FIELD-DEPENDENCE-INDEPENDENCE AND SECOND LANGUAGE ACHIEVEMENT IN GRADE 8

by Hon-wing Lee

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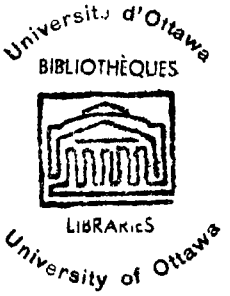

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CURRICULUM STUDIORUM

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INTRODUCTION

The work of Witkin and his associates (1954, 1962)[1,2] on field-dependence-independence has generated wide-spread interest and stimulated much research by others.

Recent studies[3,4,5] have demonstrated a functional relationship between cognitive style and academic achievement. From the findings of these and other studies, Witkin (1973)[6] concludes that relatively field-independent students tend to favour and excel in such subject areas as science, mathematics

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

2 _____, R.B. Dyke, H.F. Faterson, D.R. Goodenough, and S.A. Karp, Psychological Differentiation, New York, Wiley, 1962, v-418 p.

3 F. Stein, Consistency of Cognitive Interest, and Personality Variables with Academic Mastery: A Study of Field-Dependence-Independence, Self-Perception, and Vocational Interest in Relation to Academic Performance among Male Juniors Attending an Urban University, Unpublished Doctoral Dissertation, New York University, 1968.

4 L.R. Perney, The Relationship of Field Dependence-Field Independence with Academic Achievement, Unpublished Doctoral Dissertation, Case Western Reserve University, 1971.

5 Anna Bowles, Extent of Psychological Differentiation as Related to Achievement in Science and Attitude toward Science, Unpublished Master's Thesis, University of Ottawa, 1973.

6 H.A. Witkin, The Role of Cognitive Style in Academic Performance and in Teacher-Student Relations (Research Bulletin), Princeton, Educational Testing Service, February 1973, 58 p.

and engineering which require analytical skills, whereas relatively field-dependent students are inclined to prefer domains that focus on interpersonal relations and communication skills. On the other hand, a number of second language teaching experts[7,8] have suggested that personal predisposition is involved in language learning efficiency and that personality traits are certainly related to language learning ability. However, it appears that so far very little has been done to investigate such relationships.

It is out of this unresolved situation that the present study has grown. Broadly speaking, this study lies within the area of cognitive style and second language learning. More specifically, it seeks to examine the extent to which achievement in French as a second language is related to field-dependence-independence.

The thesis is organized into four chapters. The first consists of a review of the literature which leads to the statement of the problem and the research hypothesis. The

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7 R. Wardhaugh, "Teaching English to Speakers of Other Languages: The State of the Art", in R.C. Lugton (ed.), Toward a Cognitive Approach to Second Language Acquisition, Philadelphia, The Center for Curriculum Development, 1971, p. 19.

8 J.C. Catford, "Learning a Language in the Field", in R.C. Lugton (ed.), op. cit., p. 96.

second chapter describes the procedures by means of which the hypothesis stated in the first chapter is tested. The third chapter presents the results of the study. In the fourth chapter a discussion of the results is attempted. The report ends with a summary and the statement of conclusions, an annotated bibliography, several appendices, and an abstract of the thesis.

CHAPTER I

REVIEW OF THE LITERATURE

The review of the literature in this chapter falls into two main sections. The first outlines the nature and measures of field-dependence-independence as postulated by Witkin and his colleagues (1954, 1962, 1967, 1973). The second surveys the literature pertaining to second language learning. An attempt is then made to establish the theoretical basis for the present inquiry. The chapter ends with a statement of the research problem and hypothesis.

1. The Nature of Field-Dependence-Independence

Field-dependence-independence, as postulated by Witkin et al. (1967, 1973), is a cognitive style, which is in turn defined as a characteristic self-consistent mode of functioning found pervasively throughout an individual's perceptual and intellectual activities.[1,2] In style of experiencing and at level of intellectual functioning, a field-dependent person tends to be global and impressionistic,

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1 H.A. Witkin, "A Cognitive-Style Approach to Cross-Cultural Research", in International Journal of Psychology, Vol. 2, No. 4, 1967, p. 234.

2 _____, The Role of Cognitive Style in Academic Performance and in Teacher-Student Relations, (Research Bulletin), Princeton, Educational Testing Service, February 1973, p. 2.

whereas a field-independent person tends to be analytical, structured and articulated.[3] This means that where relationship with the surrounding field is concerned, a field-dependent person tends to blend items together into a fused and impressionistic whole, while a field-independent person is able to perceive items as discrete from their backgrounds or to reorganize a field when it is organized and, when there is relatively little inherent structure in the field, to impose structure on it and so perceive it as organized.[4]

The term of field-dependence-independence originates from Witkin's concept of psychological differentiation, which was first developed by Werner. According to Werner (1948), differentiation means increased structuralization and specialization of functions and systems.[5] He holds that during development organization progresses from a less differentiated system and relatively homogeneous state to a more differentiated system and relatively heterogeneous state.[6]

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3 H.A. Witkin et al., Psychological Differentiation, New York, Wiley, 1962, p. 13.

4 Ibid., p. 14.

5 H.L. Werner, Comparative Psychology of Mental Development, New York, International University Press, 1948, p. 40-46.

6 Ibid., p. 56.

Witkin (1962) states that, in its broadest terms, differentiation refers to the complexity of a system's structure; that a system's extent of differentiation may be judged through particular functional manifestations; and that one of the major characteristics of the functioning of a highly differentiated system is specialization.[7]

As a description of an individual's psychological system, specialization means a degree of separation of psychological areas, such as feeling from perceiving, thinking from acting. To a highly differentiated person, parts of a perceptual field are discrete, and not fused with their background as may be perceived by his less differentiated counterpart.[8]

Degree of differentiation, according to Witkin et al. (1962), also affects a system's integration, which refers particularly to the form of the functional relationships among system components, resulting in more or less harmonious working together of system components with each other and of the total system with its environment, thereby contributing to the adaptation of the organism.[9]

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7 H.A. Witkin et al., op. cit., p. 9.

8 Ibid., p. 10.

9 Ibid., p. 10.

The concept of differentiation has frequently been applied in a developmental context. On the basis of a major finding of their earlier studies, Witkin et al. (1962) maintain that young children tend to perceive in a relatively field-dependent fashion and, as they grow older, their perception assumes a generally more independent form.[10] It may, however, be expected that at any age level, children would differ in extent of differentiation and that greater or more limited differentiation would be manifested in a given child in each of the indicator areas of psychological growth and life experience.[11] Also, the extent of field-dependence-independence should be viewed as ranging on a continuum rather than falling into two distinct categories.[12]

Closely related to the above is the fact that the findings of a series of studies have also demonstrated a marked stability in field approach over long periods of time, and that although differentiation in perceptual functioning generally increases with age, especially from 5 to 17 years, each individual tends to maintain his relative position

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10 Ibid., p. 7.

11 Ibid., p. 22.

12 Ibid., p. 2.

among his peers.[13, 14, 15]

Clear-cut and pervasive sex differences have been reported in perception in general and at different age levels, as well as in verbal skills and in the performance of intellectual tasks, including problem-solving. Greater field-dependence in females has been observed in numerous groups of varied educational and socio-economic backgrounds in the United States, in Western European countries, including England, Holland, France and Italy, in Israel, Japan, Hong Kong and Sierra Leone, Africa,[16] as well as in India.[17] However, no significant sex differences have been noted among the Eskimos, whose child-rearing techniques emphasize

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13 G. Bauman, Stability of Individual's Mode of Perception and of Perception-Personality Relationships, Unpublished Doctoral Dissertation, New York University, 1951.

14 H.A. Witkin et al., Personality Through Perception, New York, Harper, 1954, p. 1-10.

15 H.A. Witkin et al., "Stability of Cognitive Style from Childhood to Young Adulthood", in Journal of Personality and Social Psychology, Vol. 7, No. 3, 1967, p. 291-300.

16 H.A. Witkin, op. cit., 1967, p. 243.

17 C.G. Pande, "Sex Differences in Field-Dependence: Confirmation with Indian Sample", in Perceptual and Motor Skills, Vol. 31, 1970, p. 70.

self-reliance and independence for both boys and girls.[18,19,20]

In perceptual and intellectual functioning, females lean towards a global approach, males towards an analytical one. Females as a group show greater dependence on others than males do, and also seem more likely than males to define their attitudes and judgments by external standards. Females also excel males in remembering names and faces and in verbal functioning.[21]

Developmental studies have, however, shown that sex differences may be slight or non-existent below 8 and above 60 years of age.[22,23,24]

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18 J.W. Berry, Culture Determinants of Perception, Unpublished Thesis, University of Edinburgh, 1966.

19 _____, "Temne and Eskimo Perceptual Skills", in International Journal of Psychology, Vol. I, 1966, p. 58-64.

20 R.S. MacArthur, "Sex Differences in Field Dependence for the Eskimo: Replication of Berry's Findings", in International Journal of Psychology, Vol. 2, No. 2, 1969, p. 139-140.

21 H.A. Witkin et al., op. cit., 1962, p. 214-221.

22 C.H. Crudden, "Form Abstraction by Children", in Journal of Genetic Psychology, Vol. 48, 1941, p. 113-129.

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

24 D. Schwartz and S.A. Karp, "Field Dependence in a Geriatric Population", in Perceptual and Motor Skills, Vol. 24, 1967, p. 495-504.

Summing up the findings of their own studies as well as those from other laboratories employing the same or closely related perceptual techniques, Witkin et al. (1962) highlight the characteristics of field-dependence-independence as follows.

Field-dependent people have difficulty in locating a familiar figure concealed in a complex design and, as a rule, experience ambiguous stimuli as vague and indefinite. They tend not to do well in the block-design, picture-completion, and object assembly parts of standard intelligence tests, but are nevertheless likely to do even better than field-independent persons on portions concerned with vocabulary, information, and comprehension. Field-independent people have also been found to excel their field-independent counterparts in recognizing people they have only briefly seen before.[25]

Field-independent people, on the contrary, tend to have no problem with embedded-figures tests;[26] they are also likely to do well in the analytical part of the intelligence tests.[27] However, while field-independent people are often able to function with a considerable degree of autonomy from

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25 H.A. Witkin et al., op. cit., 1962, p. 2-3.

