.41 years.

Psychological Differentiation was measured by the Group Embedded Figures Test, and extraversion by the Eysenck Personality Inventory (Form B).

The level of significance was set at alpha 0.05. A 2 x 2 ANOVA, polynomial regression and t tests were used as statistical techniques for the analysis of data.

Statistical analyses of the complete data, although in the predicted direction, did not support the relationship between the two variables. A separate analysis restricted to male subjects, however, showed a significant quadratic relationship between the two variables. Moreover, significant sex differences were observed in both psychological differentiation and extraversion, with male subjects being more field independent and more extraverted than female subjects.

INTRODUCTION

The fact that people differ in their height, colour, beauty and weight is nothing new. Nor is the fact that people behave differently within and outside their social setting new. These differences have always existed. Man has arrived at this conclusion by the use of common sense observation rather than by the aid of laboratory experiments.

In recent years, however, man, due to the development of his scientific-approach, has been rather reluctant to take much for granted. Hence, he has made both successful and unsuccessful attempts at establishing and verifying why people differ in their appearance and behavior. In this search, man has concluded that individual differences are deeper than the past generations and history cared to find out. Researchers (Roback, 1973; Dawson, 1972) clearly show that individual differences are both physiological and psychological in nature. For man to appreciate individual differences as they appear in behaviour and physical structure, he has first to understand his physiological and psychological composition and functioning.

Both Witkin and his associates and Eysenck, among others, have studied and researched man's behaviour from this point of view. Witkin and his colleagues (1962), in their theory of

psychological differentiation, have scientifically studied man's behaviour and concluded that people differ in their perception and cognitive styles. Some people are very analytical in their observation and perception so that they understand and isolate an item or object out of its context without being unduly influenced by the prevailing field, and others are greatly influenced by the prevailing field in their perception. The former they called analytical or field-independent and the latter, global or field-dependent. Field dependents are also characterized as gregarious, affectionate, considerate, conforming and tactful; field independents are cold, individualistic, impersonal and unaware of social stimulus value.

Similarly, Eysenck in his theory of extraversion-introversion has explored individual differences in terms of how the level of arousal plays a major role in shaping personality. In the domain of extraversion-introversion, Eysenck (1967) discusses individual differences between extraverts and introverts; the former are characterized by a low level of arousal. Extraverts tend to be sociable and outgoing, whereas introverts tend to be idea-oriented and are relatively less outgoing. These differences, however, are represented on a continuum with the majority of them tending to cluster at the centre.

The current salient emphasis in education is to treat an individual learner as a unique person rather than classifying him together with the rest on the basis of his IQ, cultural background, age and other factors (Bechtol, 1973). Educational research is showing more and more that personality differences do affect the way a person relates to others, his teachers, his peers, his studies as well as his achievement in school (Evans and Wrenn, 1942; Eysenck, 1971; Goodenough, 1976). The key to the enhancement of individual uniqueness in educating the learner lies in the in-depth and broad understanding of individual differences as indicated in theories of psychological differentiation and extraversion as well as others.

It is interesting to note that both Witkin's theory and Eysenck's theory can be meaningfully related to education (Eysenck and Eysenck, 1968; Witkin, Moore, Goodenough and Cox, 1975). As a matter of fact, in recent years, both theories have been envisaged to be of relevant implication to educational problems. Consequently, both theories have become the centre of an ever increasing rate of educational research which, to various degrees, is of relevant importance in the classroom.

The research still goes on. "A Relationship Between Psychological Differentiation and Extraversion", the title of this study, is part of this research. Personality traits of field dependents and field independents are similar to those of extraverts and introverts, respectively. This suggests that

there is a relationship between the two variables. In fact, Eysenck (1967) and Vernon (1969), among others have suggested such a relationship.

The purpose of this study, therefore, was to examine the relationship between Eysenck's theory of extraversion and Witkin's theory of psychological differentiation. Specifically, it was hypothesized that field dependents are more extraverted than field independents.

This thesis consists of four chapters. The first chapter is made up of a review of related literature concluding with the research hypothesis. This is followed by the second chapter in which the method used in the investigation of the research hypothesis is described. The third chapter consists of the presentation and discussion of the results followed by the fourth chapter which consists of the summary and conclusions.

CHAPTER I

REVIEW OF THE LITERATURE

The purpose of this research project is to study the relationship between psychological differentiation and extraversion as postulated by Witkin et al. and Eysenck, respectively. Research studies by Witkin, Lewis, Hersman, Machover, Meissner and Warner (1954) and Witkin, Goodenough and Karp (1962/1974) have shown individual differences in perception, space orientation, personality patterns and intellectual functioning. Similarly, Eysenck (1957, 1967) has observed individual differences in personality patterns. From a critical review of the literature, a rationale is proposed to relate the two variables, namely, psychological differentiation and extraversion.

In the first section of this chapter, the nature of psychological differentiation is presented, followed, in the second section, by a description of the measures of psychological differentiation. In the third and fourth sections, sex differences and the characteristics of field dependents and field independents, respectively, are described. Eysenck's theory of extraversion is introduced in the fifth section. This is followed by an argument for the relationship between the two variables in the sixth section. In the last section,

the statement of the problem and the research hypothesis are formulated.

1. The Nature of Psychological Differentiation

In this section, the historical development and major characteristics of psychological differentiation theory will be described.

Psychological differentiation is a global concept by which Witkin identifies individual differences in personality, affect and cognition. For the last three decades, Witkin's theory of psychological differentiation has undergone various stages or phases of development. Its earliest development may be traced to the laboratory experiments in which Witkin and his colleagues were interested in how people locate the upright in space (Witkin and Asch, 1948, and Witkin, 1949, 1950, 1952). To do this, they developed several types of instruments, namely, the Rod-Frame Test (RFT) and the Tilting-chair- and tilting-room Test (TCTR) which consists of the Body Adjustment Test (BAT) and the Room Adjustment Test (RAT). The subjects' performance on these measures of psychological differentiation indicated some distinct individual differences in perception as well as in space orientation. For example, on the RFT some subjects were able to bring the rod to an upright position, whereas others could not; on the BAT some subjects managed to sit upright in a tilted room, whereas others were influenced by the position of the room.

To explore individual differences in psychological differentiation further, Witkin et al. (1962) devised another instrument, the Embedded Figures Test, and found a relationship between the performance on EFT and location of upright in space. While some subjects were able to detect the embedded geometrical figures easily, others experienced difficulty in tracing the embedded figures.

From the above evidence, it was postulated (Witkin et al., 1954; Witkin, Morre, Goodenough and Cox, 1975; and Witkin and Goodenough, 1976) that the underlying individual difference in performance on the given tests was the extent to which a person perceives part of a field as discrete from the whole. For the individuals who were more influenced by the prevailing field, their mode of perception was labelled "field dependent", and for those who viewed parts as discrete from the whole, their mode of perception was labelled "field independent".

It is argued (Witkin, Oltman, Raskin and Karp, 1971; and Witkin et al., 1976) that the subjects' scores range over a continuum and are no more than a reflection of people's tendency toward one mode of perception or another. They do not imply that there are two different and distinct types of people.

In the second phase, it was further observed (Witkin and Goodenough, 1977, p. 3) that people do not only differ in their mode of perception, but also in the manner in which they deal with symbolic representation such as thinking and problem-

solving. A field dependent person who does not easily see a part from the whole is also likely to have difficulty solving a problem whose solution depends on his taking some critical element out of the context and restructuring the given information (Dunker, 1945 and Witkin et al., 1975).

Moreover, Witkin et al. (1977) also observed that the field-independent person has greater facility to overcome the dominant organization of a field by isolating items as discrete; the field dependent person is more submissive to the dominant organization and finds it relatively difficult to isolate parts from the whole. In a situation where the dominant organization lacks inherent order, such as in the Rorschach inkblots, a field-independent person tends to impose a structure, whereas a field-dependent person tends to accept the structure as it is (Witkin et al., 1974; Moore, Gleser and Warm, 1970; and Dreyer and Nebelkopf, 1970).

Witkin et al. (1975) further noted that the ability to impose a structure where there is none is not limited to perceptual material, but also extends to verbal material. This is supported by studies carried out by Bruce (1965) and Kleine (1968). On the basis of empirical evidence of a relationship between structuring tendencies and analytical tendencies, Witkin and his associates (Witkin, Goodenough and Oltman, 1977) were led to conceive individual differences in perception and space orientation as lying on an "articulated-global continuum".

A person who tends to experience the perceptual field in an articulated manner perceives items as discrete from background in an organized field; in a nonorganized field, he restructures the field and perceives it as organized. On the other hand, a person who tends to experience the visual field globally does not engage in the analysis and restructuring of the field to a significant degree.

According to Witkin and Goodenough (1977), the articulated-global concept is applicable to information processing as in the case of perception or symbolic material. Field-dependence-independence, therefore, is an analytical perceptual component of a larger dimension that includes analytical and structuring processes in perceptual and intellectual content. Witkin et al. (1975, 1977) argue that their theory deals with a broad dimension of individual differences which extends across perceptual and intellectual spheres. Since a person's approach to problems is applied to a variety of situations, Witkin et al. (1975) call it a "style". Further, since a person's mode of field approach encompasses both his perceptual and intellectual activities, his mode of field approach is called a "cognitive style". Witkin et al. (1974) have also argued that individual differences in psychological differentiation include the domain of personality.

In general, cognitive styles (Witkin and Goodenough, 1977, p. 30) may be characterized as follows: First, they refer to the form rather than the content of cognitive ability; they differentiate individuals in how they perceive, think, solve

problems, learn and relate to others. The focal point is the process. Secondly cognitive styles are pervasive in the sense that they are a feature of personality rather than being confined to cognition. Thirdly, they are stable over a long period of time so that it is possible to predict one's cognitive style, although this predictability does not overrule the possibility of change. Fourthly, cognitive styles are bipolar; this is important to note in distinguishing cognitive styles from intelligence and other cognitive abilities. In terms of ability, the more one has the better one is (Jensen, 1969). This is not so with cognitive styles; the pertinence of one's style can only be judged in relation to the circumstance with which one is confronted (Witkin et al., 1971, pp. 12-13; Witkin et al., 1976, pp. 44-46).

Psychological differentiation, however, is a more global concept (Witkin, Goodenough and Oltman, 1977) than field dependence or cognitive styles. According to Witkin (1965, pp. 319-322), psychological differentiation consists of the following components: integration, body concept, specialization, sense of separate identity and defence mechanism. Integration refers to the functioning of the interrelationship of the various components; it is subdivided into effective and complex integration. The former is the harmonious integration of the various components in relation to one another and the interaction of the total system with the

environment (Witkin, 1974, p. 10). Complex integration is an elaboration of the relationship within and among a system's components and the environment. According to Witkin et al. (1974), the complexity of a system is a function of psychological differentiation.

Body concept as a differentiation component refers to one's impression of his body either affectively or cognitively, consciously or unconsciously (Witkin, 1965, p. 319). Field-independent people tend to have a more articulated body concept; they experience their bodies as having distinct limits and perceive the various parts of the body as discrete and yet interrelated and formed into a definite structure (Witkin, 1962). Field dependents tend to have a weaker articulated body concept; for instance, in their drawings of persons, they tend to show less distinct differences between males and females (Witkin, 1965, p. 320).

Psychological differentiation is also related to a sense of separate identity (Witkin, Goodenough and Oltman, 1977). Field independents have a relatively developed sense of separate identity in the sense that they are relatively more capable of recognizing and identifying needs, feelings and attitudes that they can claim as their own and distinct from those of others; they also experience self as segregated and structured and have a relatively more developed internal frame of reference which they use as a guide for self-definition

(Witkin et al., 1974, p. 156). On the other hand, field dependents' sense of separate identity is relatively less developed (Witkin et al., 1971, p. 5).

Specialization refers to one's psychological ability in differentiating between perceiving and thinking and between acting and thinking (Witkin, 1974, p. 10). A relationship between psychological differentiation and the use of defence mechanism was also observed, with field independents tending to use more specialized defences such as isolation, intellectualization and sublimation, in contrast to field dependents who tend to use primitive denial and massive repression (Witkin, 1965, p. 322 and Witkin et al., 1977).

