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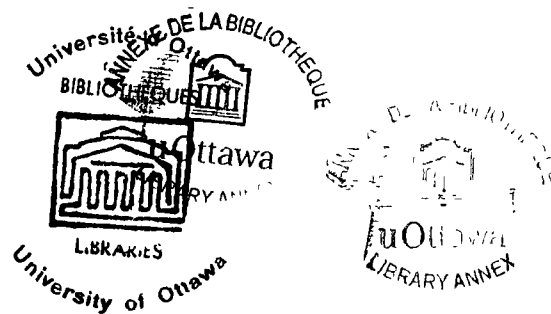
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EXTENT OF PSYCHOLOGICAL DIFFERENTIATION
AS RELATED TO VERBAL SKILLS

by Robert T. Roy

Thesis presented to the Faculty of
Psychology of the University of
Ottawa as partial fulfillment of
the Master's degree in Psychology



Brandon, Manitoba, 1970

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CURRICULUM STUDIORUM

Robert Thomas Roy was born August 18, 1944, in Saint Boniface, Manitoba. He received his Bachelor of Arts degree in Latin Philosophy from the University of Manitoba in 1965.

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INTRODUCTION

Witkin's field dependence-independence construct has fostered a good deal of perception-personality research, and this eventually led to the realization that a person's perceptual style may underlie a wide range of personality, cognitive and developmental factors. Therefore, Witkin later chose to reformulate this construct in favour of the more encompassing hypothesis of psychological differentiation, a concept borrowed from Werner's orthogenic principle of development. Field dependence scores were thus seen as reflecting extent of psychological differentiation. And Witkin reported new and impressive research evidence in support of this hypothesis.

Although many studies have shown parallels between perceptual articulation and differentiation in other fields of functioning, the differentiation hypothesis has been severely criticized for implying more generality than warranted by the evidence brought forth. More specifically, certain verbal skills which were known to require a higher degree of differentiation were found to be unrelated to Witkin's perceptual measures. However, Witkin felt that since verbal skills had been investigated only in a gross and indirect manner, further research under more controlled conditions and utilizing more precisely devised and defined

verbal tests was indicated.

The present study, therefore, will use several factor analyzed semantic tests and assess them in relation to two ratings of extent of psychological differentiation in an effort to throw some light on the disputed verbal skills - extent of differentiation issue.

Witkin's field dependence construct and its distinctive features will be reviewed in the first section of chapter one, followed by a presentation of the more recent formulation of the differentiation hypothesis. Extent of differentiation will then be discussed in its relation to verbal abilities, from the point of view of research findings and as to theoretical issues involved. A statement of the problem and the research proposal will conclude chapter one.

Chapter two will focus upon the experimental design adopted for this study, emphasizing the operational definitions and research hypotheses, the psychometric instruments, the subjects, the procedure and the statistical techniques employed to analyze the data.

The third chapter will present and discuss the results of the outlined study, followed by a summary of the findings and conclusions. The appendices will present copies of the semantic tests that formed the verbal skills battery, as well as the standardized procedures for the

two perceptual differentiation tests; and finally, an abstract of the present study.

CHAPTER I

REVIEW OF THE LITERATURE

Witkin's hypothesis that perceptual "field dependence" measures reflect "extent of psychological differentiation" has sparked new research efforts linking perceptual style to a wide variety of intellectual, emotional, motivational and defensive operations. Yet many questions remain unanswered by this theoretical formulation; more specifically the apparent lack of relationship between degree of differentiation and verbal abilities, has been the source of valid criticism.

This first chapter presents the issues involved here in four sections. The first section will briefly outline Witkin's early work on the "field dependence" construct and its methods of assessment, with a summary of its personality correlates and distinctive variables. A second section will be devoted to Witkin's adoption of the more unifying theory of psychological differentiation and to some of the criticisms that followed. A third section will focus upon the relationship between degree of psychological differentiation and verbal skills, theoretically and from the view of research findings. Moreover criticisms of past studies and future research suggestions are underlined, thus setting the stage for

the fourth and final section where the problem and research proposal will be presented.

1. Witkin's Early Works

In a series of investigations in the late 1940's¹ dealing with the perception of the upright, Witkin and Asch demonstrated convincingly that a person's ability to determine verticality depends mainly upon cues in the prevailing visual field and secondarily upon bodily or postural cues. They also discovered wide, yet consistent individual differences, in the way persons managed to orient themselves in space.²

These findings led Witkin to formulate the "field dependence-independence" theory, a construct best explained by describing the main tests used to tap this perceptual mode, namely the Rod and Frame Test (RFT), the Body Adjustment Test (BAT), and the Embedded Figures Test (EFT).

In the RFT, a subject is seated in a darkened room with but a luminous rod, surrounded by a luminous frame, visible before him. The rod, frame and the subject's chair

1 H. A. Witkin, H. P. Lewis, M. Hertzman, A. Machover, P. B. Meissner, S. Wapner, Personality Through Perception, New York, Harper, 1954, p. 1-10.

2 Herman A. Witkin, "The Nature and Importance of Individual Differences in Perception", Journal of Personality, Vol. 18, No. 2, 1949, p. 145-170.

can all be tilted independently: and under a standardized series of various tilted positions the subject is asked to set the rod to the true upright by instructions to the examiner who slowly moves the rod until subject is satisfied that it is vertical. In essence, the subject must overcome the misleading frames of reference created by the tilted conditions to estimate the true upright. For example with the chair upright and the frame tilted to the left or right, some subjects perceive the rod as straight only when aligned towards the angle of the tilted frame: their judgment is thus determined by and dependent upon the surrounding frame or visual field, and such perception has consequently been called "field dependent". Other subjects arrive at a more accurate estimate of the upright by perceiving and adjusting the rod independently of the misleading frame position: such perception is termed "field independent". Accuracy of estimate is judged in terms of error in degrees from the true upright.

In the EAT, a subject is seated in a special moveable chair within a small box-like room which in turn is suspended on ball bearing pivots: thus both room and chair can be tilted independently. With the room tilted to a series of standardized positions, the subject must align the chair to the true vertical. Some subjects habitually align their chair and body with the tilted room, thus

performing in a field dependent manner since their response is dictated to some extent by the immediate misleading surroundings. Field independent performers, however, bring their bodies to a more accurate estimate of the upright position regardless of the influence of the room, as if they sense their body as separate from the surroundings.

In the HFT, the subject is shown a simple geometric figure which he is then required to locate in a more complex design so organized as to conceal the simple figure. Whereas field independent subjects can quickly tease out the simple figure from its embedding context, field dependent subjects often fail to locate the hidden figure within the allotted time limit. And though the HFT is not specifically related to body orientation or verticality judgment, Witkin reports a high correlation between results on this test and results on the RFT and EAT.³

The factor common to all three tests was seen⁴ in that successful performance depends on the ability to deal with a given configuration analytically, i.e. in that each test requires the subject to separate or isolate an item from its surrounding field, whether that item be a rod, a

3 H. A. Witkin et al., Op. Cit., p. 83-89.

4 H. A. Witkin, R. B. Dyk, H. P. Paterson, D. R. Goodenough, S. A. Karp, Psychological Differentiation, New York, Wiley, 1962, p. 41-46.

person's own body or a simple geometric figure: the subject must perceptually differentiate that item from the field and overcome the embedding influence of said field. Successful subjects perceive the item as discrete from the organized whole of which it is part: their mode of perception has been designated as "analytical" or "field independent".⁵ Less successful subjects experience the item as fused within the whole with resulting inability to isolate that item from its background: such perception has been termed "global" or "field dependent".

The fact that relative success on the RFT was paralleled by relative success on the BAT and EFT,⁶ as well as by relative success on a wide range of perceptual tasks such as reversible figures or susceptibility to illusions,⁷ suggested a consistency in perceptual performance that had the character of a pervasive and stylistic cognitive tendency.

It should be noted here that the field dependence-independence dimension is a continuous one,⁸ most persons falling between these two extremes in a so-called

5 H. A. Witkin et al., Op. Cit., 1962, p. 35-38.

6 H. A. Witkin et al., Op. Cit., 1954, p. 61-76.

7 H. A. Witkin et al., Op. Cit., 1962, p. 46-57.

8 H. A. Witkin, "A Cognitive Approach to Cross Cultural Research", International Journal of Psychology, Vol. 2, No. 4, 1967, p. 236.

"field-central" position.⁹

Following the hypothesis that this characteristic mode of perception might manifest itself in broader areas of a person's general functioning, Witkin and his associates related subjects' scores on the standard perceptual battery to their personality variables gathered from a number of objective and projective tests, autobiographies and interviews. This large scale study forms the core of Witkin's first major publication: Personality through Perception.¹⁰

By way of summary, field dependent performers were found to have a poorly developed sense of identity and separateness from others, to be typically dependent upon their environment, submitting passively to authority and to demands made upon them. They tend to lack awareness of their inner life, showing fear, poor impulse control and high anxiety level; added to this low self-esteem, and low self-acceptance. Field independent subjects by contrast seem to cope actively with the environment, and do not look to environmental supports; they display initiative and organizing ability, they want to achieve. They maintain

⁹ James V. Spotts and Bernard Mackler, "Relationship of Field Dependent and Field Independent Cognitive Styles to Creative Test Performance", Perceptual and Motor Skills, Vol. 24, No. 1, 1967, p. 244.

¹⁰ H. A. Witkin et al., Op. Cit., 1954, xxxi-571 p.

greater self-awareness of, and control over, inner life and impulse while entertaining higher self-esteem and self-acceptance.

The above studies, conducted on young adults and college students, were later extended to psychiatric patients and children with relatively similar results.

Interestingly, small but clear cut and pervasive sex differences were found in all groups tested, males being on the average more field independent than females.¹¹ These sex differences have since been found over a large segment of the life span although there is some suggestion that they may not exist in children below the age of eight¹² or in geriatric groups.¹³ They have also been noted in groups of varied educational and social background in the U.S.A., as well as in a number of Western European countries including England, Holland, France, Italy, Israel and Japan.¹⁴ Furthermore, within each sex, greater field-independence has been related to greater "masculinity" scores on an inventory

11 H. A. Witkin et al., Op. Cit., 1954, p. 153-171.

12 D. R. Goodenough and C. J. Eagle, "A Modification of the Embedded Figures Test for Use with Young Children", Journal of Genetic Psychology, Vol. 103, First Half, 1963, p. 67-74.

13 D. Schwartz and S. A. Karp, "Field Dependence in a Geriatric Population", Perceptual and Motor Skills, Vol. 24, No. 2, 1967, p. 495-504.

14 H. A. Witkin, Op. Cit., 1967, p. 243.

designed to tap the extent to which one adheres to culturally prescribed sex roles.¹⁵

Such sex differences may reflect biological differences between males and females, or perhaps socio-cultural values that shape a female into a more field dependent life style. Some support for the socialization process comes from Berry¹⁶ and MacArthur¹⁷ who independently found no sex differences among various groups of Western Eskimo children. Whatever the explanation, the immediate research implication is that sex differences must be controlled for to obtain unambiguous results.

Witkin reported strikingly high reliability data for his perceptual tests from both sexes in cross sectional and longitudinal studies over a period of from one to three years: test retest correlations for the RFT, EFT and BAT ranged from .66 to .97,¹⁸ and subsequent research has confirmed this. Other researchers have attempted to alter mode

15 C. M. Vaught, "The Relationship of Role Identification and ego Strength to Sex Differences in the Rod and Frame Test", Journal of Personality, Vol. 33, No. 2, 1965, p. 271-283.

16 J. W. Berry, "Terme and Eskimo Perceptual Skills", International Journal of Psychology, Vol. 1, No. 3, 1966, p. 207-229.

17 J. W. MacArthur, "Sex Differences in Field Dependence for the Eskimo", International Journal of Psychology, Vol. 2, No. 2, 1967, p. 139-140.

18 H. A. Witkin et al., Op. Cit., 1962, p. 370.

of field approach under various conditions. Hellkamp¹⁹ summarized their findings as follows:

... certain variables have no significant effects on an individual's field dependence performance. These variables are: (1) psychotherapy, (2) marriage or divorce, (3) drugs, (4) stress situations (heart surgery, sensory isolation), and, (5) special training (in the long run). On the other hand, [...] certain other variables tend to have significant influences on field dependence performances and consequently require controls. They are: (1) sex, (2) E.C.T., (3) brain injury, (4) alcoholism, and (5) direct experimental distraction during the test itself.

Aside from generating research, Witkin's work has also been the target of sharp criticism. In particular, it has been strongly maintained by independent reviewers, Zigler²⁰ and Zimiles,²¹ that field dependence-independence measures may simply constitute a reflection or extension of general intelligence. Indeed, high correlations between perceptual measures and I.Q. tests have often been

19 David T. Hellkamp, Extent of Psychological Differentiation Among Hospitalized Male Schizophrenics Classified Along the Process-Reactive and Delusional-Hallucinatory Dimensions, unpublished doctoral dissertation presented to the Faculty of Psychology of the University of Ottawa, Ontario, 1967, p. 20.

20 E. Zigler, "A Measure in Search of a Theory", Contemporary Psychology, Vol. 8, No. 4, 1963, p. 133-135.

21 H. L. Zimiles, "The Problem of Individuality in Systematic Research", Merrill-Palmer Quarterly, Vol. 10, No. 4, 1964, p. 377.

reported.^{22, 23, 24} Witkin countered this argument by stating that:

the significant relation frequently reported between measures of field dependence and total standard intelligence test scores is "carried" largely by those portions of intelligence tests which require analytical functioning.²⁵

This assertion was based on Goodenough and Karp's²⁶ factor analysis of the matrix of inter-correlations among field dependence measures and WISC subtests of school children: they found a high correlation between field dependence scores and a WISC analytic factor composed of the Picture Completion, Object Assembly and Block Design subtests, and only a low non-significant correlation with a Verbal-Comprehension factor (Vocabulary, Information and Comprehension subtests) and an attention-concentration factor (Digit Span, Arithmetic and Coding subtests).

22 D. N. Jackson, "Intellectual Ability and Mode of Perception", Journal of Consulting Psychology, Vol. 21, No. 6, 1957, p. 458.

23 J. E. Podell and L. C. Philipps, "A Developmental Analysis of Cognition as Observed in Dimensions of Rorschach and Objective Test Performance", Journal of Personality, Vol. 27, No. 4, 1959, p. 438-465.

24 D. T. Hellkamp, Op. Cit., p. 69.

25 H. A. Witkin, et al., Op. Cit., 1962, p. 80.

26 D. R. Goodenough and S. A. Karp, "Field Dependence and Intellectual Functioning", Journal of Abnormal and Social Psychology, Vol. 63, No. 2, 1961, p. 241-246.

More recently, Yamada²⁷ related measures of field-dependence to a number of factor-analyzed intelligence tests chosen from Guilford's Structure of the Intellect model: some of the tests were weighted with analytic ability, others not. The results lent partial support to Witkin's "common denominator" contention. But to date this controversy is not clearly resolved, necessitating control of the general intelligence factor in research with Witkin's measures.

Anastasi²⁸ underlined the possibility of a "biasing effect in that experimentors' prior knowledge of perceptual scores may have influenced ratings of personality correlates in Witkin's research".

Trites²⁹ pointed out the all too-tempting interpretation error, in such perception-personality study, of seeing causation where there is but correlation, an error to which Witkin at times seems to succumb.

27 Kerry T. Yamada, Extent of Psychological Differentiation as Related to Intelligence, unpublished doctoral dissertation presented to the University of Ottawa, Ontario, 1968, viii-100 p.

28 A. Anastasi, Differential Psychology, New York, MacMillan, 1958, p. 357.

29 Ronald L. Trites, Perceptual Differentiation of the Field as Related to Differentiation of the Perceived Self, unpublished doctoral dissertation presented to the Faculty of Psychology of the University of Ottawa, Ontario, 1965, p. 12.

But on the whole one cannot deny that Witkin and his co-workers have come upon something meaningful, nor deny the theoretical value of their findings in directing further research.

2. The Psychological Differentiation Hypothesis

As indicated previously, Witkin and his colleagues extended their initial perception-personality study of young adults to psychiatric patients and younger children with essentially similar findings, although, as might be expected, younger children tended to perceive in a relatively more field dependent fashion, progressing into a more field independent mode with age. For example, the younger child showed "field dependent" features of relatively inarticulate body image and poor impulse regulation, whereas in later years the same child manifested more mature field independent characteristics of greater self-awareness and smoother impulse discharge.

The initially remote perceptual measures, later linked to personality traits, now seemed to reveal developmental features. And in an effort to account for these features, Witkin and his co-workers later chose to reconceptualize the field dependence construct in favour of "psychological differentiation".