26 Ibid., p. 45.

27 Ibid., p. 70.

others, some of them are strikingly isolated individuals, over-controlled, cold and distant, and unaware of their social stimulus value.[28]

Witkin et al. (1962) stress that the characteristics cited above are not a haphazard cluster of disparate elements but fall into intrinsically coherent patterns, which suggest consistency in psychological functioning that "pervades the individual's perceptual, intellectual, emotional, motivational, defensive, and social operations."[29]

Thus far, consideration of field-dependence-independence has mostly been focused on perceptual and intellectual functioning. Much evidence prevails, however, that field-dependence-independence extends beyond cognition into other psychological domains. For instance, Witkin (1973) contends that, in social situations, a relatively field-dependent person is likely to follow the prevailing social frame of reference in defining his attitudes, beliefs, feelings, and even his self-concept from moment to moment - hence field-dependent persons are selectively attentive to the human content of the environment.[30] More recent findings lead

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28 Ibid., p. 3.

29 Ibid., p. 4.

30 H.A. Witkin, op. cit., 1973, p. 7-8.

Witkin (1973) to affirm that field-dependent people are also superior to field-independent persons in attending to, and hence remembering, verbal messages that are more social in content, and that the field-dependent persons' particular sensitivity and attunement to the social environment result in a repertoire of highly developed social skills.[31]

Field-dependence-independence has also been related to academic choice and achievement.[32] Stein (1968) investigated the interrelationship of field-dependence-independence, vocational interest, verbal comprehension, and self-perception to level of academic achievement in college, and concluded that the development of cognitive skills and the receptiveness to learn in the sciences and the humanities are related to personality traits.[33] In a similar vein, Perney (1971) demonstrated a functional relationship between cognitive style and achievement.[34] In a recent study, Bowles (1973) confirmed that students of a field-independent cognitive

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31 Ibid., p. 8-9.

32 Ibid., p. 13.

33 F. Stein, Consistency of Cognitive Interest, and Personality Variables with Academic Mastery: A Study of Field Dependence-Independence, Verbal Comprehension, Self-Perception, and Vocational Interest in Relation to Academic Performance, among Male Juniors Attending an Urban University, Unpublished Doctoral Dissertation, New York University, 1968.

34 L.R. Perney, The Relationship of Field Dependence-Field Independence with Academic Achievement, Unpublished Doctoral Dissertation, Case Western Reserve University, 1971.

style exhibited a more positive attitude towards science and were higher achievers in science than students who manifested a field-dependent cognitive style.[35] On the evidence of a number of other studies, Witkin (1973) concludes that relatively field-independent students tend to favour such subject areas as science, mathematics and engineering which require analytical skills, whereas relatively field-dependent students prefer domains which call for interpersonal relations and communication skills.[36]

2. Measures of Field-Dependence-Independence

According to Witkin et al., the extent of a person's psychological differentiation can be measured by the performance of one or all of the following tasks: (a) the Rod-and-Frame Test (RFT), (b) the Body-Adjustment Test (BAT), and (c) the Embedded-Figures Test (EFT).[37,38]

The apparatus for the Rod-and-Frame Test (RFT) consists of a luminous rod pivoted at the centre of a luminous square frame. Both the frame and the rod can be tilted together or

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35 Anna Bowles, Extent of Psychological Differentiation as Related to Achievement in Science and Attitude towards Science, Unpublished Masters' Thesis, University of Ottawa, 1973.

36 H.A. Witkin, op. cit., 1973, p. 16-17.

37 H.A. Witkin et al., op. cit., 1962, p. 36-40.

38 H.A. Witkin, op. cit., 1973, p. 2-5.

separately, clockwise or anticlockwise. The test is conducted in a completely darkened room so that the subject is able to see only the rod and the frame. Both the rod and the frame are presented in tilted positions. If the subject reports that the rod is tilted he is asked to adjust it, by verbally instructing the experimenter, to a position where it appears upright to him, while the frame remains in its initial tilted position. The performance range falls between two extremes. At one extreme is the person who decides on the upright position of the rod in accordance with the surrounding frame. At the other extreme are people who can adjust the rod to the upright quite independently of the position of the surrounding frame. The standard test consists of three series, each comprising eight trials. Series 1: Both the subject and the frame are tilted to the same side at 28 degrees left or right; the rod is to be adjusted to the upright from an initial tilt of 28 degrees to the same or opposite side of the frame. Series 2: The body and the frame are tilted 28 degrees to opposite sides. Series 3: The body is erect and the frame is tilted 28 degrees left or right. The score for each series is the mean 'absolute' error in degrees from the true upright for the eight trials of the series. The raw scores for each series are converted into standard scores, using the mean and standard deviation of the subject's age-sex group. The total RFT index is the mean of the standard scores for the three series. Positive scores reflect relative

field-dependence, negative scores relative field-independence.

The Body-Adjustment Test (BAT) is in essence very similar to the RFT, except that here the object of perception is the body itself.[39] The apparatus is a small room into which a chair is projected. Both the room and the chair can be tilted together or independently of each other, clockwise or anticlockwise. At the outset of each trial, the chair and the room are presented in prepared tilted positions, and the subject is required to adjust his position to an upright position. Here again, individual differences in performance are apparent. There are people who can be tilted as much as 30 degrees in order to perceive the body as upright, as dictated by the surrounding tilted room. At the other extreme are people who are able to bring the body more or less to the upright, whatever the position of the surrounding room may be. The standard test consists of six trials, in half of which the room and the chair are initially tilted to the same side, and in the other half to opposite sides. The initial tilt of the chair is 22 degrees and of the room 35 degrees.

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39 The BAT was originally the second part of the Tilting-Room-Tilting-Chair Tests (TRTC) referred to in Witkin et al. (1962). The first part of the TRTC, the Room-Adjustment Test (RAT), however, does not seem to provide as good a measure of field-dependence as the other tests. Thus, Witkin spoke only of the BAT in his 1973 paper.

The subject's score is obtained and interpreted in the same way as in the case of the RFT.

The Embedded-Figures Test (EFT), while conveying the same message, is quite different from the first two. In this test, the subject's task is to locate in a complex design a simple figure which he is previously shown. The standard test of Witkin's consists of twenty-four figures of varying degrees of difficulty. A maximum of five minutes is allowed for each search. The subject's score is the mean amount of time taken for the task. The raw score is also converted into a standard score. A positive standard score signifies relative field-dependence, while a negative standard score indicates relative field-independence.

Witkin (1973) hold that people tend to be self-consistent in performance across these three tasks. That is, if the same subjects are tested in these three situations, those who tilt the rod far towards the tilted frame are likely to tilt their bodies far towards the tilted room and to take a long time in spotting the simple figure in the complex design.[40]

Witkin's contention is supported by earlier studies. For example, Dubois and Cohen (1970) reported a correlation

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40 H.A. Witkin, op. cit., 1973, p. 5.

of 0.56 between the RFT and the EFT ($p < .01$, $N = 143$).[41] In addition, Elliott (1961) showed a correlation of 0.42 between those same measures ($p < .01$, $N = 128$).[42]

In place of the rather complex apparatuses previously mentioned, simpler devices are now available for testing field-dependence-independence. Also, a number of such tests can be administered in group form.

Oltman (1958) constructed a small table-top model of the rod-and-frame apparatus, which can easily be transported to where subjects are to be found and which removes the necessity of a darkroom. Correlations between Oltman's RFT and Witkin's RFT and EFT are respectively 0.89 and 0.60.[43]

Jackson (1956) introduced his Short Form of the Witkin's EFT. The shortened test is based on one test trial on twelve of the twenty-four embedded figures used in the original Witkin battery. Both tests are administered and scored in essentially the same way. The subject's score

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41 Thomas E. Dubois and Walter Cohen, "Relationship between Measures of Psychological Differentiation and Intellectual Ability", in Perceptual and Motor Skills, Vol. 31, 1970, p. 411-416.

42 Rogers Elliott, "Interrelationships among Measures of Field Dependence, Ability, and Personality Traits", in Journal of Abnormal and Social Psychology, Vol. 63, No. 1, 1961, p. 31.

43 P.K. Oltman, "A Portable Rod-and-Frame Apparatus", in Perceptual and Motor Skills, Vol. 26, 1968, p. 503-506.

is based on the time (in seconds) taken to locate the simple figures within the complex designs. Rapid solution time scores with the designs are indicative of field-independence, while slow time scores denote field-dependence.[44]

Quoting earlier studies, Spotts and Mackler (1967) affirm that, despite its reduction of test items and test time limits, the Jackson Short Form of the Embedded-Figures Test correlates in the mid-nineties with Witkin's EFT, has a test-retest reliability of 0.92, and is a valid, reliable and economical measure of those processes tapped by Witkin's original EFT.[45]

In the hope of developing a reliable and economical measure of field-dependence-independence, Jackson et al. (1962) constructed a series of group administered embedded-figure tests, known as the Hidden-Figures Tests (HFT), which were structurally similar to Witkin's EFT, but were so constructed as to facilitate the evaluation of the effects of individual vs group administration, coloured vs achromatic

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44 D.N. Jackson, "A Short Form of the Witkin's Embedded-Figures Test", in Journal of Abnormal and Social Psychology, Vol. 53, 1956, p. 254-255.

45 James V. Spotts and Bernard Mackler, "Relationships of Field-Dependent and Field-Independent Cognitive Styles to Creative Test Performance", in Perceptual and Motor Skills, Vol. 24, 1967, p. 247.

designs, and task requirements of memory vs non-memory elements. One such test, Form V of the HFT, used achromatic designs with a memory format. It consisted of sixteen embedded-figures in a booklet with complex designs presented on one side of a page and a simple figure on the obverse side. Administration procedures were practically the same as those Witkin developed for individually administered EFT. The scores, however, were the number of figures correctly identified within a 10-minute test period. High scores signify field-independence while low scores are indicative of field-dependence. Despite substantiated positive correlation between these tests and Witkin's individually administered EFT, however, Jackson et al. concluded that more definitive research with specific tests would be necessary before the validity of the various group procedures could be adequately assessed.[46]

However, one group test which is significantly correlated to those Witkin et al. developed is Thurstone's Closure Flexibility Test (Form A). Significant correlations between Witkin's EFT and Thurstone's CFT have been reported

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46 D.N. Jackson, S. Messick, and C.T. Meyers, The Role of Memory and Color in Group and Individual Embedded-Figures Measures of Field-Independence, Princeton, Educational Testing Service, 1962.

by Elliott (1961) ($r = 0.55$, $p < .01$, $N = 128$)[47] as well as by Podell and Phillips (1959) ($r = 0.77$, $p < .01$, $N = 32$)[48]. Witkin et al. (1962) concur with those findings when they state:

> ... Performance (on Thurstone's Closure Flexibility Test) has been found to relate significantly to performance in the tests of our perceptual battery.[49]

An easily scorable short group test, Thurstone's Closure Flexibility Test is a paper-and-pencil test consisting of forty-nine items. Each item comprises a simple figure, presented on the left of the page, followed by a row of four, more complex, drawings to the right. The subject's task is to spot the simple figure in each of the complex drawings, and to put a check (✓) under each drawing which contains it and a zero (0) under each which does not. The subject is given ten minutes to do the test. The raw score is the number of correct answers minus the number of wrong answers, and is then converted into a standard score.