According to Witkin et al. (1954), psychological differentiation is developmental, consistent and stable. Under normal development, differentiation increases with age so that children are less differentiated than adults (Witkin and Goodenough, 1977). It is stable relative to the group involved so that a child who is less differentiated compared to his peers is likely to maintain a similar relative level of differentiation in adulthood (Witkin, Goodenough and Karp, 1967, p. 292). In cross-sectional and longitudinal studies, for example, Witkin et al. (1954) demonstrated an increase in differentiation; every subject involved showed an increase from field dependence to field independence. It was also noted that for the average person, the transitional change from field

dependence to field independence is completed by the age of 17 years.

While Witkin (1967) admits that the development of psychological differentiation reaches a plateau in early adulthood, he is aware that after the age of 24, a process of "dedifferentiation" seems to take place so that a person becomes more field dependent instead of becoming more field independent. For example, Karp and Schwartz (1967) observed some individual differences among retired geriatric subjects and those who were still working; the former tended to be more field dependent, whereas the latter were relatively more field independent.

Psychological differentiation, as used in this study, is a multi-dimensional concept by which individual differences are noted on the basis of perceptual, intellectual, personality traits and interpersonal behaviour dimensions. Its major components or indicators as postulated by Witkin, Goodenough and Oltman (1977) are: articulated cognitive functioning (structuring), sense of separate identity, articulated body concept and the use of specialized defences.

In the next section, the measures of psychological differentiation will be described.

2

2. Measures of Psychological Differentiation

Since the measures of psychological differentiation are an important component of Witkin's theory, it is essential that they be described briefly.

Various measures of psychological differentiation have been constructed (Gottschaldt, 1926; Thurstone, 1944; Witkin et al., 1954; Jackson, 1956; and Oltman, 1968). Among the tests developed by Witkin et al. (1971) one finds: the Embedded Figures Test (EFT), the Rod-and-frame Test (RFT) and the Tilting-room-tilting-chair Test (TRTC).

The RFT measures a person's perception of the upright position of an object within a given visual field. In a completely dark room, a subject is presented with a luminous frame which can be rotated about its centre either clockwise or counterclockwise. In the centre of the frame is a luminous rod which can also be tilted either clockwise or counterclockwise independently of the luminous square frame (Witkin et al., 1975, p. 4). The frame and the rod are the only objects exposed to the subject, who is required to adjust the rod to a position he thinks upright. Field dependents experience difficulty in perceiving the rod as upright; they tend to align it with the surrounding frame regardless of whether or not it is upright. Field independents, on the other hand, are relatively better able to bring the rod close to the upright by overcoming the influence of the tilted frame.

The TRTC measures the subject's perception of the position of his body and his surrounding in relation to the upright. The subject is seated in a chair that can be tilted clockwise or counterclockwise and his task is to bring the chair to an upright position. The chair is located in a room that can also be tilted clockwise or counterclockwise. The individual differences observed in the performance of the TRTC are similar to those observed in the performance of the RFT. Field dependents tend to perceive themselves in an upright position only when their bodies are aligned with the tilted room. Field independents, to the contrary, are relatively more capable of apprehending the body as separate from the prevailing field and as such, they experience very little difficulty in bringing their body to the upright (Witkin et al., 1974).

It is interesting to note, however, that when subjects are asked to close their eyes while adjusting their body to the upright position, no difference between field dependents and field independents is observed (Witkin et al., 1975, p. 6). This is an indication that the perception (visual) of the field has a differentiating effect on field dependents and field independents..

A third measure of psychological differentiation is the EPT. Although the test does not require the subject to perceive the upright, it is similar to the other two tests described in terms of its essential perceptual structure (Witkin and

Goodenough, 1977). In the EFT the subject is required to detect and trace a simple figure within a complex geometric design. Individual differences on the EFT tend to cluster in the same way as for the RFT and TRTC measures. For those individuals identified as field independents with the other measures, the sought-after simple figure is detected from the complex design faster than it is in the case with those identified as field dependents (Witkin et al., 1971).

In summary, people tend to perform in a consistent fashion on the above three tests (Witkin, 1965, p. 318). A global or field dependent person who tilts the rod in the orientation of the tilted frame in attempting to position it uprightly is also likely to tilt his body in the orientation of the tilted room to perceive his body upright; he is also likely to find difficulty locating a simple design in a complex geometric design figure (Witkin et al., 1974). The opposite is observed for the more analytic person, the field independent.

What is common in the performance on these tests is the degree to which a person perceives an object as discrete from the surrounding field as a whole (Witkin et al., 1971), or the extent to which the dominant organization of the prevailing field determines his perception of its individual parts. While individual differences exist, they do not imply that there are two distinct types of people; they only reflect tendencies toward one mode of perception. Witkin et al. clearly state:

Because scores from any test of field-dependence-independence form a continuous distribution, these labels reflect a tendency, in varying degrees of strength, toward one mode of perception or the other. There is no implication that there exist two distinct types of human beings (Witkin et al., 1975, p. 9).

While the importance of the psychological differentiation concept has been accepted by a number of researchers (e.g., Berry, 1966; Dawson, 1967 and Vernon, 1972), others have found it inadequate and controversial. For example, Wallach (1972) says that the significance of psychological differentiation has been exaggerated; Gardner, Jackson and Messick (1960) criticize Witkin for taking field articulation for psychological differentiation; other researchers such as Elliot (1961), Zigler (1963), Dubois (1970) and Watchel (1972) have criticized Witkin and his associates for their failure to control the intelligence factor in their experiments on psychological differentiation. The critics have argued that psychological differentiation is a factor of intelligence and not independent from it as Witkin and his cohorts (1962) have claimed.

In reply to this criticism, Vernon does acknowledge that psychological differentiation is related to intelligence, but contends that just because a variable overlaps with others, it does not mean that it should be discarded. He states:

There is no reason why psychologists should not use a construct which overlaps with other constructs provided that it constitutes a measurable, fruitful hypothesis (Vernon, 1972, p. 366).

Vernon further suggests that most tests are partially representative and do not measure all that is implied in a theory (Vernon, 1972, p. 366).

Witkin et al. (1962, 1971) have argued that psychological differentiation is related to intelligence only to the degree that the two constructs are based on the same analytical factor. From empirical evidence, they observed the correlation between the three subtests of WISC (Object Assembly, Picture Completion and Block Design) which load on the analytical factor and measures of psychological differentiation. The correlation observed was 0.66. Further observation showed a correlation of only 0.26 between scores of psychological differentiation and scores on the subtests of WISC (Vocabulary, Information and Comprehension) which do not load on the analytical factor. From this observation, Witkin and his associates argue that globally field independents are not more intelligent than field dependents; their being more likely to do better on the analytical subtests does not guarantee that they will do as well on vocabulary and information subtests.

In summary, psychological differentiation is measurable by a variety of tests developed by Witkin et al. (1971) and other researchers (e.g., Gottschaldt, 1926; Thurstone, 1944; Jackson, 1956; and Oltman, 1968). Individual differences on these measures have shown a high level of consistency and stability (Witkin et al., 1971). Despite the criticisms raised

(e.g., Elliot, 1961 and Zigler, 1963), psychological differentiation remains one of the most research-generating constructs nationally and cross-culturally (Cox, Witkin, Friedman, Hrishikesan and Siegel, 1974).

In the next section, sex differences in psychological differentiation will be discussed.

3. Sex Differences

In this section, a brief description on how men and women perform on measures of psychological differentiation will be given; the underlying rationale for such differences will also be suggested.

Witkin et al. (1954, 1962/1974) have made numerous observations indicating some differential sex effect in psychological differentiation. According to Witkin et al. (1971) men tend to be more field independent than women, although such differences are small relative to the differences among members of the same sex.

Studies by Barry, Bacon and Child (1957), Dawson (1967) and Vernon (1972) have supported Witkin's findings that men are relatively more field independent than women. Such findings on sex differences as well as individual differences within the same sex have led Witkin and other researchers to trace their origin. A study done by Vernon (1972, p. 371) indicated that sex differences may be due to cultural norms. While males are

expected to be autonomous from their early age, girls are not given similar expectation. For example, in school boys are encouraged to study mathematics, sciences and mechanics, whereas girls are encouraged to study non-analytical subjects. Further, from a study of over one hundred cultures, Barry et al. (1957) concluded that personality differences are cultural rather than biological; they also noted that whereas males are associated with self-reliance and achievement, girls are associated with obedience, submission and nurturance. Witkin (Dyk and Witkin, 1965; Witkin, 1967; and Witkin and Goodenough, 1977) claims that sex differences in psychological differentiation are due to biological, social, cultural, environmental and upbringing factors. This claim has been borne out by a considerable number of studies (Dyk, 1969; Berry and Annis, 1974; Kolakowski and Malina, 1974; Berry and Witkin, 1975; Dawson, 1972; Fliegel, 1955).

Although cross-cultural studies (Dawson, 1967; Witkin, 1967; Pande, 1970; and MacArthur, 1973) have identified sex differences in psychological differentiation, Berry's (1966) study demonstrated that there are no such differences among Eskimos. The lack of differences, Berry claims, may be attributed to the fact that the Eskimo society encourages self-reliance on all members, irrespective of their sex (Berry, 1966, p. 226). MacArthur (1967) made a similar study on Eskimos and confirmed Berry's findings, concluding that differences in

psychological differentiation may be due to socialization and environmental factors.

It is evident that there are a variety of causes for sex differences in psychological differentiation. No research has shown that any single one of these causes is more crucial than others. It should be noted that these sex differences, although observable, are relatively small.

In the next section, personality traits of both field dependents and field independents will be described.

4. Personality Traits of Field Dependents and Field Independents

In this section, it will be argued that individual differences in perception and space orientation extend to personality traits of both field dependents and field independents. A physiological basis of such differences will also be presented.

The individual differences noted in psychological differentiation are associated with individual differences in other areas such as personality characteristics and interpersonal relationship (Witkin et al., 1976, p. 2). According to Witkin et al. (1962, pp. 134-135), personality develops from a person's sense of separate identity which results from one's awareness of his needs, feelings, attributes and his ability to identify them as different from those of others. This sense of separate identity signifies that self is segregated, structured

and has internal frames of reference that are used as guides in self-definition. The frames of reference are used for viewing, interpreting and reacting to the external world.

It follows, therefore, that since an analytical person (field independent) has a relatively more developed sense of separate identity (Witkin, Goodenough and Olman, 1977), he tends to function independently and needs other people's support and guidance to a lesser degree. In situations of conflict with others, he tends to maintain his judgement, attitudes and values. A global person (field dependent), on the other hand, has a less developed sense of separate identity as a result of which, he tends to be dependent on others for guidance. For example, in his judgement, attitudes and values, he is more likely to be influenced by others (Witkin and Goodenough, 1977).

To support the hypothesis that field dependents are more influenced by external stimuli Witkin et al. (1962) conducted a study in which it was postulated that given a task in which directions are stated in general terms and the role of the examiner is deliberately vague, field dependents would seek the examiner's guidance and would lack confidence in their performance on the given task. It was also hypothesized that field independents would know what to do and proceed with their work without seeking the examiner's guidance. Both hypotheses were supported; the field dependents were more dependent on the

examiner's guidance than were the field independents⁸. Further support was obtained from a study by Konstadt and Forman (1965); it was hypothesized that field-dependent children would be more attentive to the examiner than field-independent children. During the testing, the examiner used approval and disapproval comments; under approval comments, no significant difference was noted. The mean score for field dependents was 3.42 while that of field independents was 3.47. Under disapproval field dependents looked more at the examiner than field independents, the mean scores being 4.42 and 2.78 respectively. Field dependents, in other words, did not perform well whenever they were subjected to disapproval, whereas under approval they performed just as well as field independents. This may be interpreted as an indication of their being externally directed when under unfavourable conditions. Secondly, it may be interpreted that unfavourable circumstance hindered their effective performance. In contrast, field independents were not affected by disapproval. Such findings are consistent with Witkin's hypothesis that field dependents more than field independents are influenced by external stimuli.