The "differentiation" concept has been widely used in both psychology and biology and finds its clearest definition in Werner's *Organismic Developmental Psychology*,³⁰ particularly in his orthogenetic principle that:

whenever development occurs, it proceeds from a state of relative globality and lack of differentiation to a state of increasing differentiation, articulation and hierarchic integration.³¹

"Differentiation", as explained by Werner,³² stands for increased structuralization and specialization of functions and systems be they physical, biological or psychological: for example, in the emotional sphere, the young child's diffuse feelings of comfort-discomfort later take on the form of more refined reactions of joy, sorrow, fear, etc. "Articulation" refers to the separateness and discreteness, as well as to the interconnectedness and coordination of said systems and functions, resulting in flexible and effective behaviour. Finally "hierarchic organization" emphasizes that more diffuse and primitive modes of functioning are gradually built upon and taken over by higher more sophisticated modes in a progressive continuity of

30 Heinz L. Werner, The Comparative Psychology of Mental Development, New York, Science Editions, 1949, xii-564 p.

31 Idem, "The Concept of Development from a Comparative and Organismic Point of View", in D. Harris, The Concept of Development: an Issue in the Study of Human Behaviour, Minneapolis, University of Minnesota Press, 1957, p. 126.

32 H. L. Werner, Op. Cit., 1949, p. 40-56.

development.

The definition and explanation of differentiation offered by Mitkin seem to follow Werner's views closely:

... differentiation refers to the complexity of a systems structure. A less differentiated system is in a relatively homogeneous state, a more differentiated system in a relatively heterogeneous state... [...] ... it is mainly through particular functional manifestations that extent of differentiation of a system may be judged [...] among the major characteristics of the functioning of a highly differentiated system is specialization. The subsystems which are present within the general system are capable of mediating specific functions which, in a relatively undifferentiated state, are not possible or are performed in a more rudimentary way by the system as a whole. When used to describe an individual's psychological system, specialization means a degree of separation of psychological areas, as feeling from perceiving, thinking from acting. It means as well specificity in manner of functioning within an area. Specific reactions are apt to occur in response to specific stimuli as opposed to diffuse reaction to a variety of stimuli.³³

Differentiation applies not only to "internal" workings of a system, but necessarily to that system's dealings with the environment. Thus:

A high level of differentiation implies clear separation of what is identified as belonging to the self and what is identified as external to the self. The self is experienced as having definite limits or boundaries. Segregation of the self helps make possible greater determination of functioning from within, as opposed to a more or less enforced reliance on external nurturance and support for maintenance typical of the relatively undifferentiated state.³⁴

33 H. A. Mitkin et al., (op. Cit., 1962, p. 9-10.

34 Ibid., p. 10.

This definition of differentiation is readily applicable to the perceptual test battery. For example, a highly differentiated person will experience parts of the perceptual field as discrete rather than fused within the totality of the background, allowing for easier separation of "item" from field and better performance on EFT, RFT and BAT. Thus Witkin and his group came to operationally define extent of psychological differentiation in terms of relative success on field-dependence perceptual tests.

The differentiation hypothesis can be readily applied to the previously mentioned perception-personality findings: for example, the "undifferentiated" field dependent individual may be viewed as having vague unrefined feelings, poor channelling of impulses and poor expenditure of energy as opposed to the sharper and more effective behaviour of the "differentiated" field independent subject.

In a second major publication, Psychological Differentiation,³⁵ Witkin and his colleagues expanded their earlier work and offered new research findings in support of the differentiation hypothesis. For example, perceptual scores were found to relate significantly to a number of indicators of extent of psychological differentiation such as articulation of body concept or body image as reflected in human

35 H. A. Witkin et al., Op. Cit., 1962, v-418 p.

figure drawings,³⁶ such as sense of separate identity as judged from ratings on the quality and stability of observed behaviour in children;³⁷ such as specialization of defenses assessed by projective and objective tests.³⁸

The adoption of the differentiation hypothesis has been met with sharp criticism from reviewers to the effect that the initial field dependence construct has been over-extended. Zigler contends that:

... the new theoretical formulations have little to recommend over those advanced in the earlier book... [...] ... in an effort to make it (differentiation) explain everything, these investigators succeed in making it explain very little.³⁹

Gardner also feels that "the term 'psychological differentiation' seems to imply more generality than is warranted",⁴⁰ and specifically mentions that certain problem-solving and verbal skills known to require higher level differentiation were found to be unrelated to Witkin's measures of "differentiation".

Witkin himself has recognized that, however fruitful the differentiation hypothesis has seemed, many questions

36 H. A. Witkin et al., Op. Cit., 1962, p. 115-132.

37 Ibid., p. 134-156.

38 Ibid., p. 157-176.

39 E. Zigler, Op. Cit., p. 134-135.

40 Riley W. Gardner, "Book Reviews", American Journal of Psychology, Vol. 76, No. 4, 1963, p. 709-711.

remain unanswered. Rather than abandon this useful theory, he has designated certain problem areas as requiring further investigation, the area of verbal skills in particular being singled out as requiring more carefully defined research.⁴¹

3. Psychological Differentiation and Verbal Skills

This section dealing with extent of psychological differentiation as related to verbal skills, will be treated under the following subheadings: (a) Witkin's findings (b) theoretical issues, and (c) findings of independent researchers.

(a) Witkin's findings.-- Witkin and his group had not considered, either in research or in theory, a relationship between verbal functioning and mode of field approach; nevertheless some intriguing evidence was accumulated as a by-product of their work.

First of all, it will be recalled that Goodenough and Karp,⁴² in their factor analytic study of the intercorrelations of perceptual ratings and WISC subtest scores on a group of children from 9.5 to 12.5 years, found but a weak non-significant correlation between perceptual indicators of differentiation and a verbal comprehension factor: the implication seemed to be that general knowledge of facts and

⁴¹ H. A. Witkin et al., Op. Cit., 1962, p. 222-228.

⁴² D. R. Goodenough and S. A. Karp, Op. Cit., p. 241-246.

events (information), general fund of words (vocabulary) and expressed knowledge of correct or incorrect behaviour (comprehension) are unrelated to extent of differentiation as indicated on perceptual measures.

The factor called Verbal Expressiveness, or the ability to give fluent verbal accounts, was also touched upon indirectly in a series of studies described by Witkin,⁴³ dealing with extent of psychological maturity. In a first study, transcripts of relatively unstructured "getting acquainted" interviews with ten year old boys were rated as to "level of maturity-adequacy". Five categories along the maturity-adequacy immaturity-inadequacy continuum were delineated: Category 1, characterized by general immaturity, poorly developed sense of awareness of self-concept, low critical abilities, lack of expressive powers, passivity, overdependence, relative lack of orientation as to past events or little understanding as to relationships between events; by contrast Category 5 was reserved for those boys who evidenced highly developed self-esteem; positive interpersonal relationships, active interests, vitality, good expressive and analytic ability, clear general orientation.

Using these guidelines, the ratings of a group of twenty-four boys by one psychologist yielded a significant

⁴³ H. A. Witkin et al., Op. Cit., 1962, p. 103-113.

correlation of .49 with measures of extent of differentiation. However, a cross validation study, using the ratings on a second group of twenty-nine boys done by a second psychologist, yielded a weak non-significant correlation of .18 with degree of differentiation as indicated on perceptual test performance. It was felt that this second psychologist may have been overly-impressed and influenced by the verbal expressiveness criterion to the neglect of other criteria, accounting for the low correlation between maturity level and extent of differentiation.

The interviews of a third group of boys were then rated as to "cognitive clarity": clear and organized experiencing of events and surroundings, keen self-awareness and awareness of the role and individuality of other people were emphasized as criteria of a high degree of cognitive clarity. General fund of knowledge was minimized in favour of the degree of assimilation of knowledge. Verbal expressiveness was specifically excluded from the criteria. The cognitive clarity ratings on this group of boys correlated significantly ($r = .77$) with extent of psychological differentiation.

In another study,⁴⁴ T.A.T. stories were rated as to level of organization and structure as judged from the productivity and organization of stories elicited. Whereas the ratings on a first group of boys correlated significantly

⁴⁴ H. A. Witkin et al., (p. Cit.), 1962, p. 97-99 and 191-192.

with measures of differentiation, they did not for a second group. Again it was felt that the lack of relation in the second group reflected over-emphasis on verbal expressiveness in rating criteria to the neglect of more structurally linked criteria. Moreover two markedly field dependent boys had obtained high "level of organization" ratings; one of them attained a WISC verbal I.Q. of 141 as opposed to a performance I.Q. of 99; it was hypothesized that under real life conditions, their coping ability might be reduced. Yet on the other hand, several boys with a differentiated and analytical field approach received low TAT "level of organization" ratings due to sparse productivity, perhaps reflecting an overly-cautious independent attitude on their part.

Whatever the case, the impression gained from analysis of interviews and T.A.T. stories is that verbal expressiveness, loosely defined, is a poor if not misleading indicator of extent of differentiation.

Witkin and his group considered the possibility that the overcoming of an embedding context in the perceptual or configurational realm (such as in field dependence situations) might be related to the same ability in verbal materials:⁴⁵ tests of camouflaged or scrambled words would logically

⁴⁵ H. A. Witkin et al., Op. Cit., p. 196.

provide such an embedding verbal context.

However, a study by Podell and Philipps⁴⁶ would seem to negate this assumption: Podell developed a word-decontextualization test made up of anagram problems requiring re-arrangement of jumbled letters so as to form a word. For one set of problems, letters were presented in random order, whereas for a second set of problems, the letters were presented in word form, hypothesizing that the meaningful arrangement would constitute an embedding function. As expected, the meaningfully presented anagrams proved more difficult to solve. However, where the rates of solution time under embedding conditions to solution time under random conditions served as a score, this test did not load on the spatial-decontextualization cluster; and consequently, in Witkin's⁴⁷ opinion, is probably unrelated to mode of field approach as well.

Witkin and his group themselves constructed a "reconciliation-of-opposites" test patterned after a Stanford-Binet item: the subject is required to discover similarities in pairs of words whose obvious meanings make the opposites: thus the subject must overcome the "opposition" context. Although the results of this test loaded

⁴⁶ J. E. Podell and L. C. Philipps, Op. Cit., p. 439-463.

⁴⁷ H. A. Witkin et al., Op. Cit., 1962, p. 196.

mainly on a verbal factor, the scores also correlated significantly with perceptual field dependence scores: such a test might thus reflect to some extent degree of differentiation.⁴⁸

All in all, the evidence accumulated by Witkin thus far seems to suggest that verbal abilities, again loosely defined, bear little or no relationship with extent of psychological differentiation as reflected in perceptual scores.

Furthermore, women, as a group consistently more field dependent than men, at the same time are known to be more proficient than men in certain types of verbal skills,^{49, 50} verbal fluency in particular: this provided but another bit of evidence towards the growing conclusion in Witkin's mind that

the development of at least some kinds of verbal skills may follow a different pathway than the development of mode of field approach and other characteristics of developed differentiation.⁵¹

(b) Theoretical Issues.— The previously mentioned fact that certain children of limited degree of differentiation

⁴⁸ H. A. Witkin et al., Op. Cit., 1962, p. 197.

⁴⁹ Leona E. Tyler, The Psychology of Human Differences, New York, Appleton Century Crofts, 1965, p. 243-251.

⁵⁰ J. R. Hobson, "Sex Differences in Primary Mental Abilities", Journal of Educational Psychology, Vol. 41, No. 1, 1947, p. 126-132.

⁵¹ H. A. Witkin et al., Op. Cit., 1962, p. 198.

nevertheless showed marked evidence of verbal skills, and vice-versa, led Witkin to offer three tentative explanations of these unexpected findings.⁵²

First of all, children whose limited differentiation and poorly developed capacity for self-direction hamper their dealing with everyday life situations may possibly substitute "talking about" in lieu of active coping with situations: impressive conversationalists, they may talk themselves around or out of situations they cannot actually handle. The noted psychiatrist Sullivan has, in this respect, commented on the adaptive value of language as a security operation: "... some people [...] can do in words practically anything and [...] have a curious faith that having said the right thing, all else is forgiven them."⁵³

Secondly, it is possible that the marked proficiency of some relatively undifferentiated children may reflect their greater need for guidance and support from others, verbal communication thus serving to solicit assistance from other persons.

⁵² H. A. Witkin et al., Op. Cit., 1962, p. 199-201.

⁵³ Harry S. Sullivan, Conceptions of Modern Psychiatry, New York, Norton, 1947, p. 7.

A third explanation comes from Haggard⁵⁴ who studied a number of school children of superior intelligence and academic achievement with respect to their performance in certain basic school skills and to personality characteristics gathered from personal data sheets, teacher ratings, objective and projective tests. High achievers in spelling and language showed marked passivity and dependence on outside sources for direction of their activities, reliance on conformance and social techniques to gain acceptance. High achievers in reading generally gave a picture of more independent action: a more intellectually active form of basic skills involved in reading as opposed to emphasis on relations and abstractions in language and spelling. Finally high achievers in arithmetic viewed their work with curiosity and felt capable of mastering any problem they might encounter. Emotionally controlled and flexible, they seemed more assertive, self-confident in relation to peer and authority figures.

Haggard's results would suggest that particular proficiency in spelling and language of seemingly undifferentiated field dependent children reflect a preference for obedient rote learning and application of mechanical rules

⁵⁴ E. A. Haggard, "Socialization, Personality and Academic Achievement, in Gifted Children", School Review, Vol. 65, Winter, 1957, p. 388-414.

in reaction to their need for external support.

Whether one accepts these explanations or not, it is noteworthy that Witkin adds:

... in view of the gross way in which verbal expressiveness has been explored in our studies thus far, we cannot be certain whether it involves to any extent capacity for articulation of experience in a verbal medium [...] further evidence would be desirable before repeating the hypothesis to which our conceptual frame work would lead that persons with an analytical field approach will tend to show articulateness in their use of language.⁵⁵

Witkin points, in this respect, to the works of Piaget^{56, 57} and Werner,^{58, 59} both of whom have emphasized how language is first intimately linked with action and perception, only gradually separating and distancing itself from the realm of concrete activity and referents.

⁵⁵ H. A. Witkin et al., Cp. Cit., 1962, p. 198.

⁵⁶ Jean Piaget and Barbel Inhelder, La Psychologie de l'Enfant, Paris, Presses Universitaires de France, 1967, 1-28 p.

⁵⁷ Jean Piaget, Play, Dreams and Imitation in Childhood, New York, Norton, 1962.

⁵⁸ Heinz L. Werner and Edith Kaplan, "The Acquisition of Word Meanings: A Developmental Study", Monographs of the Society for Research in Child Development, Vol. 15, No. 1, 1950, whole issue.

⁵⁹ Heinz L. Werner and Bernard Kaplan, Symbol Formation, an Organismic Developmental Approach to Language and Thought, New York, Wiley, 1963, xiii-530 p.

Though the basic mechanisms of speech may be present at an early age (e.g. babbling and random vocalizations), verbal behaviour depends initially upon the concepts and perceptual constellations a child acquires in his exploratory behaviour as he learns to recognize, manipulate and discriminate the features of his environment. The child gains a number of sensory impressions which he can check against past and future impressions and encounters; thus perceptual constancy and object constancy lead to the acquisition of concepts.

The line between percepts and concepts is of course a fine one, though essentially percepts refer to the organization of simple sense impressions whereas concept formation involves "discovering and defining the critical features common to a group of objects or events".⁶⁰ Thus in a sense, concept formation can be viewed as the internal representation of certain classes of impressions requiring differentiation of essential from non-essential features of a situation: in effect a pattern of distinctive variables must emerge from an incidental and indiscriminate background of sensory impressions. One can already note some parallel between this process and that of differentiation required

⁶⁰ Paul H. Mussen, The Psychological Development of the Child, Englewood Cliffs, Prentice Hall, 1963, p. 36.

in field dependence situations.

Piaget⁶¹ in particular has indicated that a child's early concepts are global, and linked to concrete experiences. Yet as he acquires notions of time, space, number and causality (preoperational stage), concepts are sharpened and expanded through the understanding of relationships between them, through greater grasp of experiences. Later still a child comes to classify objects into groups as to quality, size, etc., still bound, however, to tangible situations (stage of concrete operations). Eventually, at approximately eleven years of age, the child can think in terms of purely logical propositions divorced from concrete reality (stage of formal propositional thinking).

Language growth is intimately linked with cognitive development, initially in the simple form of naming of objects or labelling of experiences in a consistent socially reinforced way. The naming procedure allows the child to recognize similar experiences and this facilitates learning of new experiences: words also permit one to catalogue concepts and organize experiences.

61 J. Piaget and B. Inhelder, Op. Cit., 1-128 p.

McCarthy⁶² has described language development as it advances from the stage of articulated sounds to denotative use of symbols, from one word sentences to word strings to grammatically correct though primitive sentences, allowing for more sophisticated definition of experiences in keeping with cognitive development.

In short there would seem to be a link between perceptual and cognitive differentiation, and language development.

More recently Werner and Kaplan,⁶³ in their theory of symbol formation, again would suggest some relationship between extent of differentiation and verbal behaviour: summarily, symbolic activity results from an increased "distancing" between addressor and addressee on the one hand (e.g. greater separation between mother and child), and between the object of reference and the "symbolic vehicle" on the other hand. The symbolic vehicle, the means to represent the object symbolically, is the word in the vocal linguistic medium. And the word is shown to progress from a global function of simple denotation to a later more differentiated function of depiction, and on to

62 D. McCarthy, "Language Development in Children", in Carmichael, Manual of Child Psychology, New York, Wiley, 1954, p. 492-630.