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47 Rogers Elliott, op. cit., p. 31.

48 Jerome E. Podell and Leslie Phillips, "A Developmental Analysis of Cognition as Observed in Dimensions of Rorschach and Objective Test Performance", in Journal of Personality, Vol. 27, No. 4, 1959, p. 439-463.

49 H.A. Witkin et al., op. cit., 1962, p. 49.

3. Field-Dependence-Independence and Second Language Learning

Before attempting to inquire into the possible relationship between field dependence-independence and second language learning, some of the relevant studies pertaining to the teaching of second language and its effects on the students learning these languages will be reviewed.

According to Penfield (1959), second language teaching should begin in early childhood, provided that the child is taught by the direct or maternal method and that the languages are learned each within a different context. Penfield maintains that at birth the brain shows plasticity and multipotentiality owing to the large areas of uncommitted cortices, especially in the temporal lobes. These uncommitted cortices, particularly in the left hemisphere, are used during the first decade of life to establish the structure of language and expand upon it. As the child proceeds from the age of natural, imitative learning to stages characterized by conceptual learning, his brain loses plasticity and, therefore, becomes less open to new language learning.[50]

Larew (1961), prompted by Penfield's proposal, attempted to ascertain at what age children might be able

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50 W.G. Penfield and L. Roberts, Speech and Brain Mechanisms, Princeton, Princeton University Press, 1959, p. 235-257.

to reproduce Spanish phonemes articulated by a teacher. He used a sample of sixty Anglophone children ranging from 7 to 14 years of age and found that the best scores were obtained by the 7-year-olds, and that scores gradually decreased with age so that the 14-year-olds obtained the lowest scores. The author concluded that his study added to the evidence that new language learning should be introduced in the school curriculum as early as possible.[51]

Andersson (1961), in an attempt to reconcile Penfield's ideas with the practical realities of schooling, set out to determine the optimal age for introducing the study of modern languages. He suggested that ideally the study of modern languages should begin at birth, but, in terms of schooling, the years from 4 to 8 could be regarded as very favourable.[52]

Masson (1964) compared the achievement in French of 5-to 6-year-olds of Anglo-Saxon origin and that of 11-to 12-year-olds of the same ethnic background after both groups had been taught the language for comparative periods. All the children were tested individually on the extent of vocabulary and comprehension acquired. Significant

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51 L.A. Larew, "The Optimum Age for Beginning a Foreign Language", in Modern Language Journal, Vol. 45, 1961, p. 203-206.

52 T. Andersson, "The Optimum Age for Beginning the Study of Modern Languages", in Journal of Modern Languages, Vol. 12, 1961, p. 289-306.

difference was found in favour of the younger group. From these findings, Masson concluded that Anglo-Saxon children of above average intelligence may be more profitably taught French at the kindergarten level than in their teens.[53]

Asher and Garcia (1969) compared a group of Cuban immigrants (26 boys and 45 girls) between the ages of 7 and 19, most of whom had been in the United States for about five years, to a group of 30 American children in their pronunciation of English sentences. The findings showed that the experimental subjects who arrived in the United States under the age of 6 had the highest probability of acquiring near-native pronunciation of English, while those who arrived after the age of 13 had the lowest probability. The authors concluded that pronunciation fidelity may be determined by a biological variable related to age.[54]

Edwards and Casserly (1971), in a study of children enrolled in French immersion and 75-minute-French-per-day programmes in the first grade, found a number of correlations

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53 L.I. Masson, "The Influence of Developmental Level on the Learning of a Second Language among Children of Anglo-Saxon Origin", in Canadian Education and Research Digest, Vol. 4, 1964, p. 188-192.

54 J.J. Asher and R. Garcia, "The Optimal Age to Learn a Foreign Language", in Modern Language Journal, Vol. 53, 1969, p. 334-341.

between intelligence and language achievement scores which were statistically significant though of moderate value. However, they reported that little research had been carried out on the relationship of intelligence to second language learning success in terms of longitudinal studies and, thus, in the absence of more conclusive evidence, suggested the need for further investigations on intelligence as a predictor of second language learning.[55]

On the basis of the findings of a series of studies, Carroll (1962) suggested that second language achievement varies as a function of three learner characteristics (aptitude, general intelligence, and motivation) and two instructional variables (the opportunity the student has for learning and the adequacy of presentation of the material to be learned).[56] Carroll's findings have not been completely accepted by other researchers and theorists. For example, Gardner and Lambert (1972) argued that aptitude was not the complete answer since in research where measures of aptitude were correlated with grades received in courses, the relationship was not

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55 H.P. Edwards and M.C. Casserly, Research and Evaluation of Second Language Programs 1971-1972: A Summary, The Ottawa Roman Catholic Separate School Board, 1972, p. 6-7.

56 J.B. Carroll, "The Prediction of Success in Intensive Foreign Language Training", in R. Glasser (ed.), Training Research and Education, Pittsburg, University of Pittsburg Press, 1962, p. 87-136.

consistent, and that students showed different levels of attainment even if the adequacy of presentation of material and opportunity of learning were essentially the same - fixed as they were by the selection of teachers and the curriculum.[57]

In pursuit of a different explanation and on the basis of the results of a series of studies carried out by themselves and their associates over the past twelve years,[58] Gardner and Lambert (1972) advanced a sociopsychological theory of second or foreign language learning, which maintains:

> The successful learner of a second language must be psychologically prepared to adopt various aspects of behaviour which characterize members of another linguistic-cultural group. The learner's ethnocentric tendencies and his attitudes toward the members of the other group are believed to determine how successful he will be, relatively, in learning the new language. His motivation to learn is thought to be determined by his attitudes toward the other group in particular and toward foreign people in general and by his orientation toward the learning task itself. The orientation is said to be instrumental in form if the purposes of language study reflect the more utilitarian value of linguistic achievement, ... In contrast, the orientation is integrative if the student wishes to learn more about the other cultural community because he is interested in it in an open-minded way, to the point of eventually being accepted as a member of that other group.[59]

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57 R.C. Gardner and W.E. Lambert, Attitudes and Motivation in Second Language Learning, Rowley, Newbury House Publishers, 1972, p. 1-17.

58 Ibid., vi-316 p.

59 Ibid., p. 3.

In brief, Gardner's and Lambert's position may be viewed as consisting of three theoretical constructs: (1) In second language learning, attitude and motivation function as variables independent from aptitude and general intelligence. (2) Successful foreign language study is a function of a favourable attitude towards another culture and of a desire to learn about that culture, coupled with a favourable attitude towards the language to be learned and language learning in general. (3) Integrative motivation is more characteristic of successful second language learners than instrumental motivation.

The literature reviewed so far indicates that age and attitude are definite predictors of second language learning. It is suggested that a possible relationship between field-dependence-independence and second language learning may now be apparent.

Penfield's theory of plasticity and multi-potentiality in the uncommitted cortices appears to account for the young child's high efficiency in learning languages. A complementary explanation for the same phenomenon may also be found in Witkin et al. who claim that a young child is more likely to demonstrate a global field approach which tends to facilitate the acquisition of verbal skills, especially when performance at the elementary level is concerned.

Support to the above may be found in a statement by Bosco and Di Pietro (1971) who posit:

> In the instructional process, the learner is brought into contact with representative speech utterances of various situational matrices with the aim of giving him a 'direct' experience with the language. An effort is made to create a direct bond between the language and concrete entities and experiences. No distinction is made between the physical structure of sentences and the abstract structure underlying them. The critical features of sentence structure, either in a language-specific or universal sense, are not explicitly brought into focus. Language is treated in an undifferentiated 'global' manner in which entire utterances and sequences of utterances are taught by means of association.[60]

On the other hand, attitude is bound with personal predisposition. That is to say, a person's attitude is related to the extent of his perceptual and psychological differentiation, and may later vary as a reflection of his social surroundings. As advanced by Witkin et al. (1962, 1973), a relatively field-dependent person is likely to define his attitudes according to the prevailing social frame of reference, and is particularly sensitive and attuned to his social environment, whereas some of the relatively field-independent people may tend to be

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60 F.J. Bosco and R.J. Di Pietro, "Instructional Strategies: Their Psychological and Linguistic Bases", in R.C. Lugton (ed.), Toward a Cognitive Approach to Second Language Acquisition, Philadelphia, The Center for Curriculum Development, 1971, p. 34.

strikingly isolated, overcontrolled, cold, distant, and unaware of their social stimulus value. Thus, as a person's second language achievement varies as a function of his attitude towards the other group, so it may be logical to expect that his same attitudes vary as a function of his extent of field-dependence-independence. In this connection, it may be further suggested that, other things being equal, a field-dependent person is more likely than a field-independent person to hold more favourable attitudes towards the target language.

That a possible relationship exists between field-dependence-independence and second language learning has, in a way, been confirmed by Wardhaugh (1971) and Catford (1971), who respectively contend as follows:

> There is now considerable evidence that different people learn in different ways and there is every reason to believe that such learning preferences are as important in second language learning as they are anywhere else.[61]

> Not too much is known about the relationship between personality traits and language ability, but that such relationships exist is certain.[62]

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61 R. Wardhaugh, "Teaching English to Speakers of Other Languages: The State of the Art", in R.C. Lugton (ed.), op. cit., p. 19.

62 J.C. Catford, "Learning a Language in the Field", in R.C. Lugton (ed.), op. cit., p. 96.

Another area of uncertainty focuses on the relationship between sex and second language learning. On the one hand, Hurlock maintains that girls are, as a general rule, linguistically superior to boys at every age.[63] In opposition, Parisi (1971) contends that girl's traditional superiority over boys has not been reliably demonstrated.[64] Ausubel and Sullivan attribute these discrepancies to the fact that the earlier studies usually proceeded to collect performance measures with no apparent attempts to assess underlying language competence. By the same token they support Menyuk's (1963,1964) contention that, when grammatical competence is measured there are no salient differences between boys and girls.[65] Ausubel and Sullivan define competence as the understanding and knowledge of the underlying principles and structures of a language, and performance as the ability to utilize part of this knowledge in speech.[66]

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63 Elizabeth B. Hurlock, Child Development, New York, McGraw-Hill, 1956, p. 233.