In a social environment, field dependents, in contrast to field independents, pay special attention to prevailing social frames of reference (Witkin et al., 1976). Culver, Cohen, Silverman and Shmavonian (1964) have clarified such a claim by showing that such attention is paid only when the situation is

ambiguous and the person or situation involved is seen as helpful in removing the ambiguous situation.

The prediction that field dependents are more emotionally dependent than are field independents (Witkin et al., 1974) was not supported in a study by Coaxes, Lord and Jakabovics (1975) who concluded that field dependents were not more emotionally dependent than field independents.

Field dependents, unlike their counterparts are authority-oriented and tend to change their views on religious, social and political matters to suit those of their superior figures (Witkin et al., 1974); this is consistent with Linton's findings indicating that written information (by an authoritarian figure) has a greater influence on field dependents than on field independents (Linton, 1952). Similarly, Solar, Davenport and Bruehl (1969) reported that their study indicated that field dependents were more responsive to external social referents than field independents.

According to Witkin et al. (1975) field dependents are externally motivated, compared to field independents who are more internally motivated. This is consistent with field dependents being reliant on external referents for self-definition in contrast to field independents whose frame of reference for self-definition is internalized (Witkin et al., 1974).

Field dependents view themselves and are viewed by others as socially dependent; they are people-oriented, gregarious, tactful, considerate, affectionate, and are good at getting along with others (Witkin et al., 1962, pp. 143-156, Witkin and Goodenough, 1977). Field independents are relatively self-reliant, demanding and individualistic; they show greater interest in logical and theoretical ideas than in people; they also pay little attention to social cues (Witkin et al., 1974, pp. 143-144). In short:

Their (field independent) attitudes, feelings and needs are developed and discrete and do not easily become fused with the matrix of attitudes, feelings and needs of others (Witkin et al., 1962, p. 156).

On the basis of their ability to organize and structure their environment, field independents compared with field dependents, tend to remember better past events. Witkin et al. (1962, p. 99) carried out a study in which 10 year-old subjects were administered personality tests and the Thematic Apperception Test (TAT). At the age of 14, the subjects were administered the same test again; the same test was administered again at the age of 17. In the final test, the subjects were asked whether or not they had come across the TAT before; field-independent subjects recalled more than field dependents. Such a relationship, however, was not observed among female subjects. Field dependents, on the other hand, have been noted to be good

at recalling faces of people they have met before (Crutchfield, Woodworth and Albrecht, 1958).

Witkin also postulates that both children and adults with an analytical mode of field approach have a relatively developed defensive structure (Witkin et al., 1974). It is further stated that field independents use a relatively specialized complex defence mechanism such as isolation and intellectualization, in contrast to field dependents whose defensive structure is less developed.

Field dependents tend to use repression and denial as their defence mechanism (Witkin et al., 1962, p. 176). In support of this claim, Crutchfield and Starkweather (1953) and Linton (1952) observed that field dependents deny the existence of a stimulus if they perceive it to be either threatening or provocative of impulses. Field dependents tend to recall fewer dreams, and less vividly than do field independents, which is interpreted as a device of denying what they consider threatening (Witkin, Goodenough and Oltman, 1977). For instance, Eigel's study (1959) showed that at the age of 17, field dependents had a mean of 1.0 dreams, compared to a mean of 2.8 dreams for field independents in a period of two weeks. His finding was consistent with Linton's (1952) research which showed that field-independent college men had a mean of 13.5 dreams compared to a mean of 6.2 dreams by field dependents. The argument is that field dependents do not dream any less, but they suppress some of their dreams.

Research findings that have evolved from psychological differentiation have had an ever increasing and wide application to education (Witkin, 1973; Witkin et al., 1975, 1976; Albrecht et al., 1958; Ruble and Nakamura, 1972; and Barrett and Thornton, 1967). These studies have shown that since field dependents are more socially oriented, they are better at learning and remembering material with social content; they tend to specialize and do well in history, elementary school education and teaching, social work and the humanities.

Field independents, on the other hand, tend to specialize in sciences, mathematics, engineering and other analytical subjects (Witkin et al., 1976, pp. 33-34). Glass (1967) and Dubois and Cohen (1970) have argued that field dependents and field independents are not very different in their academic performance at college level; the only difference is that field dependents tend to do well in non-analytical subjects, whereas field independents tend to perform well in analytical and science subjects.

In order to confirm the physiological dimension as part of psychological differentiation (Witkin et al., 1977) interesting studies have been carried out. The author considers such studies very vital as a partial basis for establishing a relationship between psychological differentiation and extraversion.

With a sample of 48 males divided into three groups, namely, high, medium and low on the basis of the intensity of pain felt, when their hands were placed in cold water, Sweeney and Fine (1965) examined a relationship between pain reactivity and psychological differentiation. They found that the three groups were significantly different in their performance on Embedded Figures Test (Gottschaldt, 1926). High pain reactivity was a characteristic of field independents and field dependents were characterized by low pain reactivity. The rationale for such results is as follows:

The individual who experiences greater pain is an analytical perceiver who tends to extract and focus upon the most overwhelming aspect of pain as embedded in the environmental structure; this tendency is reflected in his lower judgements of intensity (Sweeney et al., 1965, p. 758).

Cohen and Silverman (1963) reported that field dependents experience greater discomfort than field independents in an environment which has low sensory input. Consistent with this finding, Petrie, Collins and Solomon (1958, 1960) demonstrated that those who tolerate pain best experience more discomfort than those who are poor pain tolerators when placed in a sensory deprivation situation.

Other researchers have examined the relationship between psychological differentiation measures and Galvanic Skin Response (GSR) spontaneity. For example, Block (1957) made a study of 20 most reactive subjects and concluded that the

non-reactors were significantly more field independent than were the reactors, when they were measured on the Rod and Frame Test and GSR. In a study consisting of 22 undergraduate students of the University of Cincinnati whose age ranged from 18 to 35, Hustmyer and Karnes (1964) observed a relationship between GSR spontaneity and the psychological differentiation. The Jackson (1956) modification of EFT was used in addition to other measures of skin resistance. Those who scored below the median were labelled stabiles, while those who scored above the median were labelled labiles. A significant correlation was observed with labiles taking longer to trace the figure than the stabiles. It was concluded that psychological differentiation has a physiological component which distinguished field dependents from field independents; field dependents showed a higher level of GSR spontaneity than field independents.

Silverman, Cohen, Shmavonian, and Greenberb (1961) selected the 6 most field dependent and the 5 most field independent from a sample of 109 subjects on the basis of Machover figure drawing and RFT. The GSR recording under sensory deprivation indicated that field dependent subjects had significantly higher spontaneous bursts than did field independent subjects, thus establishing a relationship between a physiological variable, autonomic nervous system spontaneity and a perceptual-personality dimension, field dependence versus field independence. The underlying theme in the cited studies

appears to be the impact of arousal in the subjects' performance on psychological differentiation measures.

Such impact has further been demonstrated in a number of experimental studies. Jacobson (1966) conducted a study with 41 male and female subjects with the objective of determining whether brief deprivation would act to decrease perceptual field dependence. To begin with, the subjects were administered a pretest of the RFT after which half of the subjects underwent one hour of sensory deprivation and then they were readministered the same test. There was a significant decrease of error of orientation, whereas the control group did not show any significant decrease in error orientation. A posttest for both groups showed a significant error-reduction between the two groups. It is argued that sensory deprivation generates increased attention to internal stimulation and concomitant changes in the subject's bodily feelings. This leads to less dependence on visual cues and improves one's performance on measures of psychological differentiation.

Witkin, Karp and Goodenough (1959) and Poster and Goodman (1963) have shown that most alcoholics are extremely field dependent. To examine whether raising their level of arousal would influence their performance, Witkin et al. (1959) administered a pretest of RFT to 15 male alcoholics; after the pretest, the subjects were asked to lie on a bed wearing opaque goggles. The control group was allowed to engage in some

form of activity, while the experimental group underwent sensory deprivation for an hour. Following this, a posttest was given; the results showed that the experimental group made less errors and improved their performance significantly on the RFT. There was no change observed with the control group. Consistent with this is Easterbrook's (1959) study which demonstrated that physiological arousal leads to a reduction in responsiveness to peripheral cues. Moreover, Callaway (1959) suggests that better performance on the EFT test is facilitated by drug-induced arousal. Oltman (1964) administered a RFT to 20 undergraduate students under quiet and noisy situations (the noise was delivered through earphones). It was shown that under a noisy condition, the subjects' arousal was raised, as a result of which they performed significantly better than the control group.

In summary, there is sufficient empirical evidence supporting the claim that field independents have a high level of arousal, whereas field dependents have a low level of arousal, and that their level of arousal influences their performance on measures of psychological differentiation.

In the preceding sections, the author has outlined the major differences between field dependents and field independents in terms of their perception, structuring, personality traits, intellectual skills and level of physiological arousal.

In the next section, the writer will focus on Eysenck's theory of extraversion.

5. Extraversion-Introversion

In this section, the writer will examine the personality theory of extraversion in three phases: first, the historical "roots" of the theory will be described; secondly, Eysenck's theory of extraversion will be examined, followed by a report of studies confirming or infirming Eysenck's claims.

The study of individual differences and personality, as understood by Eysenck (1973), may be traced as far back as Galen, a Greek physician who lived during the second century. Galen is known for having classified people into four types, namely, the melancholic, the choleric, the sanguine and the phlegmatic. Eysenck (1973, p. 5) claims that his theory of extraversion has a close link with Galen's theory.

Galen's theory (Eysenck, 1973) was improved upon by Kant (1912), a German philosopher and scientist. His work on the four types of personality was popular and accepted by philosophers, physicians, theologians and other scholars of the time. The difference between Kant's views and those of modern time is that he considered the personality types as pure and beyond change, and that there was no intermediate stage. Contrary to Kant's position, Wundt (1903) interpreted personality types as lying on a continuum; he also combined choleric and sanguine into what he called "unchangeable",



In terms of Eysenck's theory, the changeable are equivalent to extraverts and the unchangeable are equivalent to introverts (Eysenck, 1973).

Jung (1923), a Swiss psychologist was the first modern psychologist to deal with individual differences and personality in terms of extraversion and introversion (Murray, 1938, p. 232). According to Jung (1923), extraversion is the energy which directs the libido outside the self to external events, people and situations, whereas introversion is the libido directed inward the self. Hence, an extravert is not likely to resist the influence of forces in his environment, but he is likely to be sociable in a wide range of social situations; the introvert, on the other hand, is more contemplative, introspective, shy, unsocial and resistant to external influence.

Operationally, Eysenck (1967) defines introversion and extraversion as descriptive terms denoting two types of behavioural reaction and personality organization. An extraverted type of behaviour is marked by the outward expression of feelings, and attitudes that are expressed spontaneously; introverted type of behaviour tends to moderate spontaneous outward expression.

Eysenck's (1975, 1967) theory of extraversion-introversion is based on two principle postulates, namely, the postulate of individual differences and the postulate of typology. The

first postulate states that:

Human beings differ with respect to the speed with which excitation and inhibition are produced, the strength of the excitation and inhibition produced and the speed with which inhibition is dissipated. These differences are properties of the physical structures involved in making stimulus-response connection (Eysenck, 1975, p. 114; 1967, p. 79).

The typological postulate states as follows:

Individuals in whom excitatory potential is generated slowly and in whom excitatory potentials so generated are relatively weak are thereby predisposed to develop extraverted patterns of behavior...; individuals in whom excitatory potential is generated quickly and in whom excitatory potentials so generated are strong, are thereby predisposed to develop introverted patterns of behaviour...Individuals in whom reactive inhibition is developed quickly, in whom strong reactive inhibitions are generated and in whom reactive inhibition is dissipated slowly are thereby predisposed to develop extraverted patterns of behaviour... conversely, individuals in whom reactive inhibition is developed slowly, in whom weak reactive inhibitions are generated, and in whom reactive inhibition is dissipated quickly are thereby predisposed to develop introverted patterns of behaviour (Eysenck, 1957, p. 114; 1967, p. 79).