63 H. L. Werner and E. Kaplan, Op. Cit., 1963, xii-530 p.

more articulate representation.

(c) Findings of Independent Researchers.- Theoretically then, as Witkin suggests, and as the writings of Piaget and Werner would lead one to believe, there should be some relationship between extent of differentiation and verbal behaviour. Controlled Research in this area has been surprisingly sparse, yet some support can be found for the differentiation hypothesis.

LaCrosse⁶⁴ hypothesized a relationship between Piagetian stages of spatial conceptualization and developmental changes as reflected in RFT performance. Fifteen subjects of estimated average ability in each of the six year, eight year, twelve year and fourteen year age groups were administered the RFT as well as three tasks adapted from Piaget's studies of spatial conceptualization: a) progressive subdivision of a paper strip, b) copying a pair of supplementary angles, and c) making a diagrammatic layout of a model village.

In keeping with previous research findings, some correlation between I.Q. and RFT was found, and older children performed better on RFT. No significant differences

⁶⁴ Jean LaCrosse, "The Relationship Between Piagetian Stage of Spatial Concept Development and Rod and Frame Test Performance", unpublished doctoral dissertation, University of North Carolina, in Dissertation Abstracts, Vol. 27, No. 8-B, 1967, p. 2871-2872.

were found between age groups, but, relative to each age group, subjects who were unsophisticated in their spatial concepts were also less successful than their age mates in solving RFT. Particular Piagetian stages did not correspond to particular ranges of RFT adjustments in any one-to-one fashion; nevertheless the results, in the researcher's view, imply that a unification of Piagetian theory with approaches such as Witkin's to the study of personality and development may prove fruitful.

More recently Dickstein⁶⁵ administered a number of concept attainment tasks to a group of low field independence females. The concept attainment tasks were borrowed from Bruner et al.'s⁶⁶ study on thinking: eighty-one cards, each unique, present stimulus materials composed of various perceptual attributes such as color, shape, etc. The entire array consisted of all possible combinations of four attributes, each of which may take one of three values: the attributes of figures on cards are shape (circle, squares, or crosses), number (1, 2 or 3), color (red, green or black), and number of borders (1, 2 or 3). The twenty

⁶⁵ Louis S. Dickstein, "Field Dependence in Concept Attainment", Perceptual and Motor Skills, Vol. 27, No. 3, 1968, p. 635-642.

⁶⁶ J. S. Bruner, J. J. Goodnow and G. A. Austin, A Study of Thinking, New York, Wiley, 1956, vii-330 p.

field dependent and the twenty field independent females were chosen from a group of ninety female nursing students who had been administered both the EFT and the closely related Thurstone Concealed Figures Test. Age, level of education and I.Q. were controlled for.

The field independent subjects were significantly more efficient on the concept attainment tasks as shown by a greater number of choices to solutions and thoroughness with which attributes were tested; these subjects also showed greater readiness to accept the irrelevance of some attribute values of an initial exemplar of the concept, and also made fewer incorrect verbalizations as to solutions. Thus the more differentiated field independent subjects are shown to attain information more efficiently, rely less on guessing with inadequate information, test attributes more thoroughly, and more readily accept the irrelevance of attributes than do the less differentiated field dependent subjects.

This study clearly demonstrates that extent of differentiation is related to facility in concept attainment at least in situations where attributes are immediately perceptible.

In another study, Spotts and Mackler⁶⁷ related field dependence measures to creative test performances. The EFT was used to tap field dependence, and measures of creative thinking were obtained from two verbal and two non-verbal factored tests of creativity developed by Torrance,⁶⁸ and by Guilford and Merrifield.⁶⁹ The creative thinking tests call for the elaboration and amplification of stimulus variables, and require a good deal of flexibility and originality of thinking. For example, one of the verbal tests of creativity, sometimes called verbal fluency, asks that the subject list the most interesting and unusual uses of ordinary "tin cans" he can think of within a five minute time limit.

The field independent subjects performed significantly better than their field dependent counterparts on all creativity tests: a finding that could not be attributed to intelligence since the field independent and field dependent groups had been matched beforehand on this variable.

67 J. V. Spotts and B. Mackler, Op. Cit., p. 239-268.

68 E. P. Torrance, Guiding Creative Talent, Englewood Cliffs, Prentice Hall, 1962.

69 J. P. Guilford, J. P. and P. R. Merrifield, "The Structure of the Intellect Model: Its Uses and Implications", Reports from the Psychological Laboratory, University of Southern California, No. 24, 1960, 1-39 p.

Thus evidence exists to indicate that extent of psychological differentiation is related to some measures of concept attainment, and perhaps to some verbal abilities as shown on creative test performance. Such research needs to be extended further.

Again, as Witkin states:

On a priori grounds we would expect such a relationship to exist. A critical test on this point requires that the constituents of what we call "verbal skills" be carefully identified and situations which provide a measure of articulation in verbal experience be devised.⁷⁰

4. The Problem and Research Proposal

At this stage it may be helpful to recapitulate the major points related in the previous sections.

First of all, in an effort to account for the developmental trends revealed in the perception-personality studies, Witkin reconceptualized the field-dependence construct in favour of the more encompassing hypothesis of psychological differentiation: field dependence measures were thus viewed as reflecting extent of differentiation, and new research evidence was advanced to support this conclusion.

The adoption of the differentiation hypothesis was, however, criticized for implying more generality than

⁷⁰ H. A. Witkin et al., Cp. Cit., 1962, p. 228.

warranted: specifically it was indicated that little or no relationship had been found between verbal skills, which require a high degree of differentiation, and Witkin's perceptual measures.

Rather than abandon prematurely a heretofore fruitful hypothesis, Witkin designated the verbal skills issue as one requiring further research under more controlled conditions.

Considering Piaget's and Werner's teachings, Witkin would expect some relationship between perceptual differentiation and verbal behaviour, and research in this area, though sparse, suggests that such a relationship might exist.

The problem seems to lie in the gross manner in which "verbal skills" has been studied to date. As Witkin states, the critical test on this issue awaits a more precise definition of verbal skills and more carefully constructed situations to provide a measure of differentiation in verbal behaviour.

Considering the above, it seems to this author that a reasonable clarification of this issue might be attempted through the use of more accurately isolated and defined tests of verbal abilities afforded by factor analytic techniques.

Factored tests seem particularly suited for such a study since their results are not confused by complexity of

makeup, leading to more economical research and clear cut interpretation; their discrimination ability and research value has been amply demonstrated in the investigation of brain functions and brain disorders, in the study of heredity of abilities, in the assessment of cognitive impairment, and in the prediction of achievement and job success.⁷¹

That such an approach might prove fruitful is suggested in the aforementioned study by Spotts and Mackler⁷² who found a significant correlation between field dependence measures and factored verbal creative test performance.

Also, Yamada,⁷³ as mentioned previously, employed factored tests with some success in his study of the field-dependence general intelligence issue.

A similar line of investigation, using factored tests of verbal fluency, is presently being pursued in Witkin's psychology laboratory.⁷⁴

There exist various kinds of factored verbal tests, a careful selection of which might be used as representing

71 J. P. Guilford, The Nature of Human Intelligence, New York, McGraw-Hill, 1967, p. 35-41.

72 J. V. Spotts and B. Mackler, Op. Cit., p. 239-268.

73 K. T. Yamada, Op. Cit., 100 p.

74 Evelyn Raskin, Research Associate, Psychology Laboratory, Downstate Medical Center, State University of New York, Personal Correspondence with the Author, letter dated September 24, 1968.

various verbal skills.

It is therefore proposed that the extent of differentiation-verbal skills issue may be clarified by relating measures of extent of differentiation as reflected by perceptual test scores on the one hand, and measures of verbal skills on the other, afforded by a number of factored verbal tests.

It would be difficult at this point to foretell whether perceptual scores will relate significantly to verbal tests tapping expressive ability, general fund of word knowledge, or some other known verbal dimension. However, considering Dickstein's⁷⁵ finding that extent of differentiation is related to facility in concept attainment at least in situations where attributes are immediately perceptible, one might expect perceptual scores to relate to those factored verbal tests that call for a clearer grasp and appreciation of the distinctive attributes of words or word meanings and word content.

If perceptual measures are found to relate to factored verbal tests, further support will be advanced for Witkin's adoption of the psychological differentiation hypothesis. If on the other hand the proposed research fails to find a relationship between these two variables,

75 L. S. Dickstein, Op. Cit., p. 635-642.

more cogent evidence will be provided toward the overgeneralization criticism of reviewers of Witkin's work.

The following chapter is devoted to the research design developed to implement the research proposal.

CHAPTER II

EXPERIMENTAL DESIGN

The experimental method used to implement the general research proposal advanced in the previous chapter will be presented under the following sub-headings: (1) operational definitions and research hypotheses, (2) the psychometric instruments, (3) the subjects, (4) the procedure, and (5) the statistical techniques used to analyze the data.

1. Operational Definitions and Research Hypotheses

As indicated in the general statement of the problem in the previous chapter, the issue as to whether or not Witkin's measures of psychological differentiation are related to verbal skills might be clarified through the use of more precisely defined and constructed tests of verbal abilities: it was proposed that measures of extent of differentiation be related to scores on a number of factored verbal tests, in order to lend support to Witkin or to his critics on this thorny issue.

It was suggested that several factored verbal tests of varied nature be selected. For the purposes of research, two measures of extent of differentiation seem feasible instead of one: the VEFT and the KEFT.

With this in mind, the two main research variables are as follows: extent of psychological differentiation is operationally defined as a subject's score on either one of two field dependence tests: the FDT and the RFT; verbal skill is operationally defined as a subject's score on any one of seven selected factored tests of verbal abilities.

The research hypotheses, stated in the null form are as follows:

1. There is no statistically significant difference between field-dependent and field independent subjects, as rated on the RFT, with respect to their performance on any one of seven factored verbal tests.
2. There is no statistically significant differences between field dependent and field-independent subjects, as rated on the FDT, with respect to their performance on any one of seven factored verbal tests.

2. The Psychometric Instruments

The tests used in this study will be discussed in the following order: (a) the RFT and (b) the FDT as measures of psychological differentiation; (c) the ctis as an indicator of general intelligence, (d) seven factored semantic tests selected to represent various verbal skills.

(a) The Rod and Frame Test (RFT).— Of the three previously described field dependence tests, the RFT and the EFT have been most frequently used in research because of the relative simplicity of materials. The RFT is the tool of choice since it alone shows no practice effect,¹ particularly in its shortened version where body and chair remain erect and only rod and frame are tilted: this more economical method does not suffer any loss of validity.²

However the requirement of a completely darkened room restricted the use of the RFT until the recent creation of a portable RFT apparatus developed by Cltman,³ a tabletop version which can be used in daylight conditions.

Such a portable apparatus, marketed by Darro Scientific Products Corporation of Lynbrook, New York, designated model RF-3, was used in this study. This model consists of a headrest placed at one end of a rectangular enclosure which serves as a frame and which can be tilted to the left or to the right at an angle of 28°. The walls

1 Herman A. Witkin, "Psychological Differentiation and Forms of Pathology", Journal of Abnormal and Social Psychology, Vol. 70, No. 5, p. 332.

2 H. A. Witkin, R. B. Dyk, H. F. Paterson, D. R. Goodenough and S. A. Karp, Psychological Differentiation, New York, Wiley, 1962, p. 41.

3 P. K. Cltman, "A Portable Rod and Frame Apparatus", Perceptual and Motor Skills, 1968, Vol. 26, No. 2, p. 503-506.

of the enclosure are of translucent plastic, and the tilting rod is visible at the end of the enclosure opposite the headrest. The subject is seated in front of this table-top apparatus, with head positioned securely in the headrest: his visual field is restricted to the interior of the chamber by a shield mounted on the headrest. A curtain can be raised before the subject's face to block his view of the inside of the enclosure between test trials.

The base (24 x 36 in.) and the discs (22 in. diameter) forming the ends of the enclosure are of 3/8 inch aluminum casting. The sides of the enclosure are 12 x 24 x 1/2 inch white translucent plastic sheets that allow illumination of the chamber by room light diffusing through: matted finish on the interior surface prevents reflections. On the inside of the end opposite the headrest, the "frame" is formed by affixing black plastic strips so that they extend 3/8 inch beyond each edge. The enclosure rests on rollers so that it can be tilted smoothly to the left or to the right. The headrest is also of aluminum casting; the shield mounted to it is made of a V shaped piece of flexible plastic sheet. The curtain of black corduroy is attached to a curved wire loop which in turn pivots on the headrest: the curtain can be made to pass under the shield to a point above the subject's field of vision to block his view as the test apparatus is re-set between trials.

A weight sewn into the bottom hem of the curtain ensures full opening or closing of the curtain. Furthermore an elastic band is passed behind the subject's head and hooked to either side of the headrest, securing the head position within the headrest and disallowing visual reference outside of the enclosure.

The rod visible at the opposite end of the headrest consists of a $3/8$ x 11 inch strip of black plastic glued to the interior side of the aluminum disc, which itself is covered in a white matte surface: the rod rotates on the same axis as the enclosure. A protractor, precise to $1/2$ degree units and calibrated 28 degrees to either side of the true upright, is affixed to the back and outer side of the disc, allowing the examiner to rapidly read results of a trial or to re-set position of rod and frame for another trial.

The complete apparatus was constructed so that no marks, screwheads or other irregularities appear on the inside of the enclosure or black frame to provide contaminating cues. Also a bubble type level mounted to the base of the apparatus insures its proper positioning: if the apparatus is "out", adjustable screw-type legs allow for levelling.

As in the case of the standard RPT, the subject's task is to determine the upright under various conditions

by adjusting the rod within the frame until he feels it is vertical: the examiner moves the rod slowly, three degrees at a time initially, until the subject verbally indicates verticality to his satisfaction. The curtain is closed between trials to reset the apparatus. Eight trials are given, paralleling the shortened standard RFT "body erect" series, with frame and initial rod tilts of 28 degrees in the following series: frame LLRRLLR, rod LRRLLRNL.

Oltman⁴ reports a correlation of .89 for females and .88 for males between the results of 163 college students (83 females, 80 males) on the portable and standard RFT; sex differences and general score patterns were similar. And correlations between the EFT and the two types of RFT did not differ significantly: $r = .60$ with the portable version, $r = .56$ with the standard. Thus, at least for this age group, the portable RFT seems a valid substitute for the standard model.

High reliability has been a characteristic feature of the standard RFT, Witkin⁵ reporting numerous studies that gave corrected odd-even coefficients ranging from .89 to .92, and consistency over a one to three year period ranging from .66 to .88.

4 F. K. Oltman, Cp. Cit., p. 505.

5 H. A. Witkin et al., Cp. Cit., p. 370.

The reliability of the recent portable RFT remains to be firmly established though Oltman⁶ reported a Spearman-Brown split-half reliability estimate of $r = .96$ for his college students. Using the portable RFT on a group of 80 graduate students, McCarrey⁷ reported a corrected split half reliability of $.90$, and a test-retest coefficient of $r = 0.85$ on 30 of said students.

The validity of the RFT as a measure of extent of differentiation will be discussed after the presentation of the EFT.

(b) The Embedded Figures Test (EFT).— As previously mentioned, this test requires the subject to locate a specified simple figure incorporated within a complex figure. A variation of the Gottschaldt Test, Witkin⁸ retained eight of the original simple figures and twenty-four of the original complex figures, colouring the latter to increase the difficulty of the task in a graded manner. Thus the lines, colours and patterns of the complex cards form an embedding

6 P. K. Oltman, Op. Cit., p. 505.

7 Michael W. McCarrey, Attitude Shift, Approval Need and Extent of Psychological Differentiation, unpublished doctoral dissertation presented to the Faculty of Psychology of the University of Ottawa, Ontario, 1969, p. 76.

8 H. A. Witkin, "Individual Differences in Ease of Perception of Embedded Figures", Journal of Personality, Vol. 19, No. 1, 1950, p. 1-15.

mass to obscure the simple figure. Success on the test was related to complexity of the figures, though wide but consistent individual differences were found in ease of locating the required figures. With a five minute time limit for each of the twenty-four cards, total scores for males ranged from 2 to 56 minutes, for females from 3 to 71 minutes.⁹ Thus degree of facility in the task appears to be a persistent individual characteristic varying from person to person.

The reliability of the EFT has also been amply demonstrated: again Witkin has summarized the results of several studies, with corrected odd-even correlations ranging from .86 to .95,¹⁰ test-retest reliability over a three year period ranged from .68 to .97.¹¹

A shortened form of the EFT developed by Jackson,¹² was used in the present study. This form consists of only twelve figures selected from Witkin's standard twenty-four, with the time limit for each figure reduced from five to three minutes. Jackson reported correlation coefficients

9 H. A. Witkin, Op. Cit., p. 8-9.

10 H. A. Witkin et al., Op. Cit., p. 40.

11 Ibid., p. 370.

12 D. W. Jackson, "A Short Form of Witkin's Embedded Figures Test", Journal of Abnormal and Social Psychology, Vol. 53, No. 2, 1956, p. 254-255.

in the mid nineties, between his short form and the standard EFT, on several groups of adults and college students.