64 Domenico Parisi, "Development of Syntactic Comprehension in Preschool Children as a Function of Socioeconomic Level", in Developmental Psychology, Vol. 5, No. 2, September 1971, p. 188.

65 David P. Ausubel and Edmund V. Sullivan, Theory and Problems of Child Development, New York, Grune and Stratton, 1970, p. 541.

66 Ibid., p. 507.

However, the elementary levels of second language learning clearly emphasize performance rather than competence. If performance is the main criterion, then the literature leads us to expect that girls will perform better than boys in second language acquisition. An interesting parallel between the above contention and those findings concerning the relative standing of females on measures of field-dependence-independence may now be drawn.

Females as a group tend to be more field-dependent than males. Therefore, it is suggested that some support for the hypothesis that, field-dependent students do better than field-independent students in second language learning, may be derived from a comparison of the performance of boys and girls.

4. Summary and Basic Hypothesis

In the preceeding pages an attempt has been made to explore the concept of field-dependence-independence as postulated by Witkin and his associates (1954, 1962, 1967, 1973), and its various implications. A number of studies in second language learning have also been reviewed, which seem to suggest a possible linkage between field-dependence-independence and second language achievement. The key points considered may be summarized as follows:

(1) In style of experiencing and at level of intellectual functioning, a person ranges along a continuum of being relatively field-dependent or global at one end and field-independent or analytical at the other.

(2) Both field-dependent and field-independent people have certain perceptual and psychological characteristics, which influence their perceptual, intellectual, emotional, motivational, defensive, and social operations.

(3) A functional relationship has been demonstrated between field-dependence-independence and academic choice and achievement. Moreover, a number of second language teaching experts have agreed that personal predisposition is involved in language learning efficiency and that relationships certainly exist between personality traits and language learning ability.

(4) Previous studies have shown that one can best learn a new language between 4 to 8 years of age, and that, by and large, young children also tend to be relatively more field-dependent.

(5) It is generally held that females are superior to males in verbal and linguistic skills. Females as a group also tend to be relatively more field-dependent than males.

(6) Research support has provided for the hypothesis that a favourable attitude towards another culture and the language to be learned is conducive to effective foreign

language study. Field-dependent people are selectively attentive to the human content, particularly sensitive and attuned to the social environment, and favour occupations that involve contact with people. In direct contrast, some of the field-independent people are strikingly isolated individuals, overcontrolled, cold, distant, and socially-unconscious.

(7) Language skills, especially at the elementary level, are not developed or evaluated separately but acquired as an undifferentiated or global whole. A field-dependent person is relatively undifferentiated, global and impressionistic.

(8) Field-dependent persons tend to do even better than field-independent people in the verbal part of the WISC, and are generally superior to field-independent people in attending to, and hence remembering, verbal messages that are social in content.

On the basis of the above, it seems not unreasonable to postulate that, other variables being controlled for in the process of learning a second language, especially at the elementary level, a field-dependent person may have certain advantages over his field-independent counterpart. In an attempt to test this postulate, the following hypothesis is formulated:

In learning a second language, students who are field-dependent are higher achievers than students who are field-independent.

CHAPTER II

EXPERIMENTAL DESIGN

This chapter presents the procedures that were involved in conducting the experiment to test the hypothesis stated in the preceding chapter. The first two sections describe the sample and the instruments that were employed. The third and the fourth sections set forth the methods by which the data were gathered and analyzed.

1. The Sample

The sample included 209 eighth-graders(102 boys and 107 girls) chosen from three classes each of three English-speaking schools in Ottawa which offered a similar French language programme (i.e., 20 minutes a day from Grades 1 to 7 and 40 minutes a day in Grade 8). All the subjects were of non-French origin and did not normally speak French at home, so that French was really being learned as a second language.

To test the hypothesis, it was necessary to identify the extreme groups on the field-dependence-independence continuum. In this respect, a method derived by Cooper (1972)[1]

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1 Martin Cooper, Cattell's Personality Factors as Predictors of High School Performance, Unpublished Doctoral Dissertation, University of Ottawa, 1972, p. 87.

and later adopted by Bowles (1973)[2] showed that about 30% of the cases should be in either of the extreme groups so as to ensure against the overlap thereof. The present study followed the same method and employed approximately the top 30% and the bottom 30% of the subjects on the field-dependence-independence continuum, who were correspondingly assigned to one of the following four cells: (1) field-dependent boys, (2) field-dependent girls, (3) field-independent boys and (4) field-independent girls.

To minimize the effects of such factors as age, socio-economic status, general intelligence, student interest, instructional approach, and teacher characteristics, which might otherwise confound the results, it was thought best to regard groups of children within each class as comprising the experimental unit.[3] This means that each of the four groups of boys and girls in any one class would together be considered as an experimental unit or a 'subject'. The achievement 'score' for that 'subject' or experimental unit would then be the mean or average score for all the

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2 Anna Bowles, Extent of Psychological Differentiation as Related to Achievement in Science and Attitude toward Science, Unpublished Master's Thesis, University of Ottawa, 1973, p. 32.

3 Gene V. Glass and Julian C. Stanley, Statistical Methods in Education and Psychology, Englewood Cliffs, Prentice-Hall, 1970, p. 506.

children in that particular group. That is, whatever the number of individuals in each class, there would be nine 'experimental scores'[4] in each of the four cells described above.

The aforesaid procedure, originally recommended by Glass and Stanley,[5] was twice employed by Logan (1972, 1973)[6,7] and found to provide a sound basis for a valid analysis, "allowing for personological interactions" as well as "providing greater stability for achievement and intelligence scores".[8]

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4 Ibid., p. 505-507.

5 Ibid., p. 505-507.

6 Bayne Logan, A Study of the Possible Distinction between Developmental and Acquisitional Processes in the Attainment of Higher Order Reading Skills - A Univariate Analysis, Unpublished Master's Thesis, University of Ottawa, 1972, p. 46-47.

7 Bayne Logan, On the Learning of Mathematics: A Cross-Sectional Study of the Relative Effects of Maturation and Instructional Procedures in the Learning of Mathematics at the Junior Grade Level, Ottawa, University of Ottawa Press, 1973, p. 35-36.

8 Ibid., p. 36.

2. The Measuring Instruments

Field-dependence-independence scores were obtained for each student involved in the present research. Scores regarding achievement in French were obtained only for those students actually involved in the statistical analysis.

Thurstone's Closure Flexibility Test (Form A) was administered in group form as a measure of field-dependence-independence. Although this test is not quite as highly correlated with Witkin's RFT and EFT as one would like it to be, its use has nevertheless been well supported,[9,10,11,12].

Achievement in French was measured by means of the IEA French Listening Test (Population II).

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9 H.A. Witkin et al., Psychological Differentiation, New York, Wiley, 1962, p. 49.

10 R.I. Long, "Field-Articulation as a Factor in Verbal Learning and Recall", in Perceptual and Motor Skills, Vol. 15, 1962, p. 151-158.

11 E.W. Gardner, "Reliability of Group-Test Scores for Cognitive Controls and Intellectual Abilities over a One-Year Period", in Perceptual and Motor Skills, Vol. 36, 1973, p. 753-754.

12 Anna Bowles, op. cit., p. 33.

Recently designed by the Internaticnal Association for the Evaluation of Educational Achievement as a French proficiency test for 14-year-olds in non-French-speaking countries on the assumption that the students would have had 2 or perhaps 3 years of standard French secondary school courses, the IEA French Listening Test (Population II) is basically a test of the subject's ability to understand spoken French.

Both the directions (in the native language) and the questions (in French) are recorded on tape while multiple-choice answers are printed in the test booklet distributed to the subjects.

There are five parts in the test, consisting of 40 items in all. Part I comprises a series of statements describing one of the four pictures labelled A,B,C and D in the test booklet and the subject is required to indicate which one of the pictures is being described. Part II contains a series of remarks or questions. After each of these has been spoken, the subject is required to indicate from among the four choices printed in the test booklet the response which would most likely be made to the remark or question. Part III consists of a series of short conversations between two people, one of whom asks a question or makes a statement, and the other replies. After each

conversation, the subject is required to indicate from among the four choices printed in the test booklet the statement which is correct according to what has been said. Part IV is in the form of a series of short broadcasts or announcements, at the end of which a question is asked about what has been said. The subject's task is to indicate from among the four choices printed in the test booklet the best answer to the question. Part V is made up of a series of rather long conversations or dramatic scenes. At the end of each passage the subject is required to indicate from among the four choices printed in the test booklet the best answer to each of the several questions asked.

The score is the number of questions correctly answered.

As the IEA French Listening Test (Population II) is a relatively new test, very little seems to have been said in the literature as regards its validity and reliability. However, for administrative reasons, it was the only measure available to the researcher.

3. Collection of Data

A formal application for permission to conduct the survey in schools was submitted to the Ottawa Board of Education on 24 January 1974, together with a copy of the research proposal (Appendix 1). Approval was subsequently

received on 7 February 1974, conditional upon certain considerations as specified in Appendix 2.

A meeting was then had with the writer's thesis supervisor and the Director of Research of the Ottawa Board of Education on 27 February 1974 at which it was agreed that, for administrative reasons, the study should involve three or four classes each in four or three schools rather than one class each in twelve schools. As previously reported, three classes each of three schools were eventually involved.

The students taking part in the study were informed by the writer of the general nature and purpose of the study as outlined in Appendix 4.

As indicated in Appendix 2, only Thurstone's Closure Flexibility Test (Appendix 5) was administered by the researcher. The test was timed for ten minutes and administered in accordance with the instructions in the accompanying manual.[13]

As the sample was drawn from three different schools, it was necessary to administer the same test at various centres and at different times. The test was given to the

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13 L.L. Thurstone and T.E. Jeffrey, Closure Flexibility Test (Form A), Chicago, The University of Chicago (Industrial Relations Center), 1965, p. 1-.18.

subjects at School A on 16 April 1974, at School B on 30 May 1974 and at School C on 31 May 1974.