On the basis of this excitation-inhibition hypothesis, Eysenck (1967) identifies two types of people, namely extraverts and introverts. The extraverts are characterized by excitation, which may be defined as the extent to which an organism is aroused; secondly, they are characterized by a strong inhibition, which may be defined as a lowering of the level of arousal (Eysenck, 1971), that is generated quickly. The

introverts are characterized by both strong and quickly generated excitation as well as weak and slowly generated inhibition. On this basis, extraverts form conditioned reflexes slowly and with difficulty, whereas introverts form conditioned reflexes strongly and quickly. Hence, Eysenck (1957, p. 115) hypothesizes that introverts are more conditionable than extraverts. In line with this prediction, Eysenck (1973) and other researchers such as Lynn (1959), Reed and Kenna (1961), Reed and Sedman (1964), Rim (1964) and Kline (1966) have conducted research studies relating both extraverts and introverts to conditioning, reminiscence, pain tolerance, vigilance, speed, learning and sensory deprivation.

It is important to note, however, that Eysenck (1971, p. 3) has gone beyond a purely psychological orientation of excitation-inhibition as an explanatory concept of extraversion-introversion dimension of personality. He has added a physiological dimension by which he distinguishes extraverts from introverts on the basis of low cortical arousal levels and high cortical arousal levels, respectively. Arousal may be defined as a property of the cortex which ranges along a continuum from sleepiness and drowsiness at one extreme, to marked mental excitation at the other (Eysenck, 1972, p. 8). The cause of arousal may be attributed to differential threshold levels in the reticular formation which functions, primarily, as a regulator of the levels of arousal and inhibition in the

cortex. The current trend, therefore, has been to stress the impact of level of arousal and high arousal thresholds as well as inhibition on extraversion-introversion in place of excitation-inhibition (Eysenck, 1967, p. 248).

The level of arousal is measured on electroencephalograph (EEG) which records a person's "brain waves". In a drowsy state, a person's brain waves are synchronized, whereas in an alert state, they are desynchronized. Since extraverts tend to have a low level of arousal, their brain waves tend to be desynchronized. This is reflected on the EEG by slow alpha waves of high amplitude and fast alpha waves of low amplitude, respectively (Eysenck, 1972, p. 36).

Stimulant drugs have also been used as measures of levels of arousal (Eysenck, 1967); if an extravert is given a stimulant drug, his level of arousal will be raised and he will behave like an introvert. Given a depressant drug, an introvert will behave like an extravert. This hypothesis was supported by a study carried out by Franks and Trouton (1958) who showed that a stimulant drug, dexamphetamine sulphate facilitated eye-blink conditioning, while a depressant drug, amobarbital sodium reduced the amount of conditioning. In case of anomalous findings, the Yerkes-Dodson law which states that increase in arousal may be useful only up to a certain point and beyond which it becomes debilitating serves as a satisfactory explanation (Wilson, 1976).

Following Voss (1899) and Heckenmuller (1965), Eysenck (1967) postulates that the extravert behaves as a more fatigued person, that is, accumulating more involuntary rests, than the introvert. This hypothesis is based on the theory that extraverts have strong reactive inhibition that is generated quickly. Eysenck (1964) made a study of seventy-four industrial apprentices whom he divided into two groups: high condition drive introverts and low condition drive extraverts. The subject's task involved tapping on a metal plate with a metal stylus. The examiner counted the number of times the stylus was in touch with the plate as well as the period of time it was away from the plate. The results indicated that extravert subjects had more involuntary rest pauses (IRP) than introvert subjects' thus supporting the hypothesis that extraverts are more fatigued than their counterparts. In similar studies Frouks (1963) and Holland (1965) arrived at a similar conclusion.

Eysenck contends that introverts are more vigilant than extraverts; a subject is judged vigilant on the basis of the number of responses he makes to a given stimulus (Eysenck, 1967). This postulate was supported in a study by Halcomb and Nirk (1965) involving 40 subjects who were given a four-hour vigilance task. Other researchers, however, have failed to support Eysenck's hypothesis. For example, Das (1964) did not find any correlation between vigilance and extraversion. Studies carried out by Colquhoun and Corcoran (1964) showed

that introverts perform better in isolation and in the mornings, whereas extraverts perform better in groups and in the afternoons. In response to these rather puzzling results, Eysenck (1967) states:

Whatever may be the explanation of these curious phenomena, they serve to remind us that single simple experiments to prove or disprove a theory such as that linking extraversion-introversion and reactive inhibition are difficult to devise, and that many unsuspected variables have to be carefully controlled before we can regard the evidence as conclusive (Eysenck, 1967, p. 95).

On the basis of different rates of excitation or level of arousal, Eysenck (1967) postulates that sensory thresholds are lower for introverts than for extraverts. To test this hypothesis, Haslam (1967) conducted an experiment on 12 extraverts and 12 introverts in an attempt to relate personality to pain. The mean for head pain was higher in extraverts than in introverts. In the same experiment, pain thresholds were measured when subjects were given caffeine. It was found that thresholds were significantly lowered for both extraverts and introverts. Corcoran (1964) made a similar investigation by measuring the amount of salivation after subjects had been given lemon juice on their tongues. It was observed that introverts secreted about twice as much saliva as extraverts.

According to Eysenck (1967, p. 110), since introverts have lower thresholds, they show less adaptation to continued stimulation; it follows that an equal amount of stimulation

would be felt more by introverts than by extraverts. Hence, Eysenck postulates that extraverts are more tolerant to pain, whereas introverts are more tolerant to sensory deprivation. To verify this postulate, Weisen (1965) carried out an experiment in which subjects were required to show a preference for either the presence or absence of strong sensory stimulation. Coloured lights and loud music were used as apparatuses for strong sensory stimulation; silence and darkness were used for the absence of strong stimulation. The subjects were required to press a button strongly if they wanted coloured lights and loud music; if they preferred silence and darkness, they were to press the appropriate button lightly. Extraverts showed a preference for strong stimulation, in contrast to introverts who preferred silence (sensory deprivation).

Eysenck and Lynn (1961) conducted an experiment involving 30 subjects who were divided into three groups on the basis of their scores of extraversion on the Maudsley Personality Inventory (MPI). The time limit for pain tolerance on the Hardy Wolf thermostimulator was 20 seconds. Pain tolerance corresponded with the subjects' scores on extraversion; those who had high scores had a mean pain tolerance of 17.2 seconds; those who scored average and low had means of pain tolerance of 9.3 and 5.6 seconds, respectively. About 80% of the most extraverted group reached the time limit of 20 seconds; in the most introverted group, nobody reached the time limit.

Similarly, Bartol (1976) administered electric shocks to 12 extraverts and 12 introverts. The subjects were told that the experimenter was interested in finding out how people tolerate pain. They were, therefore, asked to make it known to the experimenter, if they thought they were unable to stand the pain any more. The results was that extraverts were more tolerant of pain than were the introverts. Reed and Kenna (1964) and Reed and Sedman (1964) have also supported the hypothesis that pain tolerance and sensory deprivation are related to extraversion. Levine, Tursky and Nicholas (1966) failed to replicate these findings.

Using eyeblink conditioning, Frank (1956) demonstrated that introverts form conditioned responses faster than extraverts. Studies on verbal conditioning have also been conducted by Eysenck (1959d) and Jawanda (1966) who observed that introverts condition easier than do extraverts. Hence, there is ample evidence that introverts are not only more conditionable than extraverts, but also condition faster than their counterparts.

Eysenck (1957), p. 213) argues that the introvert is more socialized in the sense that he has acquired a conditioned-fear mechanism which acts as immediate reward and punishment. The fear mechanism reduces the introvert's drives and makes him withdraw from socially unacceptable behaviour; the introvert's behaviour, therefore, becomes independent of external rewards and punishment. Furthermore, the introvert tends to develop an

autonomous personality which is capable of resisting group pressure. Since the extravert does not have a similar mechanism, he does not tend to behave independently of rewards and punishment which have their sources in social groups. Consequently, extraverts are relatively more sensitive to group opinions, group standards and group approval. They tend to place great values on group behavior and attempt to seek its approval in what they do, thus making them behave more socially than introverts.

It is not surprising, therefore, that extraverts are fond of seeking other people's company and find a lot of pleasure in parties and dances (Eysenck and Eysenck, 1968). Furthermore, they have no difficulty in meeting people and making friends (Eysenck and Wilson, 1975). Introverts are rather withdrawn and prefer having a few friends (Eysenck et al., 1968). This observation was confirmed by Antill (1974) and Letkovitz (1974) who showed that extraverts tend to talk more than introverts in a group of more than two people; they have more accurate social perception; they are more outgoing, and are more interested in interpersonal interaction than are introverts. Studies by Pearson (1972) and Rump and Court (1971) did not find introverts any less sociable than extraverts.

Eysenck (1967) argues that introverts are more persistent than extraverts. Persistence is based on two factors: the emphasis placed on persistence in behaviour both at school,

home and society as part of the socialization process; secondly, persistence calls for repetitive work. It follows that since introverts are more conditionable, they tend to comply with the socialization process more than do extraverts. Secondly, subjects exposed to similar stimuli for a long time develop reactive inhibition (Eysenck, 1957, p. 215). Hill (1975) supported this postulate by demonstrating that extraverts build more variety in their responses in order to increase stimulation which enables them to maintain an optimal level of arousal. In a conversation setting, Antill's investigation (1974) showed that extraverts pause more often than do introverts.

To explore the relationship between extraversion and memory, Eysenck and Howarth (1968) carried out an experiment with 55 introverts and 55 extraverts; each subject was given pairs of words and tested on how well he could recall them. On the basis of short-term memory, extraverts were found superior, but on the basis of long-term memory, they were inferior to introverts. Such differences, Eysenck (1972) notes, are due to consolidation (information retention process) which interferes with short-term memory. Wosinska (1976) tested 50 subjects on their recall of visual and verbal material and his conclusion conflicted with Eysenck's findings. It was observed that introverts have better memory for first-signal (concrete) system material than for second-signal (abstract) system material.

Michael Eysenck (1976) observed that introverts are not better than extraverts in recalling prose; this led him to question Eysenck's claim (1967, 1972, 1973) that personality characteristics are not easily changeable since they are physiologically based. Michael Eysenck argues that individual differences in personality are both semi-permanent and transient. In his conclusion, he states: "It is probably true that factor theories of personality overemphasize the stability of personality characteristics" (M. Eysenck, 1976, p. 60).

Elaborating on personality variables, Eysenck et al. (1975) state that extraverts tend to act on the spur of a moment and are prone to making hurried and premature decisions; introverts are cautious and reflective. Extraverts tend to display their emotions openly and outwardly whether it be anger, love, hate, or sorrow; introverts hardly express their emotions. Moreover, introverts show a greater interest in philosophical questions and discussions than do extraverts (Eysenck, 1960).

Academically, introverts tend to perform better than extraverts at both high school and university levels (Eysenck, 1971, Eysenck et al., 1975). However, at the elementary school level, the relationship between academic performance and extraversion is reversed: extraverts perform better than introverts. Orpen (1976) carried out a study among South African black and white junior secondary school and university students which demonstrated that success at university level is

related to extraversion. Further evidence was obtained from Seddon's (1975) study which showed that the relationship between extraversion and academic performance changes as chronological age increases. Kline's (1966) study of Ghanaian university students also supported the hypothesis that introverts tend to perform academically better than their counterparts. Child (1964), Lynn, (1959) and Savage (1962) have also supported this hypothesis.

Interestingly, Entwistle and Cunningham (1968) demonstrated that extravert females are academically as good as introvert males. Studies by Khajavi, Mehryar and Hekmat (1975), Griffith and Crocker (1976), Lovegrove (1974) and Walsh and Walsh (1978) failed to find any significant relationship between academic performance and introversion. Though Eysenck may not agree, Entwistle (1972) argues that the relationship between academic performance and personality type may be influenced by variables such as age, intellectual ability, type of institution, field of study, rather than whether one is an extravert or an introvert. Despite conflicting research findings, it must be conceded that there is overwhelming evidence in support of Eysenck's hypothesis that introverts are academically better than extraverts at high school and university levels.