Using the shortened form EFT, Trites¹³ found a corrected odd-even correlation of .80 for thirty college students. Dana and Goocher¹⁴ report test-retest reliability of .92. Both compare favourably with reliability data on the standard EFT.

Witkin has reported intercorrelations between the EFT and RFT ranging from .21 to .64¹⁵ suggesting that these two tests do tap a common factor. Thornton and Barrett,¹⁶ however, recently warned that, for females, EFT and RFT scores may hardly be related at all, with perhaps only 4% common variance as opposed to 40% for males. This warning calls for further investigation to clarify this point, and supports the use of both the EFT and RFT in future research, particularly where female subjects are used.

13 Ronald L. Trites, Perceptual Differentiation of the Field as Related to Differentiation of the Perceived Self, unpublished doctoral dissertation presented to the Faculty of Psychology of the University of Ottawa, Ontario, 1965, 94 p.

14 R. H. Dana and E. Goocher, "Embedded Figures and Personality", in Perceptual and Motor Skills, Vol. 9, No. 1, 1959, p. 99-102.

15 H. A. Witkin et al., Op. Cit., p. 44-45.

16 Carl L. Thornton and Gerald V. Barrett, "Methodological Note on N Achievement and Field Independence Comparisons", Journal of Consulting Psychology, Vol. 31, No. 6, 1967, p. 631-632.

Although the validity of the EFT and HFT as measures of extent of differentiation remains to be more fully verified, the significant correlation between these tests and "indicators" of psychological differentiation¹⁷ such as articulation of body concept, sense of separate identity and specialization of defense, would suggest that the two tests can be tentatively accepted as reflecting degree of psychological differentiation.

(c) The Otis.-- The unresolved controversy over the relationship between intelligence and field dependence measures indicated the inclusion of a test of general intelligence as a control factor.

The Otis Higher Examination Form A, administered in a thirty minute time limit, was chosen: a simple test to administer and score, the Otis has found widespread use over the years in counselling, research, in selection and screening procedures, and in the prediction of academic achievement or job success.

Reliability coefficients¹⁸ of .90 to .97 have been reported for the twenty minute time limit, and .86 for the thirty minute time limit; alternate forms have yielded

17 H. A. Witkin et al., Op. Cit., p. 115-176.

18 Donald E. Super and John C. Crites, Appraising Vocation Fitness, New York, Harper and Row, 1962, p. 104.

intercorrelations of .92.

Validity coefficients¹⁹ based on the correlation with other widely used I.Q. tests such as the Army Alpha and the Stanford-Binet, are of the order of .70 and .55 respectively; correlations with grades in several high schools ranged from .55 to .69.

The reliability and validity of this classic instrument are generally accepted facts in many settings and were deemed adequate for the purpose of this project.

(d) Factored Semantic Tests.— As indicated previously, more precisely isolated and defined verbal tests afforded by factor analytic techniques might be used to clarify the extent of differentiation-verbal skills issue.

Towards this end, seven factored semantic tests were borrowed from Guilford's Structure of the Intellect²⁰ test battery.

Guilford has been one of the foremost proponents of the application of factor analysis and multi-variate analysis in the study of human abilities. His monumental project on the "Structure of the Intellect" stems from his dissatisfaction with current narrow definitions of intelligence, with the failure of I.Q. tests to predict achievement

¹⁹ Donald E. Super and John C. Crites, Op. Cit., p. 104-105.

²⁰ J. P. Guilford, The Nature of Human Intelligence, New York, McGraw-Hill, 1967, p. vii-338.

adequately, with the low intercorrelations among the many tests that purport to reflect intelligence. As an alternative to theories emphasizing "g", Guilford has proposed his morphological model represented spatially as a three dimensional cube.

The first side or dimension of the cube is divided into five different intellectual operations or functions: cognition, memory, convergent thinking, divergent thinking and evaluation. The second dimension is divided into four kinds of content or matter: figural, symbolic, semantic and behavioural. The third dimension is divided into six kinds of end products of the intellectual operations: units, classes, relations, systems, transformations and implications. A cross between any three categories yields a factor. The model is thus theoretically open to 120 factors, eighty or more of which have actually been isolated and demonstrated to date.²¹

Since this research project deals with the verbal or "semantic" content area, thirty semantic factors, all of which have been demonstrated to some extent with carefully chosen or constructed tests, were theoretically available for this research project. The use of all thirty factors was not however feasible due to practical limitations

21 J. P. Guilford, Op. Cit., p. 65.

such as availability of the tests, ease of scoring (some tests tend to be quite subjective in scoring criteria), univocality of the factor. In regards to this last point, it should be noted that some factors have not yet been sufficiently "isolated", and overlap on other factors leading to difficulty in interpretation. With this in mind, the seven following tests, representing seven different verbal factors, were chosen.

The Wide Range Vocabulary Test loads on the Cognition of Semantic Units factor (CSU): essentially a word comprehension test, Guilford²² feels that it is probably the best known and most widely replicated factor, likely the dominant factor in intelligence tests tapping "G". The test calls for precise knowledge of frequently used words and is constructed in multiple choice form: two pages of eighteen multiple choice items each, with a four minute time limit per page. Subjects are penalized for guessing at answers since a "rights minus wrongs" scoring method is used. A copy of this test, and of those to follow, may be found in Appendix 1.

In regards to the validity of this test as reflecting the CSU factor, Guilford states that "the most dependable and univocal measure of CSU is a vocabulary test of

22 J. P. Guilford, Op. Cit., p. 77.

some kind, some kinds being better than others".²³ Although no statistical figures regarding this particular test are given by Guilford, he does recommend its use. Other studies^{24, 25} utilizing vocabulary tests reported loadings in the .50 + range on a factor similar to CMU, well beyond the critical .30 loading designated by Guilford as minimum for a test to relate significantly to a factor.²⁶

Reliability coefficients for vocabulary tests are reported in the .80 + range.^{27, 28} Yamada,²⁹ using a somewhat easier form of the Wide Range Vocabulary Test, obtained a corrected Spearman-Brown coefficient of $r = .92$.

23 J. P. Guilford, Op. Cit., p. 75.

24 J. W. Frick, J. P. Guilford, P. R. Christenson and P. H. Merrifield, "A Factor Analytic Study of Flexibility in Thinking", Educational and Psychological Measurement, Vol. 19, No. 4, 1959, p. 469-496.

25 Benjamin Fruchter, "The Nature of Verbal Fluency", Educational and Psychological Measurement, Vol. 8, No. 1, 1948, p. 33-47.

26 J. P. Guilford, Op. Cit., p. 71.

27 J. W. Frick et al., Op. Cit., p. 469-496.

28 B. Fruchter, Op. Cit., p. 33-47.

29 Kerry T. Yamada, Extent of Psychological Differentiation as Related to Intelligence, unpublished doctoral dissertation presented to the faculty of Psychology of the University of Ottawa, Ontario, 1968, 100 p.

Verbal Analogies I loads on the Cognition of Semantic Relations factor (CMR): it taps the ability to see relations between ideas or word meanings, or more precisely the ability to see relations between semantic units.

Each item of the test consists of a first pair of familiar words which is related; the subject must complete a second pair by choosing one of four given words, so that the relation in the second pair is similar to that in the first. The test has three pages of ten items each. A time limit of three minutes per page is given, as well as a warning when one minute remains for each page.

According to Guilford,³⁰ the unique feature of Verbal Analogies I is that vocabulary level has been purposely kept low to focus on clear grasp of relations between words: this feature has not been attained in many analogies tests, such as the classic Miller Analogies Test, where vocabulary level is raised to achieve item difficulty, consequently yielding something of a vocabulary test simultaneously.

Guilford³¹ reports a loading of .37 for this test in one factor analytic study, and states: "Although there

30 J. P. Guilford, op. cit., p. 68.

31 Maureen O'Sullivan, J. P. Guilford and F. de Mille, "The Measurement of Social Intelligence", Reports from the Psychological Laboratory, The University of Southern California, No. 35, June 1965, p. 22.

is some confusion with the CMC factor [...] (Cognition of Semantic Classes) the unique loading of Verbal Analogies I clearly defines this as the predicted reference factor MR."³²

Reliability coefficients using the Kuder Richardson formula, range from .50 to .70.³³

Recalled Words loads on the Memory for Semantic Units factor (MSU): the test simply taps the ability to recall isolated ideas or word meanings. It consists of two parts, each part requiring that the subject first study for one minute twenty words scattered about on a page, and secondly list those words he recalls on the following page within a one and one-half minute period. Necessarily, such a test involves some cognizing of words before retention. And the possibility of cheating through some form of "systematizing" presents an unresolved difficulty although the scattered presentation of words minimizes the learning of order. The subject's score is the number of correctly recalled words or suitable synonyms.

In a factor analysis using fifty marker tests, Recalled Words obtained a strong and respectable loading

³² Mauraen O'Sullivan et al., op. cit., p. 22.

³³ Ibid., p. 14.

of .47³⁴ on the hypothesized EMU factor. Reliability, using the corrected Spearman-Brown method for correlation between parts, was of the order of .51.³⁵

Ideational Fluency loads on Guilford's Divergent Production of Semantic Units factor (DMU). The divergent production operation calls for the generation of information from given information, the emphasis being laid upon variety and quantity of output from the same source: such an operation is most clearly involved in creative ability. This function, in terms of semantic units, calls for the ability to produce many elementary ideas appropriate to relatively unrestricted yet clearly specified conditions. For example, one item of Ideational Fluency asks the subject to list within a time limit all the fluids he can think of that are drinkable and not dangerous to health. The emphasis here is on sheer quantity of relevant output, quality (cleverness, originality) remains relatively unimportant. Ideational Fluency has four parts, each part involving one task to defined requirements within a three minute time limit. Scoring standards as to what answers

³⁴ Stephen W. Brown, J. F. Guilford and Ralph Hoepfner, "A Factor Analysis of Semantic Memory Abilities", Reports from the Psychological Laboratory, University of Southern California, No. 37, July 1966, p. 20.

³⁵ Ibid., p. 14.

are acceptable are outlined in the test manual.³⁶

In terms of validity, a factor loading of .54 was obtained by this test in one study for the hypothesized DMU factor.³⁷ Corrected Spearman-Brown reliability coefficients for between parts range from .63 to .77;^{38, 39} the somewhat lower than usual reliability must be considered in terms of the nature of the test.

Associational Fluency taps the ability to produce rapidly words that bear some specified meaningful relation to a given word: the test loads on the Divergent Production of Semantic Relations factor (DMR). In this instance, both quality and quantity of production are called for. Specifically, the subject is required to list synonyms for each of four given words: for example, he is asked to list as many synonyms as he can for the word "calm". The test has two parts of two key words each, with a time limit of two minutes per part. Scoring criteria and a list of acceptable responses are provided in the test manual.⁴⁰

³⁶ Manual for the Christensen-Guilford Fluency Tests, Beverly Hills, Sheridan Supply Company, 1959, p. 3-4.

³⁷ S. W. Brown et al., Op. Cit., p. 22.

³⁸ Ibid., p. 14.

³⁹ Manual for Christensen-Guilford Fluency Tests,
F. 8-A.

⁴⁰ Ibid., p. 5-6.

Guilford reports that this test obtained a factor loading of .56⁴¹ on the hypothesized DMR factor, with some side loading on another factor DMC (Divergent Production of Semantic Classes). In a second analysis a lower yet significant loading of .32⁴² was obtained.

Spearman-Brown corrected estimates of internal consistency have ranged from .57 to .81;⁴³ ⁴⁴ here again the lower than usual reliability likely reflects the nature of the test.

Expressional Fluency is another of Guilford's creativity tests, loading on the Divergent Production of Semantic Systems factor (DMS). Essentially a sentence construction test, it is aimed at tapping the ability to organize words into meaningful thoughts or ideas. After experimentation with various forms,⁴⁵ the following test format was judged the best to measure DMS: the subject is

⁴¹ Ralph Hoepfner, and J. P. Guilford, "Figural, Symbolic and Semantic Factors of Creative Potential in Ninth-grade Students", Reports from the Psychological Laboratory, University of Southern California, No. 35, June 1965, p. 22.

⁴² S. W. Brown et al., Cp. Cit., p. 14.

⁴³ Manual for the Christenson-Guilford Fluency Tests, p. 8-A.

⁴⁴ S. W. Brown et al., Cp. Cit., p. 22.

⁴⁵ J. P. Guilford, Cp. Cit., p. 136.

asked to construct a variety of four word sentences, given four initial letters to begin those words, with no word to be used more than once. There are four parts to this test, and in each part the subject must write sensible and complete sentences using four specified initial letters. A time limit of two minutes is allotted for each part. The score is the number of acceptable answers: although the scoring itself tends to be quite subjective, the inclusion of this test was felt necessary since it came closest to measuring expressive ability or production of meaningful discourse.

In two separate analyses, Expressional Fluency obtained factor loadings of $.59^{46}$ and $.49^{47}$ on the hypothesized DMS factor. Reliability estimates, using the Spearman-Brown formula for interpart consistency, have been of the order of $.66^{48}$ and $.67^{49}$, again somewhat lower than desirable, yet acceptable when considering the basic nature of the operation involved.

⁴⁶ P. R. Christenson and J. I. Guilford, "An Experimental Study of Verbal Fluency Factors", British Journal of Statistical Psychology, Vol. 16, No. 1, 1963, p. 1-26.

⁴⁷ R. Hoepfner and J. I. Guilford, Op. Cit., p. 16.

⁴⁸ Ibid., p. 6.

⁴⁹ Manual for the Christenson-Guilford Fluency Tests, p. C-A.

Best Trend Name was designed to tap the Evaluation of Semantic Relations factor (EMR), and calls for the ability to make choices among semantic relationships on the basis of similarity and consistency in meaning. Specifically, the test has the subject evaluate a series of four words (e.g. horse-pushcart-bicycle-automobile) that describe or contain a meaningful trend: he is then to choose one of three proposed answers (e.g. A: speed, B: time, C: size) which to his mind expresses the trend or relation best. The answer in the example here is TIME, since as a means of transportation the four words came historically in the order they are presented.

On three separate analyses,⁵⁰ factor loadings ranging from .42 to .46 were obtained by Best Trend Name on the hypothesized EMR factor. Reliability coefficients of .68 to .73⁵¹ were obtained, again using the Spearman-Brown formula for inter-part consistency.

All in all, the seven semantic tests were chosen to tap a variety of verbal functions or verbal skills. And

50 K. Nihira, J. P. Guilford, R. Hoofner and F. R. Merrifield, "A Factor Analysis of the Semantic Evaluative Abilities", Reports from the Psychological Laboratory, University of Southern California, No. 31, December 1964, p. 20.

51 Ibid., p. 11.

although the validity of these factored tests needs to be tested against more criteria, although their reliability in some instances is less than desirable, they were deemed suitable for the present research project: their theoretical value for research far outweigh their shortcomings.

3. The Subjects

All subjects used in this project were female student nurses enrolled in either a two year psychiatric nursing program (R.F.N.) or a three year registered nursing program (R.N.). Approximately one-half of the final pool of 84 females consisted of first or second year students working in the mental hospital where the author is employed. The remaining half was made up of second or third year nursing students, from four different Manitoba hospitals, who were completing the "psychiatric affiliation" phase of their training at the same mental hospital.

As indicated, only female subjects were used because of the reported sex differences in measures of field approach: that the females constitute by far the larger proportion of the nursing staff dictated the choice of this sex.

Educational backgrounds were similar in that all subjects had either a complete or partial Grade 12 (at least Grade 11 with three Grade 12 courses). The subjects ranged in age from 17 to 24 years.

All subjects were asked to participate in an on-going research project, the details of which could not at that time be divulged. They were specifically told that the project would involve about three hours of their time: two hours in group sessions during which a number of paper and pencil tests would be administered, and a final one hour session for individual administration of mystery tests of non-noxious and non-traumatic nature. The subjects were further assured that their results would be kept confidential.

In view of the high attrition rate reported in similar projects, some pressure and a number of "facilitating" measures were employed to encourage participants to complete the full testing schedule. First of all, the group testing sessions were worked into regular class hours so as to avoid infringing upon students' free time. Secondly, the hour long individual testing sessions were conducted in the evenings when students were available, in an effort to avoid conflict with their study time or social life; to this end, a schedule of times was posted on the bulletin board, and students were asked to sign in for testing at the most convenient hour. They were also encouraged to switch times with a classmate if they could not attend. Thirdly, the examiner was allowed to set up the perceptual testing apparatus and materials in a nursing residence

classroom, thus minimizing inconvenience or time-loss on the part of the subjects.