The achievement in French scores were provided by the Ottawa Board of Education which had administered the aforementioned IEA French Listening Test (Population II) to all eighth-graders during the period from September to October 1973. Individual raw scores were first converted to z-scores before being combined, averaged and further converted to T-scores to form their respective 'units of statistical analysis' in the manner described on page 33 of this thesis. The conversion of the resultant z-score to a T-score was done so that no negative numbers would be involved in the statistical analysis.

4. Analysis of Data

The research hypothesis was tested in the null form by means of an analysis of variance (ANOVA) as described by Keith,[14] with Field-dependence-independence and sex as the independent variables and achievement in French as the dependent variable.

The level of significance was set at $p < .05$.

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14 Virginia Keith, Design and Analysis in Experimentation, Ottawa, University of Ottawa Press, 1972, p. 98-136.

CHAPTER III

PRESENTATION OF RESULTS

This chapter begins with a brief description of each of the various unforeseen problems encountered during the collection and analysis of the data, and of the solutions thereto. Following this, the research problem and hypothesis are reiterated and an inferential analysis of the data is made.

1. Some Unforeseen Problems and Solutions Thereto

As shown in Appendix 7, most of the 209 subjects tested on Thurstone's CFT (Form A) clustered between standard scores 51 and 44. Adherence to the original design, that is, assigning approximately 30% of the subjects from both the top and the bottom of the field-dependence-independence continuum to their corresponding cells, resulted in the absence of two scores in Cell 2 (field-dependent girls). To solve this problem, the 'cut off' point for field-independence was lowered to 68 and that for field-dependence raised to 46 in raw scores. The adjustment increased the aggregate number in all 36 cells from 118 to 133, or about 64% of the grand total of 209.

One field-independent male and one field-independent female did not take the IEA French Listening Test (Population II) and, being the only ones so classified in their respective classes, they created two missing scores: one in Cell 3 (field-independent males) and the other in Cell 4 (field-independent females). In order to maintain an equal number in all the four cells in the analysis of variance two scores were 'statistically derived'. Those scores were derived by averaging the other eight scores in the cells with missing scores. The mean score so derived was used as a substitute for the missing value. These two scores are each marked with an asterisk as shown in Appendix 13.

Of the 36 'experimental scores' used in the analysis of variance, 8 were scores for individuals rather than mean scores for groups of individuals. This, too, was at variance from the original design which specified that the group rather than the individual should constitute the 'experimental unit'. There was, however, no other alternative but to use these scores since any adjustment would result in an aggregate number of subjects well in excess of 66% of the total - hence a possible overlap of the two extreme groups.

2. The Research Problem and Hypothesis

The problem on which the present study was based is: To what extent is a person's achievement in a second language related to his or her level of perceptual and psychological differentiation?

With this definition of the problem and on the basis of the literature surveyed, it was hypothesized that:

> In learning a second language, students who are field-dependent are higher achievers than students who are field-independent.

3. Inferential Analysis of Data

As mentioned in Chapter II, the research hypothesis was tested in its null form by means of an analysis of variance (ANOVA) with the level of significance set at $p < .05$.

The results are presented in Table I.

Table I

ANOVA for Performance of Field-Dependent and Field-Independent Males and Females on the IEA French Listening Test (Population II)

Source	df	SS	MS	F
A (Sex)	1	226.15	226.15	5.75*
B (F-D-I)	1	12.26	12.26	0.31
AB	1	36.87	36.87	0.94
R	32	1258.95	39.34	

* $p < .05$

Table I shows that the females attained significantly higher scores than the males on the IEA French Listening Test (Population II). This finding is consistent with the expectations previously stated and will be discussed in the following chapter.

Table I also shows that there was no significant difference between the field-dependent and the field-independent subjects on IEA scores. Accordingly, the null hypothesis was not rejected.

CHAPTER IV

DISCUSSION OF RESULTS

As previously reported, while the findings of the present study appeared to point in the direction predicted, no overall significant difference was found by which the research hypothesis could be upheld. Hence, the results presented in the previous chapter are not discussed as well-substantiated bases for academic generalizations; rather, they are examined as implications for careful consideration if replication or extension of the present study is contemplated.

Originally, it was proposed to involve some 360 students of both sexes (that is, 12 classes, one each of 12 schools). Administrative expediency made it necessary to reduce the sample to 9 classes (3 classes each of 3 schools) or a total of 209 students. It is possible that this reduction in number might have correspondingly reduced the representativeness of the sample. The handicap of a small sample is especially obvious in the present study in which the 'experimental unit' consisted of a group of individuals rather than one individual alone.

Sampling difficulties might be overcome if experimental subjects could be recruited from among students following elementary summer English or French

language immersion programmes at various university or language centres. It is suggested that the responses of these students would be particularly relevant and useful for the purposes of future studies, designed to replicate or to extend the scope of the present investigation.

Gardner's and Lambert's sociopsychological theory of second language learning leads to the expectation that one's attitude towards a second language and its culture might be related to one's extent of field-dependence-independence. Therefore, it is suggested that the inclusion of an attitudinal measure might have served as a useful criterion measure to demonstrate such a possible relationship.

While the question of sex differences was not the primary concern of the present study, intriguing results were found in this area. As presented in the preceeding chapter, the findings of this study showed that the females attained significantly higher scores than the males on the IEA French Listening Test (Population II). This confirms Hurlock's conclusion regarding female superiosity in language acquisition.[1] In the light of the findings of the present

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1 Elizabeth B. Hurlock, Child Development, New York, McGraw-Hill, 1956, p. 233.

study and of those quoted by Hurlock,[2] it may be suggested that, insofar as performance is concerned, females are, in general, superior to males not only in first, but also in second, language acquisition. In terms of competence, no generalization can be attempted on the basis of the findings of the present study, since the IEA French Listening Test (Population II) seems to be more concerned with performance.

Hurlock[3] has offered no explanation as to why girls are superior to boys in the language learning process. Nor have Ausubel and Sullivan[4] attempted to account for the female's superiority over the male when performance is used as a criterion measure. If the research hypothesis of the present study had been upheld, such discrepancies might have been partly attributed to the difference in the extent of field-dependence-independence. Since the findings have, instead, failed to support the research hypothesis, it may be suggested that while one's achievement in language may often vary as a function of one's sex, one's extent of

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2 Ibid., p. 233.

3 Ibid., p. 233.

4 David P. Ausubel and Edmund V. Sullivan, Theory and Problems of Child Development, New York, Grune and Stratton, 1970, p. 541.

field-dependence-independence has little or no significant effect on one's level of linguistic performance.

It may well be that in spite of the limitations just described, the current study does in fact cast serious doubt on the validity of any attempt to link the extent of one's field-dependence-independence to one's capacity for acquiring a second language.

Clearly, the present study calls for an elaborate replication since the theoretical possibilities appear to be so promising in their educational implications.

SUMMARY AND CONCLUSIONS

The present study examined the extent to which second language achievement is related to field-dependence-independence.

It was hypothesized that field-dependent students would be higher achievers in second language learning than field-independent students.

The research sample consisted of 209 eighth-graders (102 boys and 107 girls) chosen from 3 classes each of 3 English-speaking schools in Ottawa. All these students were of non-French origin and did not normally speak French at home.

Thurstone's Closure Flexibility Test (Form A) was used as a measure of field-dependence-independence while second language achievement was measured by means of the IEA French Listening Test (Population II).

Analysis of variance (ANOVA) was employed as a statistical test of significance at the .05 level, with field-dependence-independence and sex as the independent variables and achievement in French as the dependent variable.

There being no statistically significance in achievement between the field-dependent and the field-independent subjects, the results failed to confirm the research hypothesis.

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Bowles, Anna, Extent of Psychological Differentiation as Related to Achievement in Science and Attitude toward Science, Unpublished Master's Thesis, University of Ottawa, 1973.

Confirms earlier findings that students of a field-independent cognitive style exhibit a more positive attitude towards science and are higher achievers in science than students who manifest a field-dependent cognitive style.

Carroll, J.B., "The Prediction of Success in Intensive Foreign Language Training", in R. Glasser (ed.), Training Research and Education, Pittsburg, University of Pittsburg Press, 1962, p. 87-136.

A detailed report on a large-scale research project the findings of which led to the author's suggestion that foreign language achievement varies as a function of three learner characteristics and two instructional variables.

Gardner, R.C., and W.E. Lambert, Attitudes and Motivation in Second Language Learning, Rowley, Newbury House Publishers, 1972, vi-316 p.

A clearly-written summary of a 12-year study that systematically examines the roles of attitude and motivation in second language learning. Provides probably the most coherent statement concerning the author's position on the subject - hence the rationale for their proposed socio-psychological theory of second language acquisition. Also offers suggestions for further research and investigation.

Gardner, R.W., "Reliability of Group-Test Scores for Cognitive Controls and Intellectual Abilities over a One-year Period", in Perceptual and Motor Skills, Vol. 36, 1973, p. 753-754.

Demonstrates that Thurstone's Closure Flexibility Test (Form A) is among those time-saving group tests which can be used effectively for most purposes.

Lugton, R.C. (ed.), Toward a Cognitive Approach to Second Language Acquisition, Philadelphia, The Center for Curriculum Development, 1971, 244 p.

A book of papers by well-known authorities in the field of second language teaching, and a concerted effort to advocate the cognitive approach or cognitive-code learning theory as opposed to the classic audio-lingual approach or audio-lingual habit theory.

Penfield, W.G., and L. Roberts, Speech and Brain Mechanisms, Princeton, Princeton University Press, 1959, xiii-286 p.

Deals mainly with the results of a neurological investigation of the cortical areas involved in speech function. Also contains Penfield's most explicit and detailed views on second language learning.

Perney, L.R., The Relationship of Field Dependence-Field Independence with Academic Achievement, Unpublished Doctoral Dissertation, Case Western Reserve University, 1971.

Demonstrates a functional relationship between cognitive style and academic achievement.

Stein, F., Consistency of Cognitive Interest, and Personality Variables with Academic Mastery: A Study of Field-Dependence-Independence, Verbal Comprehension, Self-Perception, and Vocational Interest in Relation to Academic Performance among Male Juniors Attending an Urban University, Unpublished Doctoral Dissertation, New York University, 1968.

An investigation of the interrelationship of field-dependence-independence, vocational interest, verbal comprehension and self-perception to level of academic achievement in college. Concludes that the development of cognitive skills and the receptiveness of learning in the sciences and the humanities are related to personality traits.

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

First major work by Witkin and his associates. Presents the origins of the field-dependence-independence construct and its distinctive features, in addition to the results of a large-scale research project relating style of cognitive functioning to personality variables and individual patterns of adaptation.