Although Eysenck (1968) acknowledges the existence of sex differences, he does not address the topic to the same extent Witkin does. According to Eysenck, women score lower on

4 extraversion than men do. No rationale is given for such differences. A careful analysis of Eysenck's position indicates that sex differences are not vitally important. Moreover, he claims that they have been minimized by his new scale, Eysenck Personality Inventory. The present study examined sex differences in extraversion.

In this section, the author has examined Eysenck's theory of extraversion-introversion and the major personality differences between introverts and extraverts. It has been argued that the level of arousal accounts for most individual differences. Research studies relating to Eysenck's theory have also been examined; although some of them have conflicted with Eysenck's theory, a larger proportion of them have supported it.

In the section that follows, the author will present his rationale for holding that psychological differentiation and extraversion variables are related.

6. Relationship Between Psychological Differentiation and Extraversion

In this section, Witkin's characteristics of field dependents and field independents, and Eysenck's characteristics of extraverts and introverts will be discussed comparatively. From the discussion, a conceptual relationship between the two theories will be argued. Thirdly, empirical evidence of this relationship will be examined.

The concept of psychological differentiation provides a means whereby people can be differentiated in the way they relate themselves to the external world. In short, field independents assume an independent role relative to the external world and are relatively more capable of disembedding an object out of its context; field dependents experience difficulty in isolating an object from its context and are very much influenced by the external world in their perception (Witkin et al., 1974). It is also argued that psychological differentiation is not only limited to one's perception (Witkin, Goodenough and Oltman, 1977), but is also a pervasive characteristic of the individual, manifesting itself in the intellectual, social, personality, emotional, interpersonal and physiological domains.

It is important to note that whereas Witkin et al. (1974) base individual differences on one's mode of field perception, Eysenck (1967) bases them on conditionability or level of arousal in the cortex: introverts have a high level of arousal and are more conditionable; extraverts have a low level of arousal and are less conditionable (Eysenck, 1965). According to Eysenck et al. (1968), individual differences in arousal are also pervasive and manifest themselves in the intellectual, social, personality, emotional and interpersonal domains.

There are a number of similarities between psychological differentiation and extraversion. Witkin and his associates

(1974) observed that field dependents are more people-oriented than field independents, while Eysenck (1968) observed that extraverts enjoy the company of friends and make friends more easily than do introverts. Field dependents are more authority-oriented and they easily change their views to suit those of their superiors or authority figures; the opposite is observed with field independents (Linton, 1955, and Witkin et al., 1975). Extraverts are generally content with the rules set for them and also are more likely to change their judgements; in contrast, introverts question authority and make their own interpretation of the rules and values (Sinha and Ojha, 1963; Eysenck, 1961; and Eysenck et al., 1975).

In view of the analytical nature of computational, mechanical and science subjects, field dependents tend to experience more difficulty than field independents in these subjects (Galvin, 1974, and Witkin et al., 1975); similarly, extraverts, Eysenck (1960) reports, do experience similar difficulties. While field dependents have a tendency to express their emotions without strain, field independents hardly show their emotions (Witkin et al., 1974); according to Eysenck et al. (1968, 1975) extraverts are ever ready to show their emotions compared to introverts who seldom show their emotion openly.

Witkin et al. (1974, p. 339) and Eysenck (1973, p. 38) concur that intelligence does not play a significant role in

the classification of personality traits on the psychological differentiation and extraversion scales. Eysenck's position has been supported by Lynn (1959), Seddon (1975) and Goh and Moore (1978) who concluded that intelligence does not correlate with extraversion. Though Witkin's position has been contested, he has refused to believe that intelligence plays a crucial role in personality (Witkin et al., 1971, and Elliot, 1961).

Both variables are developmental at least till late adolescence: according to Witkin et al. (1967), the individual becomes more field independent with time; Eysenck et al. (1975) too claim that the individual becomes more introverted with time. However, the relative position of an individual in relation to his peers tends to remain stable.

These similar characteristics between psychological differentiation and extraversion suggest a relationship between the two variables. The next question of importance is: What is the underlying factor for the observed similarity? In other words, what is the basic link that unites extraversion-introversion and psychological differentiation?

As summarized earlier, there is sufficient empirical evidence supporting the claim that field independents have a high level of arousal, whereas field dependents have a low level of arousal (Block, 1957; Petrie et al., 1958; Witkin et al., 1959; Easterbrook, 1959; Callaway, 1959; Silverman et al., 1961; Cohen et al., 1963; Goodman et al., 1963; Oltman,

1964; Hustmyer et al., 1964; Sweeney et al., 1965; and Jacobson, 1966). It has been demonstrated that one's level of arousal facilitates one's performance on measures of psychological differentiation.

Eysenck (1967, 1973) postulates that on the basis of level of arousal, extraverts feel more comfortable than introverts in an environment of sensory deprivation; they tolerate pain more than introverts. On the GSR, Eysenck (1965, 1967) reports that extraverts show a higher level of spontaneity than introverts. Eysenck (1972) and Frank and Touton (1958) have indicated that by the use of stimulant drugs, the extravert's level of arousal can be raised to the extent of enabling him to behave as an introvert. By the same token, it has been demonstrated that by the use of depressant drugs, the level of arousal in an introvert can be reduced to the extent of making him behave as an extravert.

It is evident, therefore, that field independents have a high level of arousal which is characteristic of introverts; conversely, field dependents have a low level of arousal which characterizes extraverts. It is not unreasonable, therefore, to expect that field dependents are extraverted and that field independents are introverted.

A considerable number of studies have been conducted on the relationship between psychological differentiation and

extraversion. For instance, Fine and Kobrîck (1972), with a sample of 49 soldiers, observed a correlation between psychological differentiation and extraversion. Taft and Coventry (1958) also observed such a correlation. In a study involving 59 undergraduate students, Evans (1967) found a correlation between psychological differentiation and extraversion. Recently, Loo (1976) conducted a study with 35 university female subjects and found that the two variables are correlated.

Eysenck (1967) himself is of the opinion that extraversion is related to psychological differentiation, he states that:

Witkin et al. (1962) have tried to build up a personality dimension on the basis of perceptual tests which measure degree of perceptual determination by external percepts and this dimension appears closely related to extraversion-introversion (Eysenck, 1967, p. 117).

Similarly, Vernon (1969) and Klein, Barr and Wolitzky (1967) have strongly suggested that psychological differentiation is related to extraversion.

However, the relationship between psychological differentiation and extraversion was not obtained in studies carried out by Pearson (1972), Fine (1972) and May and Bell (1972). These conflicting results suggest that further investigation is warranted.

Moreover, the above studies may be contested on a variety of factors, namely, the sample size, the type of subjects and psychometric instruments. Pearson's (1972) sample was too small ($N = 30$) and consisted of neurotic subjects; Evans (1967) used the MPI which can be replaced by the Eysenck Personality Inventory (1968).

In the following section, the research problem and the research hypothesis will be stated.

7. Statement of Problem and Research Hypothesis

The objective of this research is to investigate the relationship between psychological differentiation and extraversion. From the review of the literature such a relationship is evidenced. Conflicting results on the relationship of the two variables have also been reported. In view of this, a replication of these studies with a larger sample, and different measures of psychological differentiation and extraversion is relevant and may contribute to a clearer relationship between the two variables.

Hence, it is hypothesized that:

Field dependents are more extraverted than field independents.

CHAPTER II

EXPERIMENTAL DESIGN

In this chapter, the procedure used to test the research hypothesis is described. In the first section, the subjects participating in the experiment are identified. This is followed by a description of the psychometric instruments in section two. In the third section, the procedure used in the collection of data is presented, and in the last section, the statistical design is described.

1. The Sample

The sample consisted of 192 subjects (109 females and 83 males) drawn from two Ontario high schools. These were selected from grades eleven and twelve and their mean age level was 17.41 years. The age level of the subjects is typical of most high school students in Ontario. It is important to note that at this age level (17 years) psychological differentiation reaches a plateau. The distribution of age was as follows:

Age	14	15	16	17	18	19	20	21
Number of subjects	1	2	23	75	76	11	3	1

In this section, the subjects used for the research project have been described. In the next section, the psychometric instruments used for psychological differentiation and extraversion, respectively, will be discussed.

2. Psychometric Instruments

Scores on psychological differentiation were obtained through the use of Witkin's (1971) Group Embedded Figures Test (GEFT), a pencil-and-paper test which can be administered either individually or in a group. It was designed and developed from the original individually administered Embedded Figures Test (EFT). In both presentation and format, the GEFT is very similar to the individually administered EFT. For example, seventeen of the eighteen test items it contains were taken directly from the EFT (Witkin et al., 1971).

The GEFT consists of three sections; the first section contains seven problems intended for practice, while the second and third sections contain nine problems each. These problems are arranged in ascending order of difficulty (Witkin et al., 1971, p. 27). The simple figures are printed at the back of the booklet so that the subject does not see both the simple and the complex figures simultaneously. As in the EFT, however, the subject is allowed to look at the simple figure as often as he wishes.

The directions to be followed by the subjects writing the GEFT are simple and clear. The subject, on a given page, is presented with a complex figure and asked to locate on it a simple figure found on the back of the booklet. There are eight simple figures labelled "A,B,C,D,E,F,G,H". A simple figure to be traced within the complex figure must be of the same size, the same proportion and in the same direction as it appears on the back of the booklet. The subjects are allowed to erase their answer and do it again, if they discover that they have not done it correctly.

In the first section of the test, the practice section, the subjects are allowed two minutes to do the seven problems. The second and third sections are to be completed within five minutes each. The subjects are not allowed to proceed from one section to another until they are told by the proctor. The proctor asks the subjects to proceed from one section to another only when the allocated time is over. This is done without any regard as to whether or not the subjects have finished.

The scoring of the GEFT is done with the use of a scoring key with simple figures traced over each complex figure. For subjects to receive full credit, all lines of the simple figure must be traced clearly and all the wrong ones must be erased (Witkin et al., 1971, p. 28). Items contained in the first section are not included in the total score, since they are primarily used for practice purpose. The scorer, however, is

advised to scan through this section to see whether or not the subjects understood what was required of them. The total score is the number of simple figures correctly traced in both the second and third sections. There is no penalty for wrong answers or omissions. The higher the subject scores, the more field independent he is, and the lower the subject scores, the more field dependent he is (Witkin et al., 1971).

Since the GEFT has been in circulation for a relatively short time, data on its reliability and validity are rather scarce. Witkin et al. (1971) report a reliability of 0.82 based on the results of college students; the correlation between the two sections of the test was computed and corrected by the Spearman-Brown prophecy formula.

On the other hand, it could be argued that since a large proportion of the GEFT originates from the EFT, whatever information is available on the reliability of the EFT could be used, with caution, for the GEFT. As a matter of fact, Witkin et al. (1971) report that the two tests' reliability estimates compare favourably. For females and males of ages 15 and 17, the reliabilities are 0.74, 0.92, and 0.61, 0.84, respectively. It should be noted that the average age of subjects participating in the present study is 17.4 years.

Witkin (1971) suggests several ways of assessing the validity of the GEFT as a measure of psychological differentiation by comparing it with other tests such as EFT, RFT, and

articulation of body concept test (ABCT). Witkin (1971, p. 29) states that the correlations between the GEFT and the EFT are high, especially for men; the same holds true in the case of the RFT and the ABCT, although he does not state numerically the value of their reliability.

Despite the scarcity of information on its reliability and validity, the GEFT, Witkin (1971, p. 29) affirms, must be considered a good research instrument until further data are collected from a wider variety of subjects.