Of the 107 students contacted, 91 agreed to participate in the project; 84 completed all the tests, the other seven dropping out due to illness, withdrawal from course or change of heart.

During the individual sessions, subjects were questioned as to possible history of head injury or serious infection because of the known influence of brain damage on perceptual test performance. No need was felt to eliminate any subject on these grounds.

Final selection of the subjects into field dependent and field independent groups was based on the rank order of the mean error scores in degrees on the RFT, and the mean time scores in seconds on the EFT: the top 1/3 and the bottom 1/3 were then used to represent the two modes of field approach. The EFT and RFT scores were ranked independently of one another. Thus 28 field dependent and 28 field independent females were selected, for both perceptual tests, to represent groups of high and low degree of differentiation. These groups are further described in the next chapter.

4. Procedure

The ninety-one female nurses who initially volunteered to participate in the research project formed, in

terms of their stage of training, five different groups of from 10 to 22 subjects each. The Otis as well as the factored verbal tests were administered to each group in two hourly sessions, the first usually in the morning, and the second in the afternoon of the same day.

The same order of presentation of tests was maintained for all groups. Test procedures and instructions were read aloud by the examiner as the subjects followed in their test booklets. The examiner was aided by a fellow psychologist in the distribution and collecting of test materials. Since word of mouth travels quickly, the subjects in each group were encouraged, at the end of each session, not to reveal the nature of the tests to anyone since doing so would give other subjects an edge in performance over their own. The group testing phase of the project was completed within two weeks.

Perceptual mode testing was conducted in the evenings on an individual basis: four subjects were scheduled for testing each evening, each session lasting approximately forty-five minutes to one hour. This phase of the testing was carried out by the author alone over a seven week period.

The portable RPT was set up on a solid oak table, in a classroom within the nursing residence. The examiner had assured himself before testing that the RPT protractor had been properly aligned on the back of the apparatus and

that it gave accurate measures; also that the frame or chamber tilted a full 28 degrees to the left and to the right. In addition, at the start of each evening of testing, the resting level of the apparatus was rechecked, first via the bubble level mounted on the apparatus itself, secondly with a carpenter's level set across the chamber, across the rollers on which the chamber rests, and across the frame of the apparatus itself.

With the apparatus resting level, the subject was then brought to the testing locale, and seated before the RFT in a straight-back armless chair. She was then told that the testing consisted of two tasks, the first involving the apparatus before her. The general nature of the task was then outlined in the manner dictated by P. K. Oltman in his standardized procedure. A copy of this procedure is to be found in Appendix 2.

Having understood the general nature of the test, the subject was told to rest her hands in her lap, and her head was then secured in the headrest at a comfortable height, and in such a fashion that no other part of her body touched the table or apparatus. Further instructions followed on how to respond to the task presented in the eight successive trials of the RFT, again as outlined in the standardized procedure.

Correction of the Otis and of most of the semantic tests proved to be fairly straightforward, using copyrighted or home-made scoring keys.

Associational Fluency did present somewhat of a problem: though a list of acceptable responses is furnished for correction purposes, the manual adds that:

This list should cover the great majority of responses that should be credited each with a point. A few more will be found acceptable in the course of scoring a set of tests and these should be added to the list.⁵³

Consequently the author and a fellow psychologist went through the Associational Fluency tests listing those questionable answers not accounted for in the scoring list, and with the aid of a college dictionary, eliminated the unacceptable answers, adding the remainder to the scoring list. Test scoring was afterwards carried out using the expanded scoring criteria.

As indicated previously, Expressional Fluency tends to be subjective in its scoring, and this posed quite a problem. The test manual outlines four criteria that each correct response must meet: that it a) contain four words; b) be a complete sentence; c) make sense; and d) contain the specified initial letters. However, it was often

53 Manual for the Christensen-Guilford Fluency Tests, p. 5.

difficult to judge if a response made sense per se, or if the corrector had to read some sense into it. In other instances a response conveyed sense though the grammatic structure seemed forced and unorthodox. Or again certain subjects composed sentences using proper nouns and names (e.g. BILL AND JOAN PLAY), an operation that appears less demanding than the use of common nouns.

Since the test publishers could not supply more precise information on scoring criteria, Expressional Fluency was consequently scored by the author and two fellow psychologists to obtain an interrater reliability estimate. The average of the three ratings was taken as a subject's final score.

Since a group of twenty-two students had, previous to the research project, been administered another form of the Otis as part of entrance examinations, four points were deducted from the raw score of their second Otis to make allowance for practice effect as indicated in the Otis manual.⁵⁴ Furthermore this group of twenty-two provided thus a second set of results for reliability purposes on the Otis.

A month after completion of testing, twenty-seven volunteers were re-administered the KFT and the EFT, again

⁵⁴ Arthur J. Otis, Otis Self Administering Tests of Mental Ability, New York, Harcourt Brace, 1928, p. 3.

for reliability purposes.

5. Statistical Techniques for Analyzing the Data

Reliability estimates for the psychometric instruments were computed by the following techniques: a product-moment coefficient of correlation⁵⁵ between test-retest scores on the Otis, RFT and EFT. In addition, an odd-even measure of internal consistency⁵⁶ corrected with the Spearman-Brown formula was obtained for the EFT and the new portable RFT. The Spearman-Brown formula for alternate forms⁵⁷ was applied to compute reliability on the following verbal tests: Wide Range Vocabulary Test, Recalled Words, Ideational Fluency, Associational Fluency, Expressional Fluency and Best Trend Name: Guilford's use of this technique in reporting his reliability data predicated this choice. The Kuder Richardson formula⁵⁸ was used to compute the internal consistency for Verbal Analogies I in order to make direct comparison with previously reported

⁵⁵ J. P. Guilford, Fundamental Statistics in Psychology and Education, New York, McGraw-Hill, 1965, p. 95-96.

⁵⁶ Idem, Psychometric Methods, New York, McGraw-Hill, 1954, p. 377.

⁵⁷ Idem, Fundamental Statistics in Psychology and Education, p. 457.

⁵⁸ Ibid., p. 458.

data on the test. A coefficient of multiple correlation was employed to estimate interrator reliability for Expressional Fluency.⁵⁹

Product-moment correlations were also computed between EFT and RFT scores, as well as between the Otis and both of the former.

The t test of significance⁶⁰ was used to test the difference between the means of field dependent and field independent groups, as rated on both the EFT and the RFT, for each of the factored verbal tests. For the significantly different means, point bi-serial correlations were obtained from the t test in order to estimate the size of effect or degree of relationship of the difference, as suggested by Cohen.⁶¹

⁵⁹ J. P. Guilford, Fundamental Statistics in Psychology and Education, p. 394.

⁶⁰ Ibid., p. 184.

⁶¹ Jacob Cohen, "Some Statistical Issues in Psychological Research", in E. J. Wolman (ed.), Handbook of Clinical Psychology, New York, McGraw-Hill, 1965, p. 95-121.

CHAPTER III

PRESENTATION AND DISCUSSION OF THE RESULTS

In this chapter the results of the previously described experiment will be presented and discussed under the following headings: (1) Reliability of the Instruments, (2) Control Variables, (3) Results with the EFT, (4) Results with the RFT, and (5) Discussion of the Results.

1. Reliability of the Instruments

As indicated previously, estimates of both internal consistency and test-retest reliability were obtained for both measures of extent of differentiation.

A split-half coefficient of correlation of .84 ($P < .01$) was obtained for all eighty-four subjects on the RFT: application of the Spearman-Brown formula elevated this to .91 ($P < .001$). This finding is consistent with Witkin's¹ data on the standard RFT and with McCarrey's²

1 H. A. Witkin, R. B. Dyk, H. F. Paterson, D. R. Goodenough and S. A. Karp, Psychological Differentiation, New York, Wiley, 1962, p. 376.

2 Michael W. McCarrey, Attitude Shift Approval Need and Extent of Psychological Differentiation, unpublished doctoral dissertation presented to the Faculty of Psychology of the University of Ottawa, Ontario, 1969, p. 76.

results on the portable RFT, though not quite as strong as the data reported in Oltman's³ standardization. A test-retest correlation on twenty-seven subjects of .83 seems to parallel previous findings^{4, 5} on both versions of the RFT.

An odd-even coefficient of correlation of .69 ($P < .01$) was obtained for all eighty-four subjects on the EFT; the Spearman-Brown formula was applied, resulting in a correlation of .82 ($P < .001$): this is similar to Trites'⁶ finding with the same short form EFT. A test-retest correlation on twenty-seven subjects of .86 falls in line with previously reported data on both the original⁷ and the short version⁸ of the EFT.

3 P. K. Oltman, "A Portable Rod and Frame Apparatus", Perceptual and Motor Skills, Vol. 26, No. 2, 1968, p. 505.

4 H. A. Witkin et al., Op. Cit., p. 370.

5 H. W. McCarrey, Op. Cit., p. 76.

6 Ronald L. Trites, Perceptual Differentiation of the Field as Related to Differentiation of the Perceived Self, unpublished doctoral dissertation presented to the Faculty of Psychology of the University of Ottawa, Ontario, 1965, 94 p.

7 H. A. Witkin et al., Op. Cit., p. 370.

8 R. H. Dana and B. Goocher, "Embedded Figures and Personality", Perceptual and Motor Skills, Vol. 9, No. 1, 1959, p. 99-102.

A test-retest reliability rating was obtained for the Otis, using the results of twenty-two nurses who had taken alternate forms of the Higler Examination at an interval of approximately four months: the $r = .87$ ($P < .001$) coefficient obtained compares favourably with the findings of other researchers.^{9, 10, 11}

In regards to the factored verbal tests, measures of internal consistency were computed in the manner reported by Guilford and his co-workers so as to make comparison with their data possible.

Consequently, for Verbal Analogies, internal consistency was computed using the Kuder Richardson formula, with a resulting coefficient of $r = .72$ ($P < .01$). This is slightly higher than previously reported estimates on this test,¹² perhaps owing to the homogeneity of the subject pool used in this project.

9 Donald E. Super and John C. Grites, Appraising Vocational Fitness, New York, Harper and Row, 1962, p. 104.

10 M. W. McCarrey, Op. Cit., p. 77.

11 Kerry T. Yamada, Extent of Psychological Differentiation as Related to Intelligence, unpublished doctoral dissertation presented to the Faculty of Psychology of the University of Ottawa, Ontario, 1968, p. 66.

12 Maureen O'Sullivan, J. P. Guilford and R. deMille, "The Measurement of Social Intelligence", Reports from the Psychological Laboratory, The University of Southern California, No. 34, June 1965, p. 22.

Reliability coefficients for the remainder of the verbal tests were obtained by use of the Spearman-Brown formula for estimating whole test reliability from inter part correlations: the split-half nature of the factored verbal tests (2 or 4 parts each) facilitated the use of this technique.

A reliability coefficient of .81 was obtained for the Wide Range Achievement Test, consistent with data reported on other similar vocabulary tests.^{13, 14} This, however, falls short of Yamada's finding of .92¹⁵ with another form of this same test: the fact that the form he used was somewhat easier and longer than the present form (48 items as opposed to 36) might account for this difference.

A reliability coefficient of .82 ($P < .01$) was obtained for Recalled Words, similar to data¹⁶ available on

13 J. W. Frick, J. P. Guilford, P. R. Christenson and F. R. Merrifield, "A Factor Analytic Study of Flexibility in Thinking", Educational and Psychological Measurement, Vol. 19, No. 4, 1959, p. 489-496.

14 Benjamin Fruchter, "The Nature of Verbal Fluency", Educational and Psychological Measurement, Vol. 8, No. 1, 1948, p. 33-47.

15 K. T. Yamada, Op. Cit., p. 69.

16 Stephen L. Brown, J. P. Guilford and Ralph Hoepfner, "A Factor Analysis of Semantic Memory Abilities", Reports from the Psychological Laboratory, University of Southern California, No. 37, July 1966, p. 14.

this test.

For Ideational Fluency, the coefficient of internal consistency of .70 ($P < .01$) compares favourably with previously reported findings.^{17, 18}

A reliability coefficient of .75 ($P < .01$) obtained for Associational Fluency is also in keeping with other available estimates.^{19, 20}

In regards to Expressional Fluency, an interrator reliability for the scoring of this test was first computed, yielding a coefficient of .77 ($P < .01$); this seemed adequate for the purpose of this project. On the other hand, the internal consistency estimate of .48 ($P < .01$) falls considerably short of the .66²¹ and .67²² rating

17 Manual for the Christenson-Guilford Fluency Tests, Beverly Hills, Sheridan Supply Company, 1959, p. 8-A.

18 S. W. Brown et al., Op. Cit., p. 22.

19 Ibid., p. 22.

20 Manual for the Christenson-Guilford Fluency Tests, p. 8-A.

21 Ralph Hoepfner and J. P. Guilford, "Figural Symbolic and Semantic Factors of Creative Potential in Ninth-grade Students", Reports from the Psychological Laboratory, University of Southern California, No. 35, June 1965, p. 9.

22 Manual for the Christenson-Guilford Fluency Tests, p. 8-A.

reported by other researchers. Perhaps stricter scoring of the test might be at play here: the mean score of 13.52 for all subjects in this study differs greatly from mean scores in the other reports which ranged from 22.07 to 30.8.^{23, 24}

Finally, for Best Trend Name, the obtained reliability coefficient of .51 also falls below previously reported estimates in the .70 range.²⁵ Though significant at the $P > .01$ level, this rating remains weak as an indicator of internal stability. Insufficient or unclear test instructions may be at fault here: the test task is difficult to grasp.

Both Expressional Fluency and Best Trend Name thus obtained lower than desirable reliability estimates, a fact which will need to be considered in the final interpretation of the results. Since these two tests were the last to be administered in the group testing program, their lower reliability ratings could also be attributed to fatigue and inconsistent performance on the part of the subjects at the

23 R. Hoepfner and J. P. Guilford, Op. Cit., p. 9.

24 Manual for the Christenson-Guilford Fluency Tests, p. 8-A.

25 K. Nihira, J. P. Guilford, R. Hoepfner and P. R. Merrifield, "A Factor Analysis of Semantic Evaluative Abilities", Reports from the Psychological Laboratory, University of Southern California, No. 32, December 1964, p. 11.

termination of testing.

Apart from these two tests, therefore, the reliability of the instruments seems satisfactory for research purposes.

2. Control Variables

As indicated previously, many studies have reported a relationship between measures of differentiation and general intelligence: the brighter the individual, the better his performance and the lower his score on Witkin's tests. Consequently, the Otis was included in the test battery to control for the influence of general intelligence on the results of the research proposal.

In the present study correlations of $-.46$ ($P < .01$) between the Otis and the RFT, and of $-.36$ between the Otis and the RFT were obtained: this is consistent with the findings of other researchers.^{26, 27}

26 M. W. McCarrey, Op. Cit., p. 76.

27 David T. Hellkamp, Extent of Psychological Differentiation among Hospitalized Male Schizophrenics Classified Along the Process-Reactive and Delusional Hallucinatory Dimensions, unpublished doctoral dissertation presented to the Faculty of Psychology of the University of Ottawa, Ontario, 1967, p. 69.

Although it has been suggested in the recent literature²⁸ that female EFT scores may bear but a weak relationship with their RFT scores, and consequently may not be pertinent to Witkin's differentiation concept, the present study found a correlation of .53 ($P > .01$) between female EFT and RFT performance, underlining an appreciable degree of communality between the two.

Frequency distributions of both the EFT and RFT scores showed satisfactory spread and range of results with no marked skewness. Interestingly both distributions tended to be slightly bi-modal. This likely reflects the fact that the main of the subjects came from two large hospitals, one of which maintains more stringent entrance requirements than the other: the mean I.Q. score of nurses in this group (118.4) proved to be some six points higher than the other (111.9).

3. Results with the EFT

As indicated previously, two measures of extent of differentiation were used in this study: the EFT and the RFT. The present section reports the results of the high

28. Carl L. Thornton and Gerald V. Parrett, "Methodological Note on A. Achievement and Field Dependence Comparisons", Journal of Consulting Psychology, Vol. 31, No. 6, 1967, p. 631-632.

differentiation or field independent (FID), and the low differentiation or field dependent (FD) subjects, as rated on the EFT.

Witkin has never given any precise definition, in terms of cut-off scores on his perceptual mode tests, as to what constitutes field dependence-independence: hence one must think in terms of relative field dependence-independence with regards to the particular subjects under study.

For the present project, mode of field approach or degree of differentiation was determined on the basis of the rank order of the mean time scores in seconds on the EFT for all eighty-four subjects: the top third (28 nurses) and bottom third (28 nurses) were thereby chosen to represent field-independent and field dependent groups respectively.

Table I shows the difference between the two groups with respect to their performance on the EFT and the Otis, and with respect to their age and level of education. In this last instance, number of years of completed nursing training were added to years of formal education.