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

Second major publication by Witkin and his associates. Confirms and extends the findings in their first work, as well as situating the total research within a developmental framework under the guiding principle of psychological differentiation.

--------, "A Cognitive-Style Approach to Cross-Cultural Research", in International Journal of Psychology, Vol. 2, No. 4, 1967, p. 233-250.

An expansion of a paper presented at a symposium on Intercultural Studies of Mental Development. Seeks to illustrate the value of a cognitive-style approach to cross-cultural research by considering the work done with the global-articulated dimension of cognitive functioning. Apart from reviewing earlier investigations in the 1962 publication, cites more recent studies which have thrown new light on the role of socialization practices on the development of cognitive style in general and on sex differences in particular.

--------, D.R. Goodenough, and S.A. Karp, "Stability of Cognitive Style from Childhood to Young Adulthood", in Journal of Personality and Social Psychology, Vol. 7, No. 3, 1967, p. 291-300.

Report on a longitudinal study involving two groups of subjects (one from 8 to 13 years, the other from 10 to 24 years), designed to examine i) expected increase of differentiation with age and ii) relative stability in level of differentiation. Results confirm earlier contentions of Witkin et al. that differentiation increases with age up to about 17 years, that each individual tends to maintain his relative position among his peers in the distribution of measures of differentiation from age to age, and that individual self-consistency across tests of perceptual functioning is evident at all ages. Also suggests that the development of psychological differentiation tends to approach a plateau in young adulthood and that at some point between 24 years and old age the process of dedifferentiation begins, accelerating after the late 30's.

--------, The Role of Cognitive Style in Academic Performance and in Teacher-Student Relations (Research Bulletin), Princeton, Educational Testing Service, February 1973, 58 p.

Paper presented at a symposium on Cognitive Styles, Creativity and Higher Education - possibly the most up-to-date and comprehensive statement of Witkin's position. Reiterates the nature of cognitive style, discusses cognitive style as a factor in academic evolution, and examines teaching, learning and teacher-student interaction as a function of cognitive style. Also includes a fairly exhaustive bibliography.

APPENDIX 1

FORMAL APPLICATION TO DIRECTOR OF RESEARCH OF THE OTTAWA BOARD OF EDUCATION FOR PERMISSION TO CONDUCT SURVEY IN SCHOOLS

Please provide the information requested and return with materials submitted in support of this request.

1. Title of Proposed Research Field-Dependence-Independence and Second Language Achievement in Grade 8.

2. Short Description of Research A study to determine the extent to which second language achievement is related to field approach. It hypothesizes that students who are field-dependent will achieve higher than students who are field-independent.

3. Data collection (provide copies of instruments, briefly describe procedure, amount of testing time required, etc.) Eighth-graders of both sexes and Anglo-Saxon origin will be chosen from one class each of 12 English-speaking schools in Ottawa using the French language immersion programmes. Scores will be obtained for each subject in respect of field-dependence (by means of Thurstone's Concealed-Figures Test in group form, a photostat copy of which is attached hereto) and achievement in French (based on the results of teacher-constructed tests). About 20 minutes may be required for the administration of the TCFT for each of the 12 groups of subjects.

4. Subjects (indicate numbers of teachers, students, school records, to be involved and approximate participation dates) About 12 teachers and 12 classes of students and school records may be involved in the first week of March 1974.

5. I have read and accepted the conditions under which research requests are granted and state that the materials presented in support of this request describe the delimitations beyond which data collection will not proceed unless additional permission is granted.

(If Chief Investigator is a student, this form must be countersigned by a responsible representative of the student's college or university.)

Date 24 Jan. 1974

Chief Investigator [signature]

Title MA(Ed.) Candidate, University of Ottawa

Address Thompson Hall (Room 1506)

611 Cumberland Street

Ottawa K1N 6N5

Tel. 231-6530

Countersigned by:

André Côté
Asst. Prof.
Faculty of Education

RESEARCH REQUEST FORM

A guide for use by individuals or agencies not directly related to the Ottawa Board of Education

The Ottawa Board of Education will be pleased to co-operate with researchers seeking to study various aspects of the education al system.

Permission to conduct research within our schools will be contingent upon the acceptance by the researcher of at least the following conditions;

1. That the research proposal be made in writing and include a statement of the problem area, theoretical framework, hypotheses to be tested, design of the research, sampling procedures, data-collection procedures (include copies of instruments, where appropriate), timetable of critical events, method of analysis, and school recources required.

2. That advance copies of tests, questionnaires, and other data-gathering devices be provided prior to their use in a school.

3. That the research objectives be congruent with educational objectives.

4. That the research design neither disrupt the school schedule unduly nor be detrimental to the subjects involved.

5. That the researcher agree to the usual research ethics and in particular, agree to protect the identity of participating students, teachers and schools.

6. That participating students do so with the signed consent of their parents (a consent form will be provided by the Ottawa Board of Education for this purpose) and that, in addition, it is recognized that the student may refuse to participate in the study.

7. That the researcher agree to prepare a clearly written report of his procedures and findings including the implications of his findings for educational practices. Further that the researcher allow this report to be circulated as an Ottawa Board of Education Research Report under his authorship.

Requests for additional information may be addressed to:

Director of Research,
The Ottawa Board of Education,
330 Gilmour Street,
Ottawa, Ontario,
K2P 0P9.

APPENDIX 2

REPLY FROM DIRECTOR OF RESEARCH OF THE OTTAWA BOARD OF EDUCATION

February 7, 1974

Mr. H. Lee,
Thompson Hall (Rm. 1506),
611 Cumberland Street,
Ottawa K1N 6N5

Dear Mr. Lee:

The Advisory Research Committee met on January 29 and reviewed a number of research requests. Your request was among those approved conditional upon certain considerations. The committee felt that access to student records, in order to obtain French achievement scores, was not desirable. In place of that, they have suggested that you make use of the International Education Association, Population II, scores on Grades 7 and 8 students which are presently available in our records. I would be pleased to discuss the further progress of your research with you and your faculty advisor.

It may be of some interest to you that we have recently received a bibliography entitled "Field-Dependence-Independence and Psychological Differentiation" offered by Witkin et al. This bibliography is available for your use in the library of the Research Centre.

Cordially,

Signed

G. Halpern, Ph.D.
DIRECTOR OF RESEARCH

c.c. André Côté

APPENDIX 3

PARENTAL CONSENT FORM

The Ottawa Board of Education
Le Conseil scolaire d'Ottawa
330 Gilmour Street
Ottawa 4, Ontario

PARENTAL CONSENT FORM

Dear Parent:

The Ottawa Board of Education frequently receives requests to cooperate in research studies. Each request is carefully reviewed for technical adequacy by our Research Centre. Those requests which are acceptable on technical grounds are then carefully reviewed by an Advisory Research Committee which selects studies likely to produce information which will assist in providing quality education.

A recently approved study will examine the extent to which the learning of French is associated with certain ways of looking at geometrical designs (field dependence or independence). Your son or daughter would be asked to take a 25 minute test to measure his usual way of seeing geometrical patterns. The study is to be conducted by Mr. H. Lee, a student in the Faculty of Education at the University of Ottawa.

Your son or daughter has been included among the students requested to participate in this research. Any test scores or other measures of students participating in this study will be kept confidential nor will such scores be placed at any time on the student's school records. Your child's name will not appear in any record or report of the results of this study.

The research procedures are not harmful. Rather it is likely that participating students will find the study interesting. We consider that this research will provide educationally useful information and therefore request that you allow your son or daughter to participate.

Cordially,

G. Halpern, Ph.D.
DIRECTOR OF RESEARCH

- -

Please check one { Permission Granted ☐ / Permission Denied ☐

Date _____ Parent's Signature _____

PLEASE RETURN THIS FORM TO YOUR SCHOOL AS SOON AS POSSIBLE.

APPENDIX 4

INSTRUCTIONS TO SUBJECTS PRIOR TO ADMINISTRATION OF THURSTONE'S CFT (FORM A)

To begin with, may I take this opportunity of thanking you all for your kind cooperation and help. I also wish to thank your parents, your principal, and last but by no means least, your French teacher, for permitting me to have your assistance.

The central purpose of my present research is to find out how far a person's achievement in a second language is related to his or her particular style of learning. To ensure that French is being learned as a second language, those who take the test which I am going to give you must be of non-French origin and do not normally speak French at home. If you do not meet this requirement, i.e., if either or both of your parents are French and if you usually speak French at home, please raise your hand.

The results of the test will be kept in strict confidence and only myself as a researcher and my professors who supervise this research will know about them.

I am going to give you each a test booklet. Please do not open it until I ask you to do so.

(The researcher distributed the test booklet and proceeded as per the directions on the cover thereof).

APPENDIX 5

THURSTONE'S CLOSURE FLEXIBILITY TEST (FORM A)

CLOSURE FLEXIBILITY

(Concealed Figures)

(Form A)

Please fill in:

Name _____

Age _____ Sex _____ Date _____

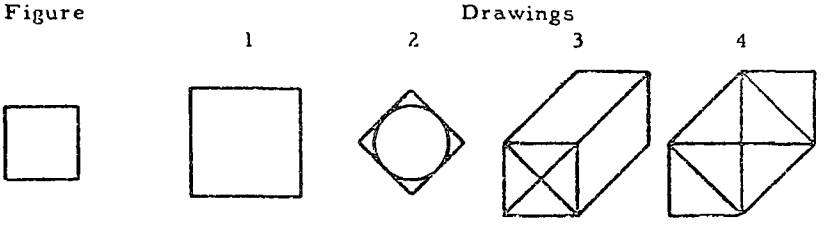
Occupation _____

_____

Developed by: L.L. Thurstone, Ph.D. and T.E. Jeffrey, Ph.D. - The Psychometric Laboratory - The University of North Carolina

Directions:

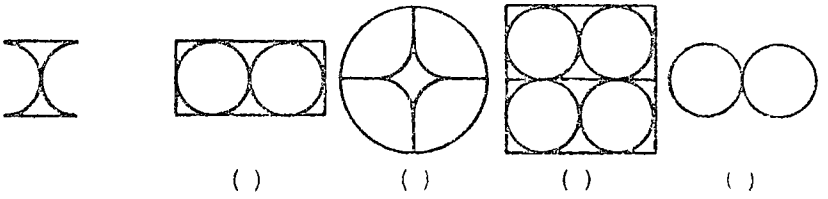
The row of designs below is a sample item of this test. The parts have been labeled to make description easier. These labels do not appear in the test items. The left hand design in each row is the figure. You are to decide whether or not the figure is concealed in each of the four drawings to the right. Put a check mark (✓) in the parentheses under a drawing, if it contains the figure. Put a zero (0) in the parentheses under a drawing, if it does not contain the figure. Look at the row of designs below.