The variable extraversion was measured by the Eysenck Personality Inventory (Eysenck et al., 1968). Like the GEFT, it is a paper-and-pencil test administered either individually or in a group. Essentially, the EPI measures two pervasive dimensions of personality, namely extraversion-introversion (E) and neuroticism-stability (N) (Eysenck et al., 1968, p. 5). The test consists of fifty-seven questions to which the subject is required to answer "Yes" or "No". Twenty-four of these items measure extraversion, nine of them are used for a lie scale and the remaining twenty-four items measure the subject's neuroticism. Only the extraversion-introversion dimension of personality was retained for the present research study.

There are two parallel forms (Form A and B) of the EPI; Form B was used in this study.

Historically, the EPI was developed from the Maudsley Personality Inventory (MPI) used for measuring the two

dimensions of personality (E and N). Eysenck (1968, p. 16) concedes that the EPI is similar to the MPI and correlates highly with it (0.70); he goes on to say that to a great extent the results obtained by the use of the MPI also could be applied to the EPI. On the other hand, the latter is superior to the former for a variety of reasons. These are:

- a) There are two parallel forms for the EPI which make retesting possible. The retesting does not interfere with memory factors.
- b) Questions in the EPI are worded in such a manner that intelligence or education factors are minimized.
- c) The correlation between extraversion and neuroticism present on the MPI, has been practically eliminated on the EPI. The two dimensions are, according to Eysenck, orthogonal and therefore there should be no correlation between them. . . .
- d) The EPI has a Lie Scale used for identifying subjects showing "desirability response set"; the MPI does not have such a scale.
- e) The retest reliability of the EPI is higher than that of the MPI; Eysenck says that even after periods of several months lapse, the reliability is still more than 0.85.

In conclusion, Eysenck asserts that there is ample evidence that the EPI is a valid descriptive instrument of the behavioural

manifestation of personality. It was partly for these reasons that the author used the EPI in the present study.

The procedure involved in writing the test is quite simple. The subject is asked to answer all the questions by "Yes" or "No" by shading the space provided. The subject chooses either answer on the basis of how well it describes the way he behaves, feels and acts under a described given situation. The test has no time limit, but it is assumed that most subjects should be able to complete it in about ten minutes (Eysenck et al., 1968).

There are three overlays for scoring the EPI; the Extraversion Scale, the Neuroticism Scale and the Lie Scale. Scoring is done by crediting the subject with one point for each identified response on the corresponding scoring key. The total score for each scale (E, N, and L) is the sum of the corresponding responses for the scale. The higher the score on the E scale, the relatively more extraverted the subject is, the lower the total score on the same scale, the relatively more introverted a person is.

Eysenck (1968) reports reliabilities ranging between 0.84 and 0.97 for the two test-retest parallel forms combined, and between 0.80 and 0.97 for the separate forms. In view of the long interval (ranging from nine months to one year) between test and retest, Eysenck concludes that the reliability (0.85) is highly adequate.

Scales measuring extraversion and neuroticism define broad domains of personality. Eysenck, in reporting the validity of the EPI, says the E and N scales from the MPI and the EPI are highly correlated." In fact, it is argued that the validity of the MPI may be justifiably used for the validity of the EPI (Lanyon, 1972, p. 161). Based on a sample of 400 subjects used for item analysis in the development of the MPI, the Extraversion Scale correlated 0.79 with the Guilford (1940) Rhathymia Scale and the Neuroticism Scale correlated 0.92 with the Cycloid Disposition Scale. Eysenck (1968, pp. 16-17) reports that in an unpublished study, Knapp (1962) reported correlations (0.77) between the Neuroticism Scale of the EPI and Cattell's (1957) anxiety factor and neuroticism factor. On this evidence, Eysenck affirms the EPI validity as a measure of both extraversion and neuroticism.

Critics of the EPI are in agreement with Eysenck that the EPI is probably the best instrument available for measuring extraversion (Cline, 1972, p. 160). Lanyon (1972, p. 161) further noted that the EPI may be characterized as the basic and excellent assessment tool in research on Eysenck's theory of personality.

Both measures of psychological differentiation and extraversion have been described. In the next section, the collection of data will be reported.

3. The Collection of Data

The procedure followed in the collection of data will be reported in this section.

The data were collected from two schools, namely, Kingsway College in Oshawa and Confederation High School in Ottawa. The author wrote to the President of Kingsway College requesting that grade eleven and twelve students of his school be used as subjects for a research experiment (as indicated in Appendix A).

In May 1978, the two tests, the Eysenck Personality Inventory and the Group Embedded Figures Test were administered to one hundred and five students of Kingsway College. Before the administration of the tests, the College President introduced the author to the subjects and the purpose of his visit. The author expressed his gratitude to the school administration for being allowed to use their students for the research project. Secondly, he thanked the students for their willing participation. This was followed by a brief explanation of the two tests and what was expected of them.

The GEFT, a timed test, was administered first for a duration of about fifteen minutes, including the time of distributing the test material, i.e., pencils and booklets. The regulations stipulated for the administration of the test were adhered to. As soon as the allotted time was over, every subject was asked to stop writing and the booklets were collected immediately.

Following the completion of the GEFT, the students were administered the EPI test. The author instructed the subjects to make sure that they answered all the questions in accordance with the instruction provided on the first page of the test. Since the test is not timed, it was felt that some students would finish before others and then would want to leave. Inasmuch as their departure was likely to disturb those who were still writing the test, the subjects were asked to remain in their seats, until everyone was through. They all complied with this direction.

The tests were invigilated by both the author and the College President, Dr. Kuhn. Both invigilators moved around the hall to ensure that subjects were doing the tests in accordance with the regulations stipulated in their respective manuals.

Inasmuch as it was felt that a larger sample than 105 subjects was needed, the author approached the Confederation High School principal for more subjects. Mr. Ferguson, the school principal, told the author that the school was willing to provide the needed subjects on condition that the author received the approval of the Carleton Board of Education. The correspondence is shown in Appendix: B, C, and D.

Both the GEFT and the EPI were administered by class teachers in June 1978. The subjects were assigned numbers to keep their identity anonymous in compliance with the Board's

directive. There were eighty-seven participants; thus making a total of 192 subjects. Both tests were scored by the author in conformity with the instruction prescribed in the manuals of both tests.

In the next section, the statistical design will be described.

4. The Statistical Design

The research hypothesis that field dependents are more extraverted than field independents was analysed by means of a 2 x 2 Analysis of Variance as described by Keith (1972). This was used as a primary means of testing the hypothesis. As a supplement, a correlation analysis as described by Dixon and Brown (1977) was carried out. The level of significance for testing the hypothesis was set at $p = 0.05$.

Psychological differentiation was treated as an independent variable, whereas extraversion was treated as a dependent variable.

In the next chapter, the analysis and presentation of data will be described.

CHAPTER III

PRESENTATION OF DATA ANALYSIS AND DISCUSSION OF RESULTS

In this chapter, the purpose of the study and research hypothesis is reiterated. Secondly, the analysis of data is presented, followed by a discussion of the results.

1. Research Hypothesis

As described in Chapter 1, the purpose of this research project was to investigate the relationship between psychological differentiation and extraversion. On the basis of conceptual similarities and empirical evidence noted in the related literature, it was conceived reasonable to expect a relationship between the two variables. It was, therefore, hypothesized that:

Field dependents are more extraverted than field independents.

This prediction is examined in the following section.

2. The Analysis of Data

To categorize field dependents and field independents, the median of the GEFT scores was used. The subjects who scored below the median of 14 were categorized as field

dependents, while those who scored above the median were categorized as field independents. Those who had a score of 14 were eliminated. The descriptive statistics (means, standard deviations, and size) on scores of extraversion for each of the four resulting groups, are presented in Table I.

The research hypothesis that field dependents are more extraverted than field independents was tested by a 2 x 2 ANOVA. The level of significance was set at $p = 0.05$. Psychological differentiation was the independent variable and extraversion was the dependent variable. The results are summarized in Table II.

From the analysis of variance, it is observed that there is no interaction between sex and psychological differentiation. Hence, a direct comparison between main effects is possible.

From Table II, there is a main sex effect at the selected significance of 0.05, which means that the level of extraversion is different for males and females. On the other hand, there is no significant main effect for psychological differentiation. In other words, there is no significant difference in extraversion between field dependents and field independents.

As a supplement, the writer investigated sex differences in psychological differentiation and extraversion; a nonlinear relationship between the two main variables was also examined. The results are reported here.

TABLE I

Means and Standard Deviations for Field-
Dependent and Field-Independent Males
and Females on Extraversion

N = 184

	FD-Males	FD-Females	FI-Males	FI-Females
M	15.76	14.43	14.98	14.11
S	3.40	3.25	3.62	4.21
N	34	60	45	45

TABLE II

Summary of ANOVA for Psychological Differentiation
and Sex with Extraversion as the Dependent Variable.

N = 184

Source	DF	SS	MS	F	P
Sex	1	86.29	86.29	6.79	0.010*
Psychological differentiation	1	0.010	0.010	0.001	0.978
Sex x Psychological differentiation	1	0.214	0.214	0.017	0.897
Error	180	2288.59	12.71		

Note: *Significant at the selected alpha level of 0.05.

Fine (1972) has suggested that the failure to find a relationship between psychological differentiation and extraversion could be due to the fact that researchers have concentrated on finding a linear relationship and yet, in Fine's opinion, the relationship may be nonlinear. In the present study, this suggestion was investigated by the use of a polynomial regression. The results are summarized in Table III.

Table III shows the subjects' total means score of 12.96 with a total standard deviation of 4.38 on psychological differentiation; on extraversion, the corresponding mean score is 14.98 with a standard deviation of 3.64. The linear and quadratic correlation coefficients of $r = 0.161$ and $r = 0.0951$, respectively, are non-significant.

Further analysis was made to examine whether or not the global results were affected by sex differences. A quadratic correlation coefficient of $r = 0.3295$, significant at $p = 0.05$, was observed for male subjects, thus partially supporting Fine's assertion of a nonlinear relationship. On the other hand, no correlation was observed for female subjects. The scatter diagram with a quadratic regression curve for the male subjects is displayed in Figure I.

Witkin (1971) has consistently claimed that women are more field dependent, while men are more field independent. His claim has been supported by a variety of researchers (e.g., Dawson, 1967). The present study investigated such a claim.

TABLE III

Descriptive Statistics on Psychological Differentiation (PD)
and Extraversion (E) for Different Groups of Subjects

	<u>N</u>	<u>MEAN</u>		<u>S.D.</u>		R_1^b	R_2
		PD ^a	E	PD	E		
Total	192	12.96	14.89	4.38	3.64	.016	.095
Females	109	12.44	14.40	4.28	3.66	.087	.091
Males	83	13.65	15.52	4.40	3.51	.106	.320*

Note: a. P and E stand for Psychological Differentiation and Extraversion, respectively.

b. R_i , $i = 1, 2$ stand for the i th degree correlation between extraversion and psychological differentiation.

* Indicates the coefficient is significant at $p = 0.05$.