As can be seen from this table, the two groups differ markedly on perceptual test performance, and that they also differ significantly on the Otis. Nevertheless, general intelligence alone cannot account for the differences between the two groups since the t values for the

Table I

Means, Standard Deviations, Ranges and t Values for Field Independent (FID) and Field Dependent (FD) Subjects, as rated on the EFT, for Age, Education, I.Q. and EFT Scores.

Variable	FID			FD			t Value
	Mean	S.D.	Range	Mean	S.D.	Range	
Age	20.1	.99	18.67-22.83	20.3	1.39	17.92-23.92	.61
Education	13.1	.96	12-14	13.1	.75	12-14	.00
<u>Otis</u>	121	5.81	111-137	112	7.94	97-133	4.75 *
<u>EFT</u>	36.6	10.1	10.75-55.92	110	18.3	83.83-165.33	18.3 *

N = 56

* = $P < .01$

Otis and EFT also differ, the latter being by far the greater. Still the previously reported correlation of $-.46$ between the Otis and EFT performances points to a communality of approximately 20% between these tests. As suspected, mean age and educational level of the two groups do not differ significantly: all subjects had fairly similar educational backgrounds: partial or complete Grade 12 with one or two years nursing training. All subjects formed a relatively homogeneous age group ranging from 17 years 11 months to 23 years 11 months.

Considering these two extreme groups as representative of high and low extent of psychological differentiation, comparisons were made between their respected performance on each of the factored tests of verbal skills.

Table II thus reports the means, standard deviations, ranges and t values for the two groups: as indicated the FID subjects tended to perform at a slightly better level (higher scores) on all verbal tests than FD subjects. However, the differences attain the level of significance for only two of the seven tests, Verbal Analogies and Associational Fluency: on both these tests the FID group performed significantly better ($P < .01$) than the FD group.

To determine the size of effect in the case of these two tests, a pt. bis. correlation was estimated from their

Table II

Means, Standard Deviations, Ranges, t and r. p. bis Values
for the Field Independent (FID) and Field Dependent (FD)
Subjects, as rated on the EFT, for the Tests of Verbal Skills.

Test	FID			FD			t Value	r
	Mean	S.D.	Range	Mean	S.D.	Range		
W-R Vocab.	15.70	4.84	7-30	13.90	4.54	8-26	1.71	
Verb. Anal.	18.00	2.90	12-24	14.90	3.22	10-20	3.72 *	.45
Rec. Words	27.60	3.79	21-33	25.3	4.89	10-33	1.93	
Ideat. Fluency	56.90	10.7	41-80	52.1	11.3	31-83	1.60	
Assoc. Fluency	14.8	3.87	9-21	11.7	3.57	3-17	3.06 *	.38
Expres. Fluency	14.29	3.13	9-20	13.07	2.83	8-18	1.67	
Best Trend	13.6	2.76	7-19	12.7	2.79	7-17	1.19	

N = 56

* P > .01

t value according to Cohen's formula.²⁹

The formula is:

$$r. p. bis. = \sqrt{\frac{t^2}{t^2 + df}}$$

where df stands for degrees of freedom for the t test, in this case 56, less 2 for the restriction imposed by the two means, or 54.

The computation yielded a point bis-serial r. of +.45 for Verbal Analogies and of +.38 for Ideational Fluency.

The significant results with the Ideational Fluency test might have been expected in view of previous research findings between FD and FID groups on creativity tests:³⁰ nevertheless it is interesting to note that differences on the other two divergent production tests, namely Ideational Fluency and Expressional Fluency, did not attain significance. The significant difference on Verbal Analogies had not been clearly predicted from the sparse research conducted to date. These results, with the EFT, will be discussed in detail later in this chapter following presentation of the results with the RFT.

29 Jacob Cohen, "Some Statistical Issues in Psychological Research", in B. J. Wolman (ed.), Handbook of Clinical Psychology, New York, McGraw-Hill, 1965, p. 104.

30 James V. Spotts and Fernard Mackler, "Relationship of Field Dependent and Field Independent Cognitive Styles to Creative Test Performance", Perceptual and Motor Skills, Vol. 24, No. 1, 1967, p. 239-260.

4. Results with the RFT

As in the case of the EFT, but independently of the same, RFT performance of all eighty-four subjects was also ranked, in terms of mean error scores in degrees: the top and bottom thirds formed field independent and field dependent groups respectively.

Table III presents the means, standard deviations, ranges and t values of the FID and FD groups, with respect to their performance on the RFT, and Otis, with respect to age and educational level. The results parallel those obtained with the EFT in that the groups differ markedly with respect to perceptual mode performance, age and level of education having seemingly little influence on the appreciable differences between the groups. The significant difference between Otis scores suggests some relationship between general intelligence and field dependence: in this study a correlation of $-.36$ between Otis and RFT scores underlines a communality of approximately 13%. However, here again intelligence alone cannot account for the differences in mode of field approach as attested to by the differences in t values.

Again considering the FID and FD groups as representing high and low levels of psychological differentiation respectively, Table IV shows the results of the comparison

Table III

Means, Standard Deviations, Ranges and t Values for Field Independent (FID) and Field Dependent (FD) Subjects, as rated on the RFT, for Age, Education, I.Q. and RFT scores.

Variable	FID			FD			t Value
	Mean	S.D.	Range	Mean	S.D.	Range	
Age	20.4	1.31	18-23.75	20.3	1.47	17.83-24.5	.26
Education	13.0	.87	12-14	12.9	.84	12-14	.43
<u>Otis</u>	118	7.59	101-137	112	7.36	97-127	2.95 *
<u>RFT</u>	2.51	.71	1.25-3.75	12.0	3.24	7.75-19.12	14.9 *

N = 56

* = $P < .01$

Table IV

Means, Standard Deviations, Ranges, t and r. p. bis Values
for Field Independent (FID) and Field Dependent (FD) Sub-
jects as rated on the RFT, for the Tests of Verbal Skills.

Test	FID			FD			t Value	r
	Mean	S.D.	Range	Mean	S.D.	Range		
W-R Vocab.	15.40	3.97	7-27	14.1	5.92	7-30	0.95	
Verb. Anal.	17.6	3.19	11-23	16.4	2.66	12-21	1.50	
Rec. Words	27.4	4.15	15-33	26.2	4.37	10-33	1.02	
Ideat. Fluency	57.8	9.93	43-80	54.4	11.8	31-83	1.15	
Assoc. Fluency	14.0	3.44	9-21	11.9	3.67	3-17	2.17 *	.28
Expres. Fluency	14.58	3.28	9-20	13.28	2.95	10-18	1.79	
Best Trend	13.0	3.24	6-19	12.7	2.72	6-17	0.37	

N = 56

* = $P < .05$

of these two groups with respect to their performance on each of the verbal tests.

An inspection of this table shows that again the FID group performed better (higher scores) than the FD group, though only in one case, Associational Fluency does the difference attain significance at the $P < .05$ level. Application of Cohen's formula, to determine size of effect, yielded a point bis-serial r , of .28. Again this finding would tend to fall in line with previous research findings on perceptual mode as related to creativity test performance. Although the two other tests of divergent production do not attain significance, Expressional Fluency does show a trend in this direction.

These results are discussed in the following section.

5. Discussion of the Results

In this section the verbal test performance of the high differentiation (FID) and low differentiation (FD) groups will be discussed in the light of past research findings and theoretical implications.

From an overall viewpoint, examining Tables II and IV, one notes that verbal test differences between FID and FD groups, and their t values, tend to be greater when extent of differentiation is based on LFT than on RFT scores. Only one test, Expressional Fluency, yielded a higher t

value between the RFT groups than between EFT groups. And though the pattern of results tends to be similar with both measures of differentiation, the general impression gained is that verbal skills may be related more to EFT than to RFT performance.

When the FID and FD groups were based on EFT scores, the null hypotheses could not be rejected for the verbal tests save for Verbal Analogies and Associational Fluency: on these tests the FID group performed significantly better ($P > .01$) than the FD or low differentiation group.

When the two modes of field approached were based on RFT scores, the null hypotheses could not be rejected for any of the verbal tests with the exception of Associational Fluency, on which test the high differentiation group performed significantly better ($P > .05$) than the low differentiation group. Although the two groups did not differ significantly on Verbal Analogies, as was the case with the EFT based groups, the difference did however show a strong trend in that direction of $t = 1.50$.

The similarity in the general results, whether the FID and FD groups were formed from EFT or RFT scores, will facilitate the discussion in that performance on each verbal test can be compared to extent of psychological differentiation as such.

In regards to Associational Fluency, as already indicated, the significant differences were not unexpected since Spotts and Mackler³¹ had found significant differences between FID and FD groups on other tests of verbal creativity. These researchers attributed the better creativity test performance of field independent subjects to the fact that they are more sensitive to the structure and features of their environment, and capable at the same time of remaining separate and detached from the environment: consequently they are more apt to "toy" with, reorganize, restructure or integrate elements of their experience than field dependent subjects who are unable to stand apart from embedding environmental influences. Openness to the environment and capacity to reorganize one's experience are thus seen as the critical features in the creative process, features which FID subjects possess to a greater extent than their FD counterparts. This explanation seems plausible yet one wonders at the same time why these critical field independent traits come through on Associational Fluency but not on the other two divergent production tests, namely Ideational Fluency and Associational Fluency.

It has also been suggested that if differentiated subjects excel on fluency tests, "it may be because of their

31 J. V. Spotts and B. Mackler, Op. Cit., p. 239-268.

being less reliant on external structures and support for 'productivity'.³² Yet such an explanation in terms of personality makeup seems to fall prey to the temptation, in perception-personality research, of seeing causation where there is but correlation or parallel phenomena.

It seems to the writer that Associational Fluency, which calls for the enumeration of synonym-like words, requires quality as well as quantity of production whereas Ideational Fluency, and to some extent Expressional Fluency emphasize mainly quantitative production.

Associational Fluency seems to require greater appreciation of finer nuances between words or the content-message they carry. And hence the explanation as to why highly differentiated persons fare better on this test may lie in the more basic dimension of phenomenal or experiential awareness. Theoretically the highly differentiated person maintains clearer subject-object separation, clearer separation of self from surroundings, clearer grasp and understanding of inner and outer life. And his greater success on a test such as Associational Fluency may reflect the ability to penetrate beyond the surface value of a word,

³² Evelyn Raskin, Research Associate, Psychology Laboratory, Downstate Medical Center, State University of New York, Personal Correspondence with the Author, letter dated September 24, 1968.

and to distinguish between its essential and non-essential features, between essential attributes and incidentals. Such an ability is most evident in concept formation and the symbolic process which calls for the capacity to hold incidentals "constant" and to "pull out" or abstract essential or common features of experience.

On Verbal Analogies, the FID subjects, as rated on the EFT, performed significantly better ($P < .01$) than the FD group. When the two groups were based on RFT the difference in performance on this verbal test did not attain significance although a trend in this direction was noted. To some extent, the greater success of the FID subjects on Verbal Analogies may again reflect their greater appreciation, on the experiential-phenomenal plane, of subtle differences between situations and experiences, greater ability to compare and grasp communality. Again the task in a test calling for Analogies touches upon the symbolic process and abstract ability.

If indeed the greater success of the FID group on Associational Fluency and Verbal Analogies reflects their greater ability to penetrate beyond words on an experiential plane and in better conceptual or abstract ability, one may wonder why this has not come out more clearly in Witkin's

own studies. It will be recalled that Goodenough and Karp,³³ in their factor analytic research on the WISC subtests of school children, isolated three factors: a Verbal Comprehension factor, comprised of the Vocabulary, Comprehension and Information subtests, which did not relate significantly to degree of differentiation; nor did an Attention Concentration factor comprised of the Digit Span, Arithmetic and Digit Symbol subtests. But the perceptual scores did correlate highly with a WISC Analytical Factor composed of the Picture Completion, Object Assembly and Block Designs subtests. It is, however, noteworthy that the Similarities subtest has somehow been omitted: and this subtest does call for the clear grasp of words and appreciation of differences or communality between words. Perhaps this subtest was left out because conceptual and abstract ability may not be highly developed in school children. However at one point Witkin mentions that Similarities were not included in the Verbal Comprehension factor because of "the high degree of relationship between Similarities scores and perceptual index scores".³⁴ It seems to the writer that something of importance is revealed in this statement, yet Witkin offers no further explanations,

³³ D. R. Goodenough and S. A. Karp, "Field dependence and Intellectual Functioning", Journal of Abnormal and Social Psychology, Vol. 63, No. 2, 1961, p. 241-246.

³⁴ H. A. Witkin et al., Op. Cit., p. 66.

and from thereon the matter is dropped.

Witkin and his colleagues also questioned whether the overcoming of an embedding context in the perceptual realm might be related to the same ability in the verbal medium.³⁵ They found that success in solving anagram problems or scrambled words tests did not correlate with perceptual measures. They also constructed a "reconciliation of opposites" tests where the discovery of similarities in pairs of words whose obvious meaning makes them opposites requires the subject to overcome the embedding "opposition" context: this test reportedly loaded mainly on a verbal factor, "although scores for this test correlated significantly with perceptual index scores".³⁶

Here again one suspects that Witkin and his group touched upon something important without following it up. It seems, to the writer, that the significant correlation of "reconciliation of opposites" with the perceptual index scores reflects the fact that this test calls for abstract ability and for the ability to see beyond words. Indeed, it would seem thus far that this conceptual-symbolic dimension of verbal skills has been neglected in research undertakings, and merits closer examination.

35 H. A. Witkin et al., Op. Cit., p. 196-197.

36 Ibid., p. 197.

In passing, one might be tempted to attribute the significant difference on Verbal Analogies and Associational Fluency to general intelligence since the high differentiation groups did tend to perform significantly better on the Otis than the low differentiation groups. Yet it seems to this writer that such an explanation comes too easily, and that the general intelligence-field dependence controversy may be little more than a "tempest in a teacup". Indeed, considering our vague and nebulous definitions of intelligence, we may be "flogging a dead horse" in perpetuating this line of reasoning.

It is precisely the vagueness of the concept of intelligence, and the low intercorrelations between traditional I.Q. tests, which led Guilford to formulate his more comprehensive Structure of the Intellect³⁷ model. Interestingly, Guilford has considered Witkin's field dependence tests as possibly fitting into one of his model's cells, that of Convergent Production of Figural Transformations (NFT), although he hastens to point out that these perceptual tests may be factorially complex.³⁸ But the implication here is that field dependence should perhaps be viewed as a specific

37 J. P. Guilford, The Nature of Human Intelligence, New York, McGraw-Hill, 1967, vii-538 p.

38 Ibid., p. 179-180.

factor or ability in a more comprehensive theory of intelligence or cognitive development, rather than simply as a reflection of general intelligence.

It is also interesting to note here that, in reference to Guilford's Model of the Intellect, the two significant tests Verbal Analogies and Associational Fluency involve the same end product, namely "relations". Verbal Analogies results from the combination Cognition of Semantic Relations, and Association Fluency results from the combination Divergent Production of Semantic Relations. Thus the information yielded by both tests is defined in terms of a common form of product, that of "relations". This end product consists of seeing connections between items of information based upon variables or points of contact that apply to them. And this ability to recognize connections or relationships between objects or ideas depends largely on concept formation. Perhaps a more intensive study of field dependence vis-à-vis the relations dimension in verbal skills might prove fruitful.

In regards to the remainder of the factored verbal tests, although the FID group tended to attain better scores than the FD group, none of the differences reached significance.

Non-significant findings on the Wide Range Vocabulary Test seems to confirm Witkin's view that tests loading on the

"Verbal Comprehension" factor do not relate to mode of field approach: this factor has been defined in terms of the Vocabulary, Information and Comprehension subtests of the WISC and WAIS, and in Witkin's own words, "neither on conceptual grounds nor from the existing factor analytic research would we expect a relation to exist".³⁹ The non-significant findings here also confirm Yamada's⁴⁰ non-significant results on a simpler form of the Wide Range Vocabulary Test between high and low differentiation groups of both male and female college students. Perhaps such a vocabulary test involves a more automatic function of rote learning rather than the ability to grasp the essence of the concept behind the word, and consequently does not relate to extent of differentiation in the same way as Verbal Analogies or Association Fluency.

For Recalled Words, a test which requires the subject to list from memory a previously studied page of everyday words, no significant difference was found between the high and low differentiation groups. One might have expected the differentiated subjects, who theoretically are more capable of analyzing and structuring their experiences, to be able to grasp words more clearly and perhaps "systematize" them in order to retain and recall to a greater degree. However,

39 H. A. Witkin et al., Cp. Cit., p. 203.

40 K. T. Yamada, Cp. Cit., p. 70 and 84.

this did not prove to be the case. Witkin himself reports rather inconsistent and inconclusive results with research on both short term and long term recall.⁴¹ In one particular study he found no significant differences between high and low differentiation groups with respect to recall of learned material, whether in the form of word lists or nonsense syllogisms. But he concluded that further research in more clearly defined situations was needed.