In the row above a zero (0) has been written in the parentheses under drawing 1. The first drawing is a square but it is larger than the figure. A zero (0) has been written under drawing 2. Although the second drawing contains a square of exactly the same size as the figure, it has been turned. Check marks (✓) have been written under the third and fourth drawings since they each contain a square of exactly the same size as the figure and have not been turned. It does not matter that the figure contained in drawings three and four is on a different level from the figure at the left.

Sample:

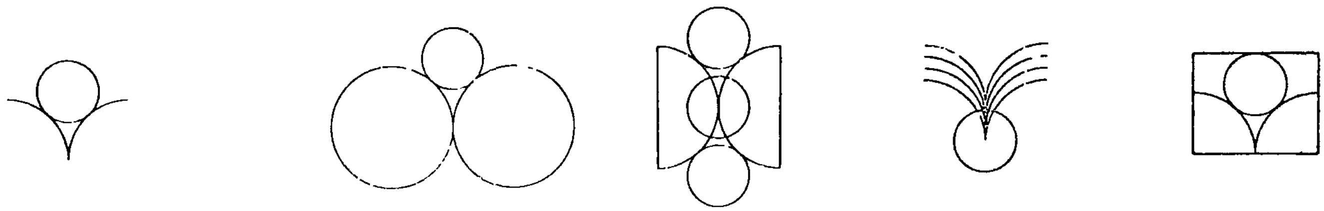
Here is another example for practice. Try it.



You should have placed check marks (✓) in the parentheses under the first and third drawings and zeros (0) in the parentheses under the second and fourth drawings.

WHEN YOU GET THE SIGNAL TO BEGIN, turn the page and mark more problems of the same kind. Work as fast and as accurately as you can, but do not guess. Wrong answers will count against you. You are not expected to finish in the time allowed. You will have exactly ten minutes to do as much as you can.

TMNF-119
8-3-5000



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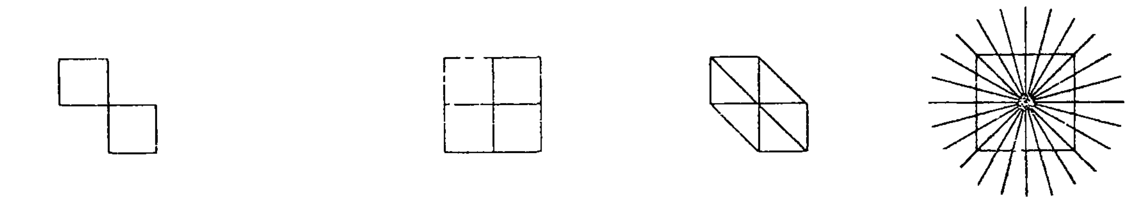

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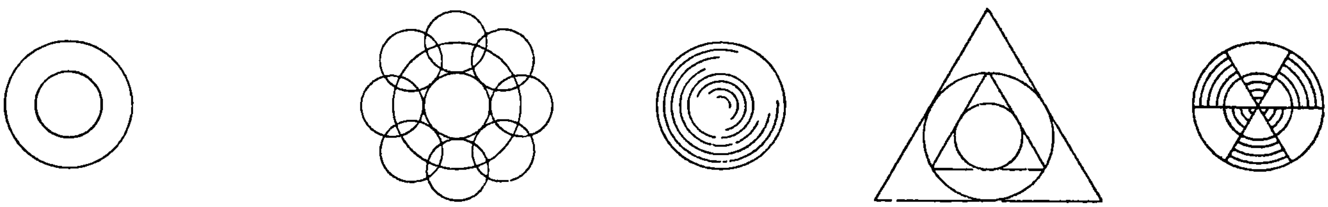

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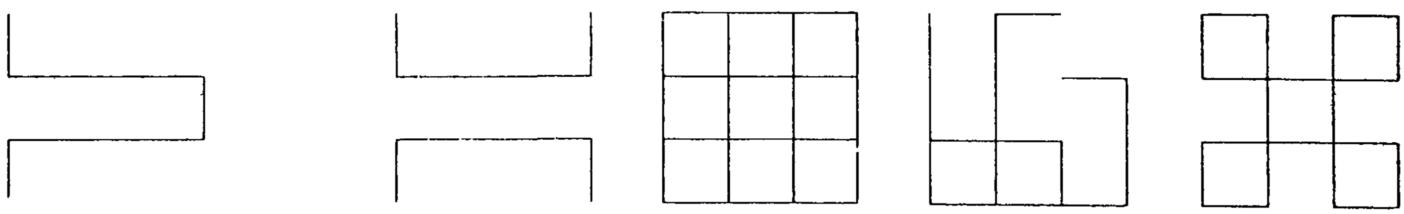

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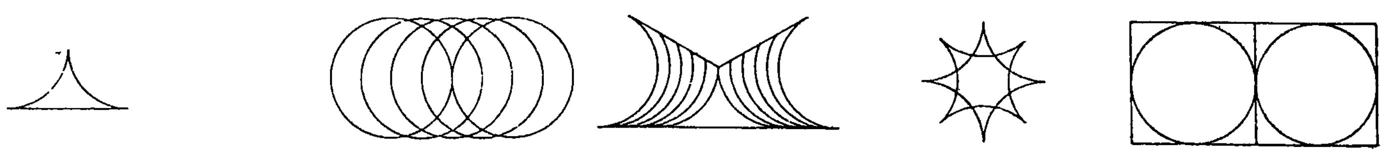

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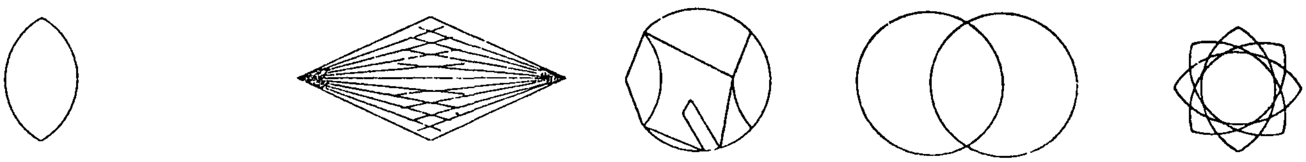

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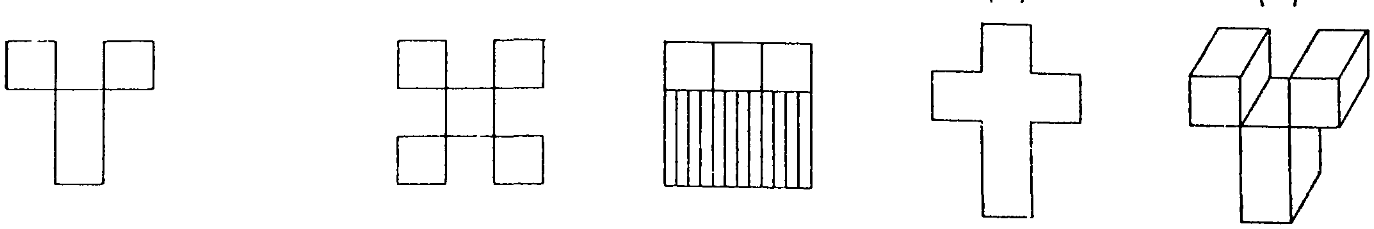

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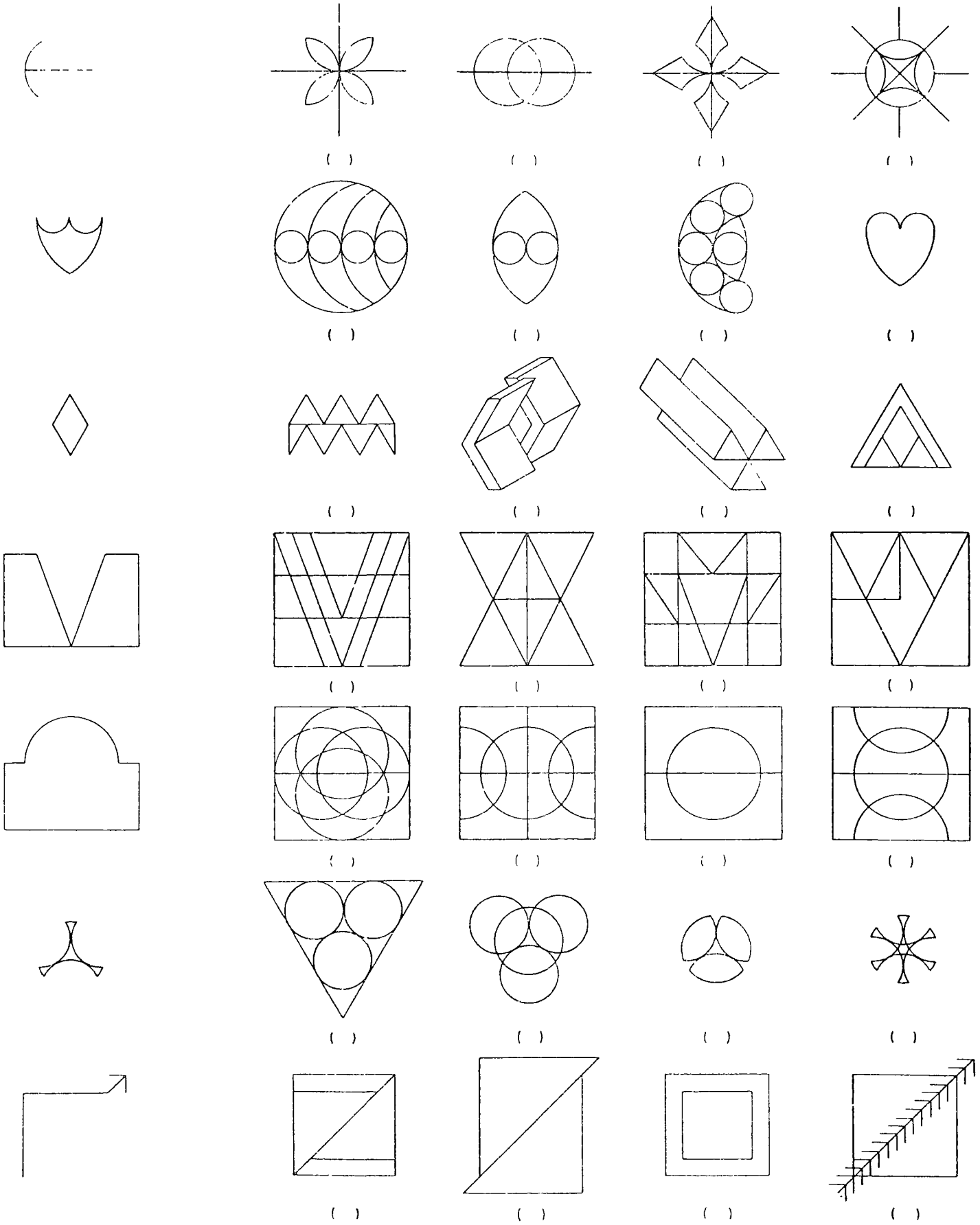