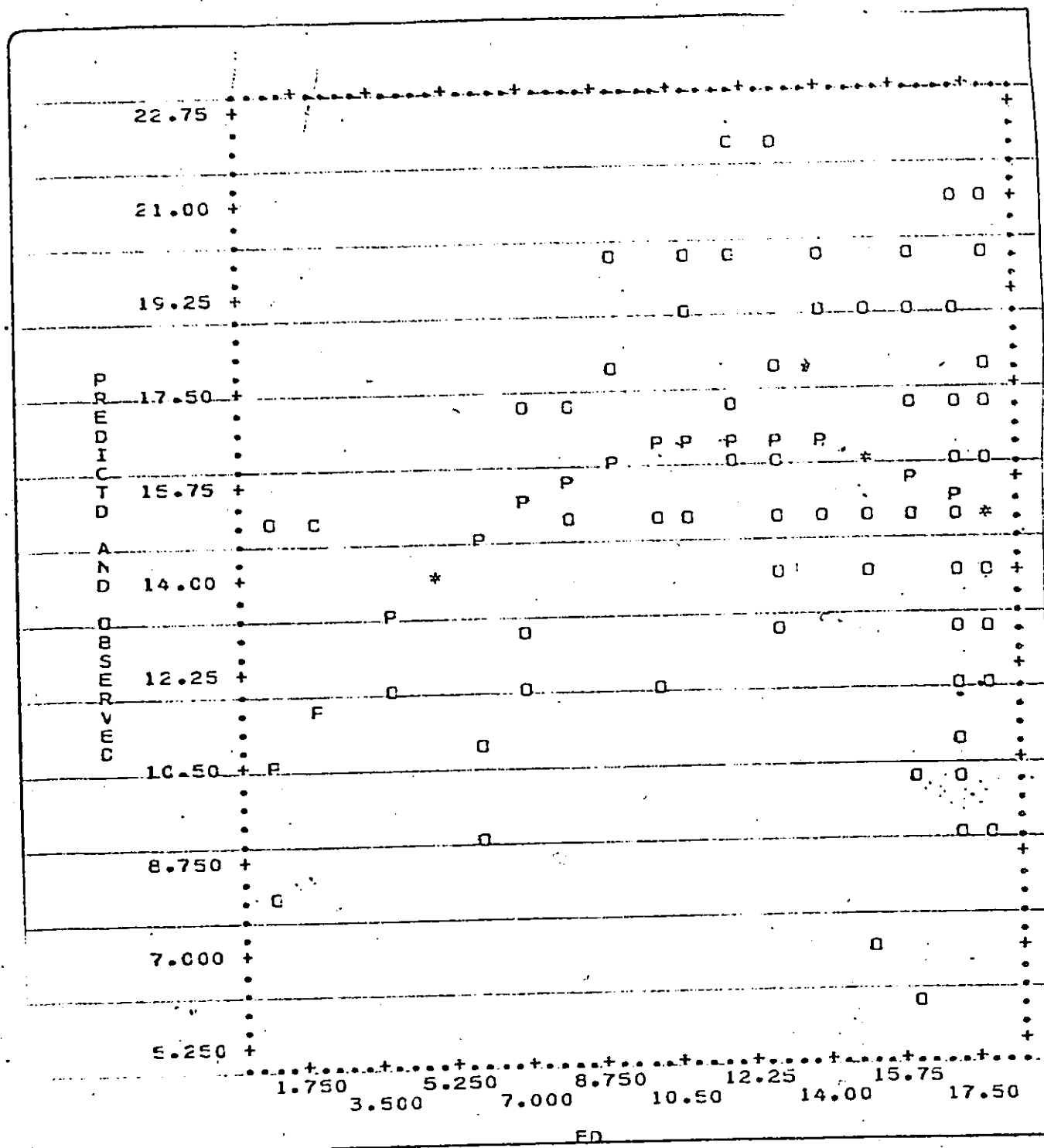


FIGURE I:

Scatterdiagram for the Male Subjects Together with the 2nd Degree Polynomial Regression Curve of Extraversion on Psychological Differentiation.

Table III shows the distribution of means and standard deviations for both male and female subjects on psychological differentiation. As can be seen, the mean score for males is 13.65 with a standard deviation of 4.40; the mean score and standard deviation for females are 12.44 and 4.28, respectively. The mean score for males is higher than that of females by 1.21, which is statistically significant ($t = 2.88$; $df = 190$, $p = 0.01$). Witkins' claim has been borne out by this study.

Eysenck (1968) reports that female subjects tend to score lower on extraversion than male subjects. In this study, sex differences in extraversion were investigated and the results are summarized in Table III.

From Table III it is observed that males have a mean extraversion of 15.52 and a standard deviation of 3.51 compared to a mean score of 14.40 and a standard deviation of 3.66 for females. The males' mean score is higher than the females' mean score by 1.12 which is statistically significant ($t = 3.20$; $df = 190$; $p = 0.01$). Eysenck's claim that there are sex differences in extraversion was supported in the present study.

In this section, the research data have been analyzed; the research hypothesis has not been supported. Supplementary analyses have lent support to Witkin's sex difference postulate; Eysenck's claim that sex differences are not large has been borne out.

A discussion of the results will be the focus of the following section.

3. Discussion

The research hypothesis was derived from the observed similarities between psychological differentiation and extraversion variables as propounded by Witkin et al. (1974) and Eysenck (1967) respectively. Such similarity led Eysenck to state that:

Witkin et al. (1962) have tried to build up a personality dimension on the basis of perceptual tests which measure the degree of perceptual determination by external percepts, and this dimension appears closely related to extraversion-introversion (Eysenck, 1967, p. 117).

In a similar vein, Vernon (1969) has noted that Witkin interprets that field independent neurotics are more liable to dysthymic disorders, while field dependents are more prone to hysterical disorders. Vernon concludes that:

....according to Eysenck this would mean that they are introverts and extroverts, respectively (Vernon, 1969, p. 61).

In an extensive review of literature, Klein et al. (1967) have also noted some apparent similarity between Witkin's theory of psychological differentiation and Eysenck's theory of extraversion.

In view of this conceptual link, Evans (1967), Kobrick et al. (1972) and Loo (1976) conducted research studies which

confirmed that indeed the two variables are related. Puzzling as it may be, such conclusion was not supported by studies carried out by other researchers (e.g., Pearson, 1972, and Mayo et al., 1972).

Similarly, the statistical analysis in the present study did not support the research hypothesis that field dependents are more extraverted than field independents. This is consistent with other studies in which researchers failed to show a relationship between the two variables. On the other hand, the present finding contradicts those of other researchers who have observed a relationship between the two variables. This leads one to question why such a difference should arise.

Most researchers do not give rationales other than the fact that the two variables are not related. Fine (1972), however, made a general observation as to why some researchers have failed to confirm such a relationship. He suggests that the relationship between the two variables may be nonlinear. He states:

Our results indicate that the lack of reported relationships between the two variables may be due to the fact that they are not linearly related and consequently, have escaped detection by the usual statistical techniques (Fine, 1972, p. 154).

Fine's observation is interesting, although it is difficult to accept it since most of the evidence reported in the literature points toward a linear relationship. The present study,

nevertheless, investigated Fine's (1972) suggestion. Interestingly enough, a curvilinear relationship was observed for the male subjects. It would be interesting, therefore, for researchers to explore such a possibility further.

Although the present study did not support the research hypothesis, it is important to note that the results pointed in the expected direction. For example, Table I shows that field-dependent females' mean score on extraversion is higher than that of field-independent females by 0.32. The mean score for field-dependent males is also higher than the mean score for field-independent males by 0.78. These differences, however, were nonsignificant.

Witkin's postulate that men are more field independent than women was confirmed in this study. This is consistent with the findings of other researchers. On the other hand, it conflicts with the findings of Mayo et al. (1972) and Evans (1967) who failed to observe sex differences. Despite this discrepancy, Witkin's postulate of sex differences has received substantial empirical support, the present study included, to be considered valid.

Eysenck's claim that sex differences on extraversion are not large was borne out by the present study. The sex differences as shown in Table III are statistically significant at $p = 0.01$.

In summary, the research hypothesis was not supported by the data, though these point in the expected direction.

Significant differences between female and male subjects on both psychological differentiation and extraversion were observed. Fine's suggestion for a nonlinear relationship was explored and found to be partially supported in a separate analysis of male subjects.

In the next section, the summary and conclusions of this research project will be outlined.

CHAPTER IV

5 SUMMARY AND CONCLUSIONS

Conceptually, Witkin's personality characteristics of field dependents and field independents are similar to Eysenck's extraverts and introverts. It was argued that the level of arousal influences a subject's performance on measures of psychological differentiation. It was further argued that extraverts are characterized by a low level of arousal, whereas introverts have a high level of arousal. This led to the conclusion that field dependents, compared to field independents, have a low level of arousal which partially accounts for their low performance on measures of psychological differentiation. Hence, it was hypothesized that field dependents are more extraverted than field independents.

The sample consisted of 192 subjects, 57% of whom were females. These subjects were drawn from two schools located in Ontario. The subjects were in grade eleven and twelve, with a mean age of 17.41 years.

The Group Embedded Figures Test (Witkin et al., 1972) was used for measuring psychological differentiation. The GEFT consists of eighteen problems which the subjects are required to complete in ten minutes.

The Eysenck Personality Inventory Form B, which consists of 57 questions, was used for measuring extraversion. While the EPI is not timed, it was completed in about ten minutes.

A 2 x 2 ANOVA statistical technique was used as the primary means of statistical analysis. The level of significance was set at $p = 0.05$. A correlational analysis was used as a supplement.

The research hypothesis that field dependents are more extraverted than field independents was not supported. Other analyses indicated that sex differences on both variables were statistically significant. Males were more field independent and more extraverted than females. Fine's suggestion that the two variables are nonlinearly correlated was partially supported.

This study has not settled the question of whether or not psychological differentiation is related to extraversion. Hence, the search must continue.

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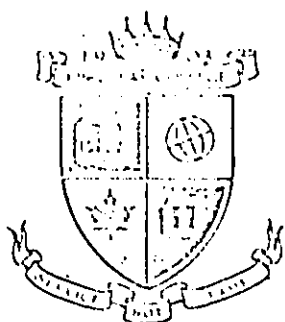
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APPENDIX A

A LETTER OF PERMISSION FROM KINGSWAY COLLEGE



KINGSWAY COLLEGE

BOX 605, OSHAWA, ONTARIO L1H 7M6

January 19, 1978

Mr. Tuntufye Mwamwenda
985 - B Morrison Drive
Ottawa, Ontario K2H 7L1

Dear Mr. Mwamwenda:

I just arrived on campus here approximately two weeks ago, and have received your letter concerning the tests that you would like to give to our grades 11 and 12 for your Masters project. Currently, I am in the process of completing my doctorate programme, with a survey type examination, and understand the problems involved in obtaining this type of information. We are pleased to give you the opportunity of administering these examinations to our grades 11 and 12, however, we do need to know the timing and would like to have some correspondence as to when you would like to have these tests administered, or whether you would be administering them yourself. Please correspond to this effect and we will let you know whether this fits into our programme. I know that for the next two weeks we are in the semester examination programme, and would find it difficult to give these tests. I would suggest sometime in the month of February might suit our plans better.

We are looking forward to hearing from you on these particular questions and wishing you the best as you complete your work towards the degree of Masters of Arts.

Sincerely yours,

Leroy R. Kuhn
President

LRK/jfb

APPENDIX B

A LETTER FROM THE CARLETON BOARD OF EDUCATION

The Carleton Board Of Education
Le Conseil d'Éducation de Carleton

133 Greenbank Rd., Ottawa, Ontario K2H 6L3 613-820-1870



89

1978 05 -02

Tuntufye S. Mwanwenda,
985-B Morrison Drive,
Ottawa, Ontario
K2H 7L1

Re: Your Research Project

In answer to your letter of April 25, 1978, I am enclosing an application form to be completed for our Research Committee. It would be appreciated if you would fill it out and return it to this office as soon as possible. The next meeting of the Committee will be held on May 17 and your project will be submitted for approval at that time.

It will not be necessary to include another copy of your proposal. We will be keeping your present one on file pending receipt of the application.

Yours sincerely,

mpilon / for

W.R. McGillivray,
Chairman,
Research Committee

Encl.

MP/lis

APPENDIX C

A LETTER OF PERMISSION FROM THE
CARLETON BOARD OF EDUCATION

The Carleton Board Of Education
Le Conseil d'Éducation de Carleton

133 Greenbank Rd., Ottawa, Ontario K2H 6L3 613-820-1820



91

1978 05 23

Tuntufye S. Mwamwenda,
985-B Morrison Drive,
Ottawa, Ontario
K2H 7L1

Re: Research Project No. 152
A Relationship Between
Differentiation and Extraversion

This will confirm that the Research Committee at its meeting of May 17, 1978 approved your research project.

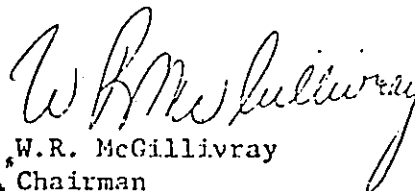
However, the Committee granted this approval under certain conditions. It will be necessary

- to have the school principal's approval;
- to have the parents' aware that this is a personality inventory and get their approval; and
- to have the students remain anonymous.