Recalled Words can best be described as an exercise in immediate recall with previously unlearned material. Yamada⁴² used a somewhat similar test of immediate recall with numbers, Auditory Number Span, which loads on Guilford's Memory of Symbolic Units (MSU) factor, and which resembles the WAIS Digit Span: on this test he found no significant differences between FD and FID groups of college students for both sexes. Yamada attributes this finding to the fact that Auditory Number Span had no apparent embedding quality to it, and that the somewhat bland and unstimulating nature of the test may not have challenged the subjects.⁴³ A similar line of reasoning may be invoked in regards to the non-significant differences on Recalled Words which calls

⁴¹ H. A. Witkin et al., Op. Cit., p. 100-103.

⁴² K. T. Yamada, Op. Cit., 100 p.

⁴³ Ibid., p. 83.

for pure repetition of unrelated words.

The lack of significant differences on Ideational Fluency, as previously suggested, might be related to the fact that this test calls for mainly quantitative production of material appropriate to relatively unrestricted conditions. The test itself is not remarkably stimulating: little is called for in terms of overcoming embeddedness in verbal medium, in terms of penetrating beyond the surface value of words, in terms of originality or cleverness.

Non-significant differences on Expressional Fluency, the only test in the battery that attempts to measure meaningful discourse as such, are difficult to explain. The highly subjective nature of the scoring may have been a decisive factor here: perhaps the scoring was too strict resulting in generally lower mean scores for the FD or FID groups in comparison to normative data available on this test. Or again the lower than desirable internal consistency, perhaps due to motivational factors, may be at play: this test, along with Best Trend Name, was administered at the termination of the group testing, and may have suffered the detrimental effects of fatigue or lack of persistence on the part of the subjects. Nevertheless whereas the differences and t values for all the other verbal tests proved weaker with the RFT groups, the difference and t value for Expressional Fluency proved stronger. Perhaps if more

appropriate scoring methods were devised, or a more appropriate test of expressive ability designed, significant differences might appear, perhaps related more to RFT than to EFT.

Finally, in regards to Best Trend Name, one might have expected significant differences on this test, since evaluation of a series of words in order to discover or extract a trend seems to involve some ability to read beyond the words or to overcome embeddedness in a verbal medium, as would seem to have been the case in Verbal Analogies. However, in view of the low reliability rating on this test, one can only hypothesize what the results might have been under better conditions.

All in all, the results would suggest that extent of differentiation may be related to the ability to penetrate or read beyond words, to overcome embeddedness in a verbal medium, to appreciate the subtle differences and similarities between words and to "extract" common features between words. Such a process is certainly related to conceptual ability and abstract attitude. In a sense extent of differentiation may be viewed as related to the "inner language" of meanings that precedes expression of the spoken word. Perhaps a more intense study of these processes in relation to extent of differentiation might prove fruitful.

In regards to verbal ability in the sense of expressional fluency, or the ability to produce meaningful discourse, no significant differences could be found on the one test employed to tap this function. However, the internal consistency of this particular test being low, significant differences might be obtained under more controlled and favourable test conditions. Moreover, more sophisticated instruments to tap this dimension need to be devised.

Thus some support for Witkin's differentiation hypothesis can be advanced inasmuch as extent of differentiation seems related to the ability to penetrate beyond words on the experiential plane, to the ability to appreciate subtle differences and similarities between words, in a sense to the ability to overcome embeddedness in a verbal medium.

Such results necessarily need to be cross-validated, and necessarily apply at this time but to females in the age group studied. Extension of this study to males and to other age groups is indicated. A closer study of the symbolic process in relation to extent of differentiation may yield interesting results. Finally, perhaps a distinction between the structure of language (phonological and morphological systems, syntax, basic vocabulary) as opposed to verbal skills in the sense of concept formation and fluency, might prove to be a useful point of departure for future research.

SUMMARY AND CONCLUSIONS

The apparent lack of relationship between Witkin's field dependence measures and verbal abilities requiring a high level of differentiation has been one of the main criticisms levelled against Witkin's hypothesis that mode of field approach reflects extent of psychological differentiation.

In view of Witkin's contention that further research with more precisely defined and carefully devised verbal tests was required on this point, it was felt that an attempt to clarify this issue might be made by relating field dependence measures to factored tests of verbal abilities.

It was proposed that on a series of factored semantic tests selected from Guilford's Structure of the Intellect Test battery, significant differences in performance might appear between groups of field dependent (FD) and field independent (FID) subjects representing groups of low and high degree of differentiation respectively.

Eighty-four undergraduate female nurses of relatively similar age and educational level were administered both the RPT and the BFT, as well as seven of Guilford's factored semantic tests; their field dependence scores were ranked, with the top third (20 subjects) and the bottom third (20 subjects) on each perceptual test being designated as the high and low differentiation groups.

The following hypotheses, in the null form, were stated for the research proposal:

- A. There is no significant difference between FD and FID subjects as rated on the LFT with respect to their performance on any one of seven factored verbal tests.
- B. There is no significant difference between FD and FID subjects, as rated on the RFT with respect to their performance on any one of seven factored verbal tests.

The null hypothesis could not be rejected in all cases, whether differentiation was rated on the EFT or the RFT. The significant results suggested that field dependence measures may be related to the ability to appreciate the finer measures of words, to penetrate beyond words, in a sense to the ability to overcome an embedding context in the verbal medium. This ability plays a part in conceptualization and the abstract process, and further research in these areas is suggested.

Although no relationship was found between perceptual differentiation and expressional fluency, further research here is also indicated.

The lack of significant results on some of the verbal tests was considered in terms of 1) the subjectivity of scoring criteria, 2) lower than desirable reliability estimates perhaps due to motivational factors.

The results do lend some support to Witkin's differentiation hypothesis, although further research is needed.

Some suggestions as to possible areas of investigation were offered.

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This study clearly demonstrates that extent of psychological differentiation is related to facility in concept attainment at least in situations where attributes are immediately perceptible.

Gardner, Riley W., "Book Reviews", in American Journal of Psychology, Vol. 76, No. 4, p. 709-711.

The author criticizes Witkin's adoption of the differentiation hypothesis for implying more generality than warranted by research findings. Specifically, he points out that certain problem-solving and verbal skills requiring a high level of differentiation did not relate to Witkin's measures of differentiation.

Guilford, J. P., The Nature of Human Intelligence, New York, McGraw-Hill, 1967, p. v-538.

Guilford's first major report of his efforts to lend to the concept of intelligence a comprehensive and systematic foundation under the informational-operational framework he calls the Structure of the Intellect.

Spotts, James V. and Bernard Mackler, "Relationships of Field-Dependent and Field-Independent Styles to Creative Test Performance", in Perceptual and Motor Skills, Vol. 24, No. 1, 1967, p. 239-268.

In this investigation, field independent college males were found to perform consistently better on two verbal and two non-verbal factor analyzed tests of creativity than comparable groups of field-central and field-dependent peers.

Witkin, Herman A., H. B. Lewis, M. Hertzman, K. Machover, P. S. Meissner and S. Lapner, Personality Through Perception, New York, Harper, 1954, xxvi-571 p.

In this first major publication, Witkin and his associates present the origins of the field dependence construct and its distinctive features, as well as the results of a vast research project relating style of cognitive functioning to personality variables and individual patterns of adaptation.

Witkin, H. A., R. B. Dyk, H. F. Paterson, D. R. Goodenough and S. A. Karp, Psychological Differentiation, New York, Wiley, 1962, p. v-418.

This second major work consists of a confirmation and extension of the first, as well as the placing of the total research within a developmental framework under the guiding principle of psychological differentiation.

Yamada, Kerry T., "Extent of Psychological Differentiation as Related to Intelligence", unpublished doctoral dissertation, University of Ottawa, Ontario, 1968, p. vi-100.

The author's review of the literature, touching upon the verbal skills-extent of differentiation issue, proved to be the inspiration of the present study. Furthermore, his use of factor analyzed tests provided the impetus.

APPENDIX 1

The following verbal tests may not be reproduced without permission from their authors or holders of the copyright.

Name :

105

ADVANCED VOCABULARY TEST - V-4

This is a test of your knowledge of word meanings. Look at the sample below. One of the five numbered words has the same meaning or nearly the same meaning as the word above the numbered words. Mark your answer by putting an X through the number in front of the word that you select.

jovial

- 1-refreshing
- 2-scare
- 3-thickset
- 4-wise
- ~~5-jolly~~

The answer to the sample item is number 5; therefore, an X has been put through number 5.

Your score will be the number marked correctly minus a fraction of the number marked incorrectly. Therefore, it will not be to your advantage to guess unless you are able to eliminate one or more of the answer choices as wrong.

You will have 4 minutes for each of the two parts of this test. Each part has one page. When you have finished Part 1, STOP. Please do not go on to Part 2 until you are asked to do so.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

Part 1 (4 minutes)

- | | | |
|--|---|---|
| 1. mumble
1-speak indistinctly
2-complain
3-handle awkwardly
4-fall over something
5-tear apart | 7. veer
1-change direction
2-hesitate
3-catch site of
4-cover with a
thin layer
5-slide | 13. replete
1-full
2-elderly
3-resentfull
4-discredited
5-restfull |
| 2. perspire
1-struggle
2-sweat
3-happen
4-penetrate
5-submit | 8. orthodox
1-conventional
2-straight
3-surgical
4-right-angled
5-religious | 14. frieze
1-fringe of curls
on the forehead
2-statue
3-ornamental band
4-embroidery
5-sherbert |
| 3. gush
1-giggle
2-spout
3-sprinkle
4-hurry
5-cry | 9. strippling
1-stream
2-narrow path
3-engraving
4-lad
5-beginner | 15. treacle
1-sewing machine
2-framework
3-leak
4-apple butter
5-molasses |
| 4. massive
1-strong and
muscular
2-thickly populated
3-ugly and awkward
4-huge and solid
5-everlasting | 10. salubrious
1-mirthful
2-indecent
3-salty
4-mournful
5-healthy | 16. ignominious
1-inflammable
2-elflike
3-unintelligent
4-disgraceful
5-mysterious |
| 5. feign
1-pretend
2-prefer
3-wear
4-be cautious
5-surrender | 11. limpid
1-lazy
2-crippled
3-clear
4-hot
5 slippery | 17. abjure
1-make certain
2-arrest
3-renounce
4-abuse
5-lose |
| 6. unwary
1-unusual
2-deserted
3-incautious
4-sudden
5-tireless | 12. procreate
1-sketch
2-inhabit
3-initate
4-beget
5-encourage | 18. duress
1-period of time
2-distaste
3-courage
4-hardness
5-compulsion |

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO

STOP

Part 2 (4 minutes)

- | | | |
|----------------------|------------------|---------------|
| 19. bayonet | 25. meander | 31. prolific |
| 1-small tent | 1-marvel | 1-freely |
| 2-basket | 2-predict | reproductive |
| 3-helmet | 3-slope | 2-prehistoric |
| 4-sharp weapon | 4-forget | 3-talented |
| 5-short gun | 5-wind | 4-highly |
| | | temperamental |
| 20. astound | 26. burnish | 5-frivolous |
| 1-scold severely | 1-polish | 32. paroxysm |
| 2-make angry | 2-wave | 1-bleach |
| 3-surprise greatly | 3-dye | 2-disaster |
| 4-drive out | 4-heat | 3-storm |
| 5-ascertain | 5-consume | 4-fit |
| 21. contamination | 27. duplicity | 5-revolution |
| 1-contradiction | 1-extent | 33. antipodal |
| 2-contempt | 2-double-dealing | 1-outmoded |
| 3-warning | 3-agreement | 2-slanted |
| 4-pollution | 4-cleverness | 3-melodious |
| 5-continuation | 5-overlapping | 4-opposite |
| 22. amplify | 28. mundane | 5-four-footed |
| 1-electrify | 1-wordly | 34. acrimony |
| 2-expand | 2-obstinate | 1-promptness |
| 3-cut off | 3-deafening | 2-boredom |
| 4-signify | 4-servile | 3-divorce |
| 5-supply | 5-penniless | 4-stupidity |
| 23. mural | 29. deleterious | 5-bitterness |
| <u>pertaining to</u> | 1-injurious | 35. lissome |
| 1-growth | 2-hysterical | 1-lonely |
| 2-manners | 3-critical | 2-young |
| 3-the eyes | 4-slow | 3-dreamy |
| 4-war | 5-thinned out | 4-supple |
| 5-a wall | | 5-dainty |
| 24. hale | 30. nascent | |
| 1-glad | 1-colorful | 36. succinct |
| 2-fortunate | 2-broad | 1-sudden |
| 3-tall | 3-unpleasant | 2-concise |
| 4-robust | 4-floating | 3-prosperous |
| 5-ready | 5-beginning | 4-literary |
| | | 5-cunning |

DO NOT GO BACK TO PART 1 AND

DO NOT GO ON TO ANY OTHER TEST UNTIL ASKED TO DO SO.

STOP.

VERBAL ANALOGIES I - CMR01A
(Revised)

103

NAME _____ GROUP _____
(Print) Last First

This is a test of your ability to find relations between words. In each item of this test you will be given a first pair of words which is related. You are to complete a second pair by choosing one of the four given words. The second pair should have a relation similar to that of the first pair. Now look at the example.

Example:

1. CLOTH : DYE as HOUSE : _____ ?

A. shade
B. paint
C. brush
D. wood

Of the four possible answers, B has been circled as the correct choice to show that cloth is related to dye as house is related to paint. The relations in the two pairs is similar. Paint colors a house as dye colors cloth.

In this test, first find the relationship in the first pair, then select the alternative word which best fits the blank in each item, and circle the letter corresponding to that word to indicate your answer.

This test has three pages with 10 items on each page. You will be given 3 minutes to work on each page and will be told when 1 minute remains for each page.

If you have questions, ask them now.

STOP HERE

WAIT FOR FURTHER INSTRUCTIONS

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VERBAL ANALOGIES I

109

Start with item 1 on your answer sheet, below.

- | | |
|--|---|
| 1. PICKLE : JAM as SOUR : _____ ? | A. sweet
B. sugar
C. agreeable
D. smiling |
| 2. ATHLETE : HISTORIAN as STADIUM : _____ ? | A. seclusion
B. history
C. book
D. library |
| 3. MORNING : LUNCH as SPRING : _____ ? | A. time
B. summer
C. dinner
D. season |
| 4. VERDICT : SENTENCE as JURY : _____ ? | A. court
B. defendant
C. law
D. judge |
| 5. CIGARETTE : PLANT as AUTOMOBILE : _____ ? | A. model
B. gasoline
C. steel
D. vehicle |
| 6. CUSTOM : LAW as SPEAKING : _____ ? | A. language
B. song
C. voice
D. tone |
| 7. GARBAGE : DISEASE as HATRED : _____ ? | A. love
B. jealousy
C. war
D. dislike |
| 8. SMOKE : RAIN as ASCENT : _____ ? | A. fall
B. water
C. rise
D. cloud |
| 9. REVENGE : WISDOM as EMOTION : _____ ? | A. fear
B. thought
C. education
D. trouble |
| 10. CURIOSITY : SCIENCE as SUN : _____ ? | A. earth
B. shade
C. life
D. light |

STOP HERE & WAIT FOR FURTHER INSTRUCTIONS

VERBAL ANALOGIES I

110

Start with item 11, below.

- | | |
|--|---|
| 11. TUESDAY : WEDNESDAY as JUNE : _____ ? | A. summer
B. July
C. bride
D. vacation |
| 12. CHAOS : UNCERTAINTY as WAVE : _____ ? | A. ripple
B. ocean
C. beach
D. boat |
| 13. SATISFACTION : SUCCESS as MILK : _____ ? | A. food
B. baby
C. liquid
D. cow |
| 14. HAWK : MOUSE as FLOWER : _____ ? | A. petals
B. water
C. bird
D. honey |
| 15. SPEECH : SONG as ICE CREAM : _____ ? | A. cone
B. cake
C. sundae
D. soda |
| 16. ELECTRICITY : ENERGY as GREEN : _____ ? | A. red
B. grass
C. Irish
D. color |
| 17. GAMBLING : WINNING as CHANCE : _____ ? | A. method
B. success
C. roulette
D. risk |
| 18. RUBBER : HIGHWAY as STEEL : _____ ? | A. house
B. economy
C. rails
D. automobile |
| 19. IDEA : BEHAVIOR as SPARK : _____ ? | A. forest
B. decision
C. water
D. fire |
| 20. POEM : DICTIONARY as WALTZ : _____ ? | A. party
B. sing
C. jump
D. movement |

STOP HERE & WAIT FOR FURTHER INSTRUCTIONS

VERBAL ANALOGIES I

111

Start with item 21, below.