It is understood that you have already been in touch with Confederation H.S. and that you will be testing students from Grades 11 and 12.

Good luck in your project!

Yours sincerely,


W.R. McGillivray
Chairman

Research Committee

MP/ls

c.c.:
G.M. Ferguson
Confederation H.S.

APPENDIX D

A REQUEST FOR PARENTS' APPROVAL

The Carleton Board Of Education Le Conseil d'Éducation de Carleton



Confederation High School
1045 Woodroffe Avenue
Ottawa, Ontario K2G 1W3
Tel: 825-3555

May 30, 1978.

Dear Parents:

With the approval of the Carleton Board of Education, Confederation High School has agreed to help Mr. Tuntufye Mwamwenda, a graduate student at the University of Ottawa, to complete a research study as part of his Master of Arts thesis in education. This involves about one hundred grade 11 and 12 students completing two short personality inventories. These inventories attempt to relate personality traits to a student's likelihood of success in certain subject areas. The individual students who participate in this survey will remain anonymous and records of their individual responses will not be kept.

We ask your permission to allow your son or daughter to participate. If you agree to this, please sign in the space below and return the detached stub to the school as soon as possible.

Thank you,

G.M. Ferguson

GMF/MSB

I give permission for my son/daughter _____
to participate in an education research project at Confederation High School.

Date: _____

Signature: _____

PREVIOUSLY COPYRIGHTED MATERIAL
IN APPENDICES "E" AND "F",
LEAVES 94 to 99, NOT MICROFILMED

94 - 96 - Eysenck Personality Inventory, Form B.

MAY BE OBTAINED FROM

Educational and Industrial Testing Service
Box 7234
San Diego, California 92107

97 - 99 - A partial sample of the Group Embedded Figures Test
by Philip K. Oltmann, Evelyn Ruskin and Hermann A. Wilkin

MAY BE OBTAINED FROM

Consulting Psychologists Press
577 College Avenue
Palo Alto, California 94306

APPENDIX G

RAW SCORES ON PSYCHOLOGICAL DIFFERENTIATION,
EXTRAVERSION, NEUROTICISM AND LIE SCALE
ACCORDING TO AGE, SEX AND SCHOOL

N=192

APPENDIX G

TABLE IV

RAW SCORES ON PSYCHOLOGICAL DIFFERENTIATION,
EXTRAVERSION, NEUROTICISM AND LIE SCALE
ACCORDING TO AGE, SEX AND SCHOOL

N=192

<u>Subject</u>	<u>Age</u>	<u>Sex</u>	<u>School</u>	<u>Psych-Diff.</u>	<u>Extra-version</u>	<u>Neuro-ticism</u>	<u>Lie Scale</u>
1.	17	0	1	18	08	15	3
2.	17	0	1	18	12	12	2
3.	16	0	1	18	19	11	4
4.	17	0	1	18	06	20	0
5.	17	0	1	18	19	13	2
6.	18	0	1	17	10	19	0
7.	16	0	1	17	10	10	2
8.	18	0	1	17	14	14	1
9.	17	0	1	17	15	18	4
10.	17	0	1	17	10	04	7
11.	18	0	1	17	14	16	0
12.	18	0	1	17	20	12	0
13.	16	0	1	17	09	22	2
14.	16	0	1	16	14	08	2
15.	16	0	1	16	18	14	3
16.	17	0	1	16	13	06	2
17.	17	0	1	16	16	06	1
18.	16	0	1	16	16	17	1
19.	18	0	1	16	05	16	1
20.	17	0	1	16	14	22	1
21.	19	0	1	15	16	10	1
22.	17	0	1	15	18	12	0
23.	17	0	1	15	16	10	1
24.	18	0	1	15	08	18	2
25.	17	0	1	15	17	11	0
26.	17	0	1	15	09	14	0

APPENDIX G - TABLE IV.

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<u>Subject</u>	<u>Age</u>	<u>Sex</u>	<u>School</u>	<u>Psych-Diff.</u>	<u>Extra-version</u>	<u>Neuroticism</u>	<u>Lie Scale</u>
27.	17	0	1	14	13	14	4
28.	18	0	1	14	19	11	3
29.	17	0	1	14	20	20	0
30.	18	0	1	13	13	14	0
31.	16	0	1	13	13	11	2
32.	16	0	1	13	07	10	1
33.	17	0	1	12	16	06	0
34.	18	0	1	12	18	09	2
35.	18	0	1	12	13	18	0
36.	18	0	1	12	11	18	3
37.	18	0	1	11	19	12	3
38.	16	0	1	11	16	18	1
39.	17	0	1	10	15	18	0
40.	18	0	1	10	20	11	0
41.	18	0	1	10	14	16	2
42.	16	0	1	10	18	13	2
43.	15	0	1	09	19	18	0
44.	17	0	1	09	13	12	1
45.	17	0	1	09	11	06	2
46.	18	0	1	09	07	20	2
47.	16	0	1	08	14	11	2
48.	18	0	1	08	14	16	2
49.	16	0	1	08	12	16	2
50.	19	0	1	08	18	12	3
51.	16	0	1	08	14	08	1
52.	17	0	1	08	09	17	3
53.	18	0	1	08	12	16	1
54.	18	0	1	08	16	21	1
55.	15	0	1	07	15	14	1
56.	17	0	1	07	17	17	3
57.	18	0	1	06	23	15	2
58.	17	0	1	06	15	17	1
59.	19	0	1	05	14	20	1
60.	17	0	1	04	12	15	2

<u>Subject</u>	<u>Age</u>	<u>Sex</u>	<u>School</u>	<u>Psych-Diff.</u>	<u>Extra-version</u>	<u>Neuro-ticism</u>	<u>Lie Scale</u>
61.	20	0	1	02	13	15	6
62.	17	0	2	18	15	17	1
63.	18	0	2	18	17	23	0
64.	17	0	2	18	15	18	1
65.	17	0	2	18	17	09	1
66.	18	0	2	18	09	18	1
67.	17	0	2	18	22	11	1
68.	17	0	2	17	14	18	0
69.	17	0	2	17	06	19	3
70.	18	0	2	17	14	18	0
71.	17	0	2	17	14	19	1
72.	17	0	2	17	20	08	0
73.	18	0	2	16	20	06	4
74.	18	0	2	16	12	15	1
75.	18	0	2	16	19	18	2
76.	17	0	2	16	16	19	0
77.	17	0	2	15	18	10	0
78.	18	0	2	15	16	10	3
79.	17	0	2	15	12	16	3
80.	17	0	2	14	17	13	0
81.	17	0	2	13	14	16	1
82.	17	0	2	13	18	12	0
83.	18	0	2	13	13	08	0
84.	17	0	2	13	19	11	1
85.	17	0	2	13	13	17	2
86.	18	0	2	13	12	09	3
87.	18	0	2	13	14	15	0
88.	19	0	2	13	11	11	0
89.	18	0	2	12	17	05	2
90.	18	0	2	12	12	08	2
91.	18	0	2	12	10	15	1
92.	18	0	2	11	15	09	2
93.	18	0	2	11	14	22	1
94.	18	0	2	10	12	15	3

APPENDIX G - TABLE IV

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<u>Subject</u>	<u>Age</u>	<u>Sex</u>	<u>School</u>	<u>Psych-Diff.</u>	<u>Extra-version</u>	<u>Neuro-ticism</u>	<u>Lie Scale</u>
95.	17	0	2	10	15	16	2
96.	17	0	2	11	12	16	3
97.	17	0	2	10	13	16	1
98.	17	0	2	10	13	12	3
99.	17	0	2	11	13	10	1
100.	17	0	2	10	18	18	1
101.	17	0	2	08	19	12	2
102.	17	0	2	08	14	11	1
103.	17	0	2	07	17	15	2
104.	18	0	2	06	16	13	0
105.	18	0	2	04	08	14	2
106.	18	0	2	02	21	12	1
107.	18	0	2	02	15	18	3
108.	17	1	1	18	14	06	1
109.	16	1	1	18	12	07	0
110.	16	1	1	18	17	13	0
111.	17	1	1	18	18	04	2
112.	17	1	1	18	16	16	1
113.	17	1	1	18	18	07	1
114.	17	1	1	18	21	17	1
115.	17	1	1	18	17	15	1
116.	17	1	1	18	14	14	1
117.	17	1	1	17	17	09	3
118.	18	1	1	17	16	11	0
119.	17	1	1	17	16	05	1
120.	18	1	1	17	15	00	2
121.	16	1	1	17	14	16	0
122.	17	1	1	17	09	09	4
123.	17	1	1	17	17	18	0
124.	18	1	1	17	12	09	5
125.	17	1	1	17	19	14	5
126.	21	1	1	16	06	11	0
127.	17	1	1	16	20	15	2
128.	16	1	1	16	19	10	0

APPENDIX G - TABLE IV

105

<u>Subject</u>	<u>Age</u>	<u>Sex</u>	<u>School</u>	<u>Psych-Diff.</u>	<u>Extra version</u>	<u>Neuro-ticism</u>	<u>Lie Scale</u>
129.	16	1	1	16	15	04	3
130.	16	1	1	15	15	10	4
131.	20	1	1	15	07	05	5
132.	17	1	1	13	14	08	3
133.	19	1	1	13	18	13	2
134.	18	1	1	13	18	19	1
135.	16	1	1	13	16	16	0
136.	18	1	1	13	13	14	1
137.	16	1	1	13	18	15	1
138.	18	1	1	12	22	09	1
139.	18	1	1	12	17	14	2
140.	18	1	1	10	15	13	3
141.	19	1	1	10	12	14	1
142.	17	1	1	08	17	17	1
143.	19	1	1	08	15	15	0
144.	17	1	1	07	13	18	1
145.	18	1	1	07	12	15	1
146.	17	1	1	07	17	14	1
147.	16	1	1	06	09	12	1
148.	19	1	1	05	14	13	1
149.	17	1	1	02	15	11	3
150.	18	1	2	18	15	12	2
151.	18	1	2	18	13	14	3
152.	18	1	2	18	09	05	1
153.	18	1	2	18	15	10	2
154.	18	1	2	18	14	11	4
155.	18	1	2	18	20	06	1
156.	17	1	2	17	21	14	1
157.	17	1	2	17	11	06	1
158.	18	1	2	17	15	09	2
159.	18	1	2	17	10	18	1
160.	18	1	2	17	19	02	7
161.	17	1	2	17	13	02	3
162.	18	1	2	17	16	12	2

APPENDIX G - TABLE IV

106

<u>Subject</u>	<u>Age</u>	<u>Sex</u>	<u>Schoql</u>	<u>Psych-Diff.</u>	<u>Extra-version</u>	<u>Neuro-ticism</u>	<u>Lie Scale</u>
163.	19	1	2	17	17	08	3
164.	19	1	2	17	11	10	4
165.	16	1	2	16	17	06	2
166.	18	1	2	16	10	16	0
167.	17	1	2	15	19	10	1
168.	18	1	2	15	16	10	0
169.	18	1	2	15	14	06	3
170.	18	1	2	14	20	17	2
171.	18	1	2	14	19	17	3
172.	18	1	2	14	20	06	3
173.	17	1	2	14	19	15	0
174.	18	1	2	14	15	07	0
175.	18	1	2	13	22	12	3
176.	18	1	2	13	15	19	1
177.	18	1	2	12	20	09	0
178.	18	1	2	12	16	14	0
179.	17	1	2	11	20	13	2
180.	18	1	2	11	15	15	0
181.	18	1	2	11	20	11	2
182.	17	1	2	11	19	14	0
183.	18	1	2	10	15	19	0
184.	18	1	2	10	15	09	2
185.	18	1	2	09	18	14	0
186.	18	1	2	09	20	09	2
187.	18	1	2	06	11	15	0
188.	18	1	2	04	12	16	3
189.	20	1	2	01	15	07	2
190.	19	1	2	01	08	15	0
191.	17	0	1	16	12	14	0
192.	19	0	1	15	15	17	4