- | | |
|---|---|
| 21. SUNSHINE : AWNING as DEATH : ____ ? ____ | A. medicine
B. illness
C. funeral
D. happiness |
| 22. RISK : RESCUE as EFFORT : ____ ? ____ | A. ease
B. spirit
C. need
D. success |
| 23. INSULT : INJURY as BONUS : ____ ? ____ | A. money
B. salary
C. taxes
D. effort |
| 24. WAY : LIFE as STYLE : ____ ? ____ | A. church
B. country
C. belief
D. writing |
| 25. BEATS : RHYTHM as NOTES : ____ ? ____ | A. drum
B. time
C. melody
D. repetition |
| 26. EYES : HEART as EARS : ____ ? ____ | A. lungs
B. stomach
C. blood
D. life |
| 27. STRICTNESS : OPPOSITION as MOVEMENT : ____ ? ____ | A. rest
B. change
C. friction
D. speed |
| 28. TRENCH : FORT as ADVANCE : ____ ? ____ | A. attack
B. defense
C. strategy
D. retreat |
| 29. PROGRESS : TRADITION as SHIP : ____ ? ____ | A. rudder
B. anchor
C. fleet
D. pilot |
| 30. MAN : STARS as FISH : ____ ? ____ | A. ocean
B. sharks
C. birds
D. electric eels |

STOP HERE & WAIT FOR FURTHER INSTRUCTIONS

This is a test of your ability to remember words. On a study page you are to memorize a list of words. Then, on a test page, you are to write down as many of the words as you can remember. If you cannot remember the exact word, a synonym will do. The words need not be given in the same order as they were presented on the study page

This test has two parts of 20 words each. You will have 1 minute to examine each study page and $1\frac{1}{2}$ minutes to write as many of the words as you can remember. Do not turn any pages either backward or forward unless you are instructed to do so.

If you have questions, ask them now.

STOP HERE

WAIT FOR FURTHER INSTRUCTIONS

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MMU05A
1/5

BABY

DARK

RABBIT

HELP

DEEP

NOISE

FLUFFY

HARD

FUR

SHOE

HEAR

EGG

ICE

GOAT

EARTH

TOGETHER

GIRL

CAT

HIGH

GENTLE

STOP HERE

WAIT FOR FURTHER INSTRUCTIONS

224

Write the words you remember from Study Page 1.

This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or printed text on the page.

WAIT FOR FURTHER INSTRUCTIONS

RECALLED WORDS

115

STUDY PAGE II

BAD

HAND

LIFT

SPOT

HER

LOVE

TIME

SNCW

BUY

PULL

RECEIVE

APPLE

LEAVE

BAKE

ZEBRA

LOOK

PUT

BOOK

ASK

GRAB

STOP HERE

WAIT FOR FURTHER INSTRUCTIONS

116

Write the words that you remember from Study Page II.

[illegible]

WAIT FOR FURTHER INSTRUCTIONS

IDEATIONAL FLUENCY I

117

Form A

By Paul R. Christensen and J. P. Guilford

NAME _____ SEX: M _____ F _____
(Print) Last First Middle

ORGANIZATION _____ SCORES: I _____
II _____
III _____
IV _____
Total _____

GROUP _____ DATE _____

In this test you are to name things that belong in certain classes.

SAMPLE ITEM:

Name FLUIDS that will
BURN.

gasoline
kerosene
hydrogen
alcohol

In this sample item, the task is to make a list of fluids that will burn. Four such fluids have been listed by way of example. Of course, there are many other answers that could be listed.

For this test, a fluid is any non-living thing that is liquid or gas. A solid is any non-living thing that is not liquid or gas.

The items in this test will be somewhat like the sample item above. Your task will be to write as many things as you can that belong to certain classes. If you are not certain whether a thing fits the class, write it down anyway and try to think of another suitable thing.

WAIT FOR THE SIGNAL BEFORE TURNING THIS PAGE.

There will be four parts to this test. You will have 3 minutes per part. Are there any questions?

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

Name **FLUIDS** that are suitable for
DRINKING.

Acceptable — milk
Not acceptable — ether

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

Name SOLIDS that
FLOAT on water.

Acceptable — a cork
Not acceptable — oil

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

Name ARTICLES of CLOTHING.

Acceptable — coat

Not acceptable — spectacles

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

Name SOLIDS that are generally used as
FOOD and that are
SWEET TASTING.

Acceptable — sugar
Not acceptable — flour

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

ASSOCIATIONAL FLUENCY I

122

Form A

By Paul R. Christensen and J. P. Guilford

NAME _____ SEX: M _____ F _____
(Print) Last First Middle

ORGANIZATION _____ SCORES: I _____

II _____

GROUP _____ DATE _____ Total _____

In this test you are to write words similar in meaning to the given word.

SAMPLE ITEM:

Write words similar in meaning to the word HARD.

HARD:

<u>difficult</u>	<u>severe</u>
<u>solid</u>	<u>unfeeling</u>
<u>tough</u>	_____
<u>stiff</u>	_____

Notice that the words written above are all somewhat like the word HARD in meaning. In the test you are to write as many words as you can that are similar in meaning to the given word.

WAIT FOR THE SIGNAL BEFORE TURNING THIS PAGE.

Write as rapidly as you can. Avoid using a word more than once. Your score will be the total number of words you write (similar in meaning to the given word).

There are two parts to this test. You will have 2 minutes for each part.

Are there any questions?

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

a. CALM:

b. FOUL:

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

a. POSITIVE:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

b. FAIR:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

EXPRESSIONAL FLUENCY

125

Form A

By Paul R. Christensen and J. P. Guilford

NAME				SEX	M	SCORE	I
(Print)	Last	First	Middle		F		II
							III
							IV
GROUP				DATE			Total

In this test you are to write sentences each made up of four words. Each word must begin with the letter indicated.

SAMPLE ITEM:

<i>Keep</i>	<i>u</i>	<i>p</i>	<i>y</i>	<i>o</i>	<i>u</i>	<i>r</i>	<i>i</i>	<i>n</i>	<i>t</i>	<i>e</i>	<i>r</i>	<i>e</i>
<i>Kill</i>	<i>u</i>	<i>s</i>	<i>e</i>	<i>l</i>	<i>e</i>	<i>s</i>	<i>s</i>	<i>e</i>	<i>s</i>	<i>s</i>	<i>e</i>	<i>s</i>
<i>Kidnapping</i>	<i>u</i>	<i>p</i>	<i>s</i>	<i>e</i>	<i>t</i>	<i>s</i>	<i>y</i>	<i>o</i>	<i>u</i>	<i>n</i>	<i>g</i>	<i>i</i>
<i>K</i>	<i>u</i>	<i>s</i>	<i>e</i>	<i>t</i>	<i>s</i>	<i>y</i>	<i>o</i>	<i>u</i>	<i>n</i>	<i>g</i>	<i>i</i>	<i>n</i>

The task in this item is to write sentences using words that begin with the given letters: K, u, y, and i, in that order. The test contains items similar to this one. You will be required to write as many four-word sentences as you can, using words that begin with the given letters.

WAIT FOR THE SIGNAL BEFORE TURNING THIS PAGE.

All sentences should make sense and be complete. Avoid using the same word twice. Your score will be the number of acceptable sentences you write in the time allowed.

There are four parts to this test. You will have 2 minutes for each part. Are there any questions?

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

L c e n

L c e n

L c e n

L c e n

L c e n

L c e n

L c e n

L c e n

L c e n

L c e n

L c e n

L c e n

L c e n

L c e n

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p
F	o	s	p

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d
B	t	h	d

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g
M	a	r	g

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

Example:

A. speed
(B). time
C. size

Speed, alternative A, is not a good trend name because a horse is faster than a push cart, but a push cart is not faster than a bicycle, nor is a bicycle faster than a car. Size is not a good trend name for the same reason.

Remember: pick the name that best describes the trend of all four words, and circle the letter that it corresponds to.

STOP HERE

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BEST TREND NAME

131

Start with item 1 below, circling your answer as directed.

-
- | | |
|--------------------------------------|---|
| 1. accident - wound - bandage - scar | A. size
B. noticeableness
C. time |
|--------------------------------------|---|
-
- | | |
|---|--|
| 2. Los Angeles - Chicago - London - Paris | A. size
B. direction
C. prestige |
|---|--|
-
- | | |
|---|--|
| 3. malted milk - milk shake - ice cream soda - coke | A. thickness
B. sweetness
C. utility |
|---|--|
-
- | | |
|--|-----------------------------------|
| 4. roller skate - tricycle - bicycle - wheelbarrow | A. price
B. wheels
C. speed |
|--|-----------------------------------|
-
- | | |
|--------------------------------------|-------------------------------------|
| 5. lake - stream - river - waterfall | A. size
B. power
C. direction |
|--------------------------------------|-------------------------------------|
-
- | | |
|------------------------------|--------------------------------|
| 6. tree - log - pulp - paper | A. size
B. value
C. time |
|------------------------------|--------------------------------|
-
- | | |
|--------------------------------|---|
| 7. shoes - pants - shirt - tie | A. price
B. direction
C. importance |
|--------------------------------|---|
-
- | | |
|---------------------------------|-----------------------------------|
| 8. crane - shovel - cup - spoon | A. utility
B. size
C. price |
|---------------------------------|-----------------------------------|
-
- | | |
|---|---------------------------------------|
| 9. office boy - clerk - manager - president | A. age
B. knowledge
C. prestige |
|---|---------------------------------------|
-
- | | |
|-------------------------------------|-----------------------------------|
| 10. quarrel - debate - battle - war | A. morality
B. size
C. time |
|-------------------------------------|-----------------------------------|
-

STOP HERE - WAIT FOR FURTHER INSTRUCTIONS (EMR 2/3)

Start with item 11, and circle answer as directed.

11 throat - tongue - teeth - lips

- A. importance
- B. size
- C. direction

12 cookie - cupcake - pie - cake

- A. volume
- B. price
- C. utility

13 nest - egg - chicken - fowl

- A. time
- B. price
- C. usefulness

14. arithmetic - algebra - trigonometry - calculus

- A. difficulty
- B. utility
- C. directions

15. tree - violin - notes - music

- A. value
- B. time
- C. size

16.

shoes - tennis shoes - rain boots-fishing boots

- A. amount of rubber
- B. age
- C. price

17. crayon - chalk - pencil - pen

- A. thickness
- B. softness
- C. length

18. sail - deck - cabin - porthole

- A. importance
- B. size
- C. space

19. icecream - hot fudge - whipped cream - nuts

- A. sweetness
- B. direction
- C. calories

20. poker chip - button - coin - broach

- A. value
- B. complexity
- C. roundness

STOP HERE - WAIT FOR FURTHER INSTRUCTIONS (ENR 3/3)

APPENDIX 2

PROCEDURE FOR PORTABLE RFT - ADULTS

Note: Apparatus must be on sturdy table and be level.

Before seating S in front of apparatus:

"In this test we want to find out how well you can determine the upright - the vertical - under various conditions."

"In this box (FRFT) you will see a square frame and within this frame you will see a rod."

"It is possible for me to tilt the frame to the left or the right. I can also tilt the rod to the left or right. I can tilt the frame alone or the rod alone; or I can tilt them both at the same time, either to the same side or to opposite sides."

"When I lower the curtain at the beginning of each trial, I want you to tell me whether the rod and frame are straight up and down - i.e. vertical - or whether they are tilted. In other words tell me whether the rod and frame are straight with the walls of this room or whether they are tilted."

"Are there any questions?"

Seat S in front of apparatus and adjust head rest.

Trial 1: Adjust the frame to 28L and the rod to 28L. Lower curtain. Say to S: "What is the position of the rod and the frame?" (Record S's response.)

If S says the rod is not vertical, say to him:

"I will now turn the rod slowly until you think it is straight with the walls of this room. As I said, I will turn it slowly, and after each turn, tell me whether it has been turned enough or whether you want it turned some more. Just say 'more' or 'enough' after each turn. Please make your decisions quickly and don't be too finicky. Which way shall I move the rod to make it vertical - clockwise or counter-clockwise?"

Now move the rod about 3° at a time opposite to the direction in which the S says it is tilted, until he reports "enough". Ask the S after he reports the rod vertical:

"Is the rod now vertical - that is, is it straight with the walls of this room? In other words, is it straight up the way the flagpole outside is?"

If the S should now say that he wants the rod moved some more in either direction, do so. Raise the curtain and record the position of the rod and the time.

If on this first trial, the S reports the rod to be straight at the outset, ask him the question:

"Is the rod now vertical, that is, is it straight with the walls of this room?"

In such instance, give the S the instructions concerning the straightening of the rod, as above, on the next trial. If on the next trial, the S again states that the rod is straight at the outset, give him these instructions on the first trial on which he says that the rod is tilted.

Trial 2: Leave the frame at 28L and adjust the rod 28R. Lower the curtain and say to the S:

"Would you tell me now and at the beginning of all subsequent trials whether the rod and frame are straight with the walls of this room, or tilted; and if the rod is tilted, whether the rod should be moved clockwise or counter-clockwise to be made straight."

If the S asks you to turn the rod, do so until he says "enough".

Ask him again: "Is the rod now vertical - that is, is it straight with the walls of this room?"

Do not ask this question on subsequent trials. Raise curtain. Record adjustment and time. Proceed to the next trials.

Trial 3: Frame 28R Rod 28R

Trial 4: Frame 28R Rod 28L

Trial 5: Frame 28L Rod 28L

Trial 6: Frame 28L Rod 28R

Trial 7: Frame 28R Rod 28R

Trial 8: Frame 28R Rod 28L

Before S enters the room, be sure frame is straight and curtain up.

If at any time after the rod has been adjusted on a given trial the S should say that he wants it moved some more in either direction, do so.

If the S should take more than 5 seconds on any trial before saying "more" or "enough", tell him: "Please make your decisions quickly."

If the S should repeatedly say "more" or "enough" before the turn of the rod is completed, say to him: "Please wait until I have completed the turn."

Check from time to time to determine whether the S's head is in the proper position in the head rest. Attaching the elastic cord around the back of S's head is recommended.

APPENDIX 3

EMBEDDED FIGURES TEST

(Instructions for Adult Subjects)

"I am going to show you a series of colored designs. Each time I show you one of these designs, I want you to describe the overall pattern that you see in it. After examining each design, I will show you a simpler figure which is contained in that larger design. You will then be given the larger design again, and your job will be to locate the smaller figure in it. Let us go through one to show you how it's done."

Show S the practice complex figure (P-1) for 15 seconds. Then have him turn it over and show him the practice simple figure (P) for 10 seconds. After that say: "I will now show you the original figure again and you are to find the smaller figure in it." Remove simple figure. Present practice complex figure again and start stopwatch. After S finds figure, stop watch and say: "Would you now trace the figure with this (blunt stylus) without touching the paper?" Record time taken to find simple figure.

"This is how we will proceed on all trials. I would like to add that in every case the smaller figure will be present in the larger design. It will always be in the upright position. There may be several of the smaller figures in the same larger design, but you are to look only for the one in the upright position. Work as quickly as you possibly can, since I will be timing you, but be sure that the figure you find is exactly the same as the original figure, both in size and proportions. As soon as you have found the figure, tell me at once. If you ever forget what the small figure looks like, you may ask to see it again. Are there any questions?"

Present first test complex figure and proceed as above on this and all subsequent trials.

Notes to the examiner:

1. The complex figure is to be exposed for 15 seconds and the simple figure for 10 seconds on the first inspection presentation of each trial.

2. The subject may examine the simple figure again if he forgets it. If the subject asks to see the simple figure again stop the watch, but do not reset it. Do not allow the subject to see the simple figure for more than 10 seconds. When the 10 second period is up, show the complex figure again and start the watch. For example, if the subject asks to see the simple figure after 34 seconds, stop the watch and show him the simple figure for no more than 10 seconds. After 10 seconds show the complex figure and start the watch from 34 seconds.
3. If the subject has not found the simple figure in 5 minutes, go on to the next trial. Record score as follows:
5:00" (F).
4. When the subject says he has found the simple figure note the time, but do not stop the watch. If his simple figure is the right one, record the time at which he found it. If it is not the correct one, note the time, followed by an (X). In the latter case, permit the stop watch to go on.
5. Cover the complex figure while S is examining the simple figure and vice versa.

APPENDIX 4

ABSTRACT OF

Extent of Psychological Differentiation as Related to Verbal Skills¹

Witkin's adoption of the differentiation hypothesis has been severely criticized for implying more generality than warranted, particularly since certain verbal skills known to require a high level of differentiation were found to be unrelated to measures of perceptual differentiation. However, verbal skills have only been studied in a gross and indirect manner, and further research with more precisely devised and defined verbal tests is indicated.

This study was carried out to investigate the relationship between two measures of perceptual differentiation, the EFT and the RFT, and a selection of seven factor analyzed verbal tests borrowed from Guilford's SI model. Eighty-four female nursing students were first administered the above tests. Their scores on the EFT and RFT were independently ranked, the top and bottom third (28 subjects each) forming the final samples of high and low differentiation groups: differences, on each verbal test, between

¹ Robert T. Roy, Master's thesis presented to the Faculty of Psychology of the University of Ottawa, Ontario, 1970, viii-139 p.

pairs of group means were tested by Student's *t*.

The few significant results lend some support to Witkin's theoretical position inasmuch as perceptual differentiation seems to be related to conceptual or abstract ability, or to the ability to overcome embeddedness in a verbal medium. Some of the non-significant results were discussed in terms of the subjectivity of scoring or lower than desirable reliability of the verbal tests.