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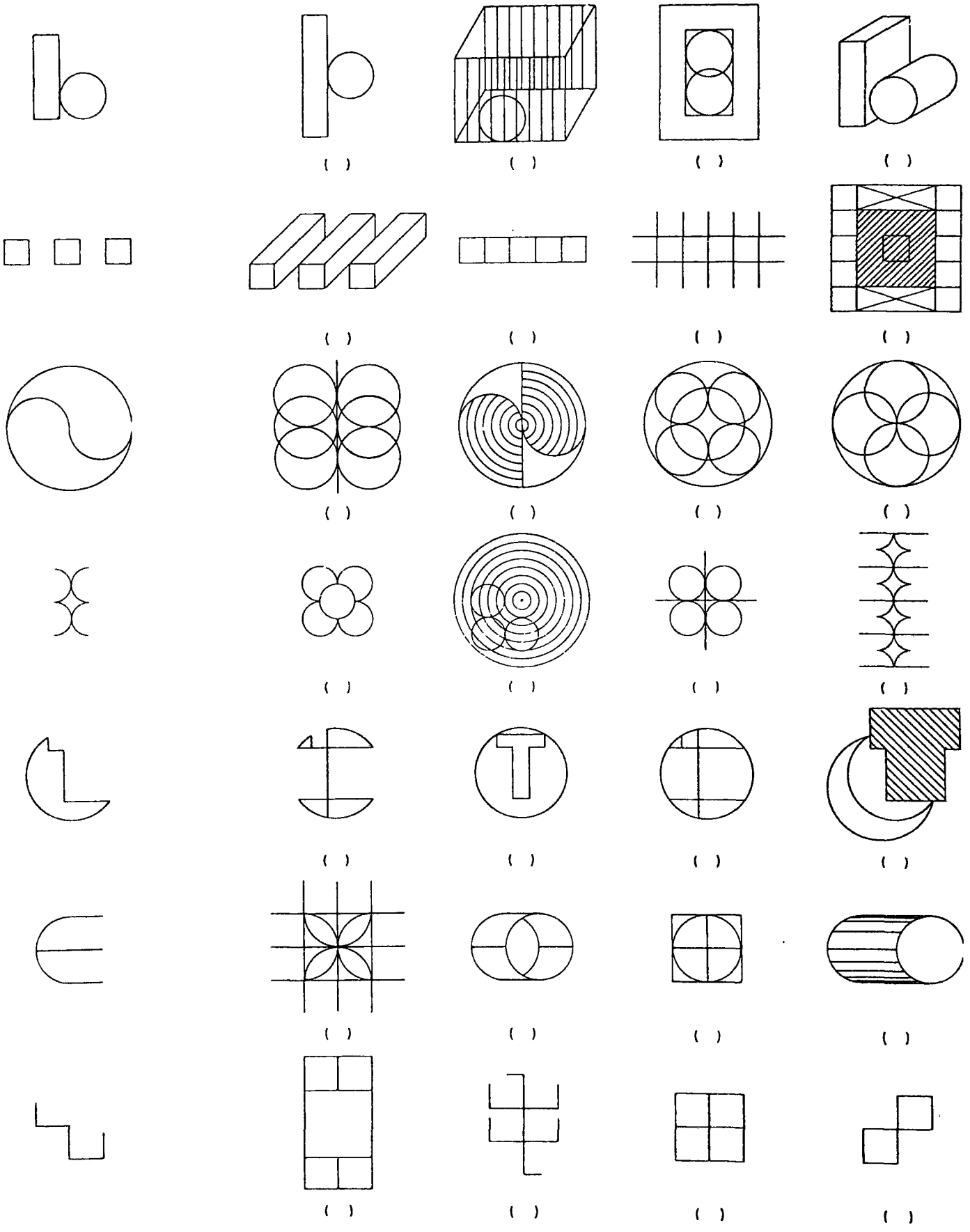

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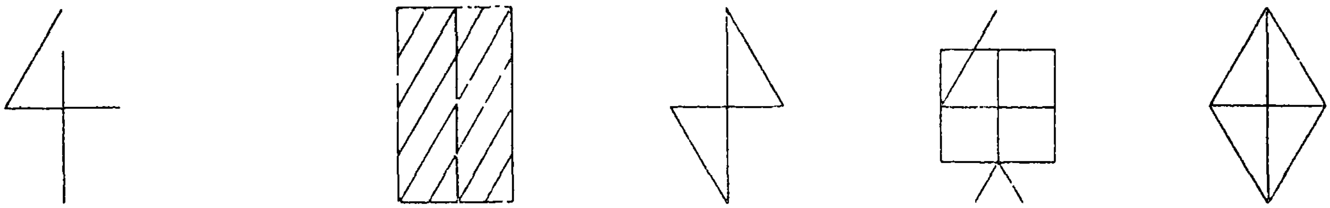

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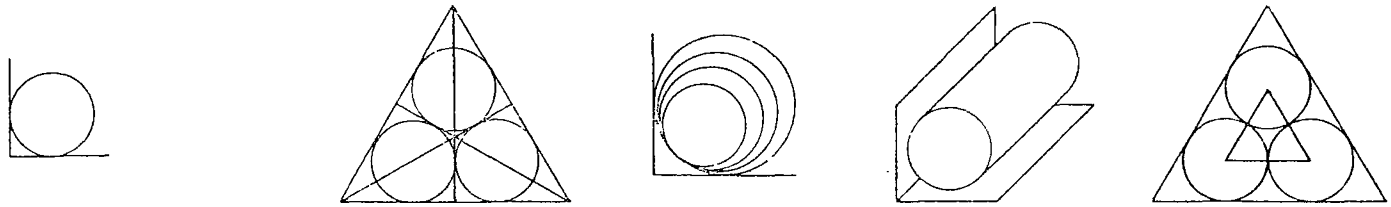

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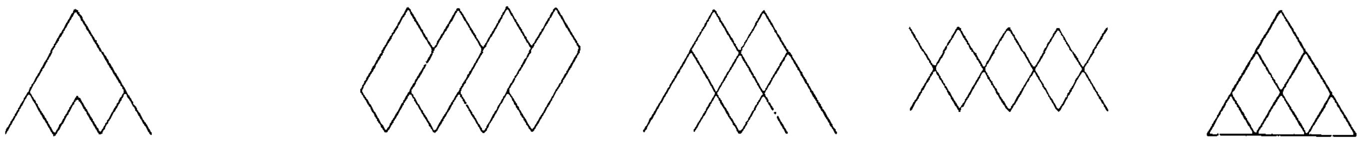

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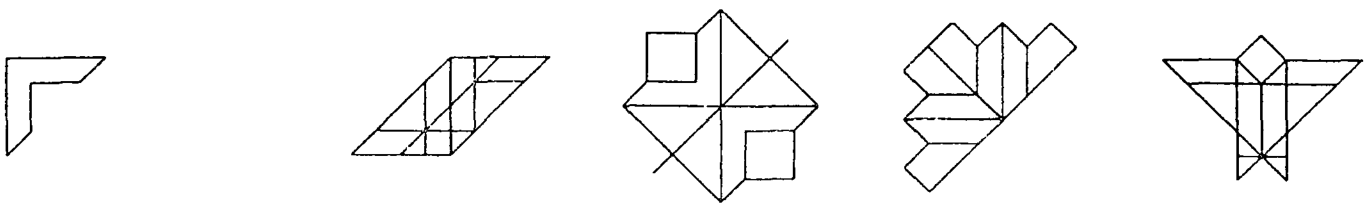

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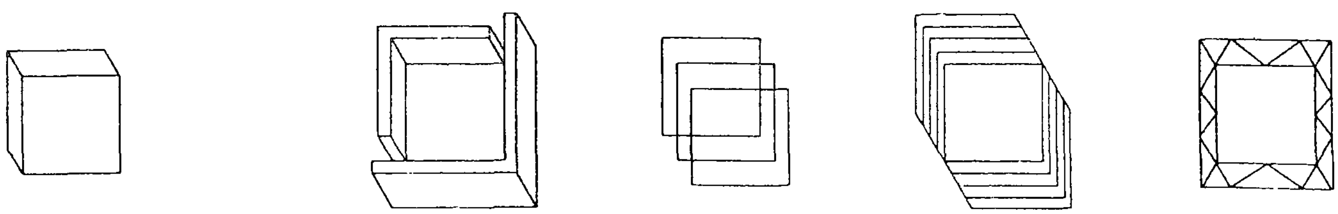

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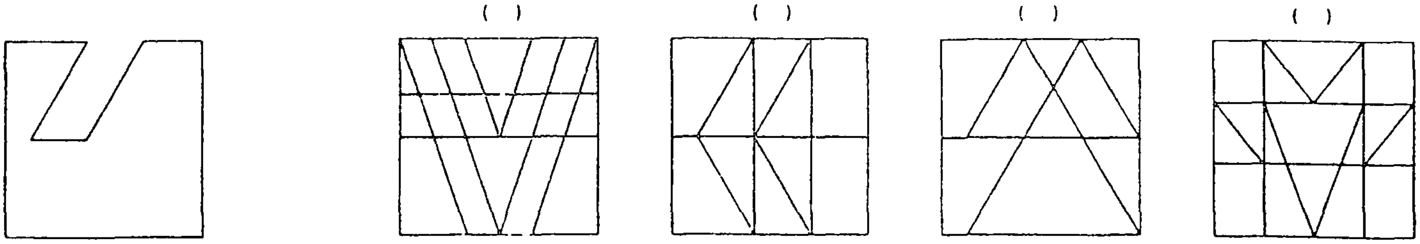

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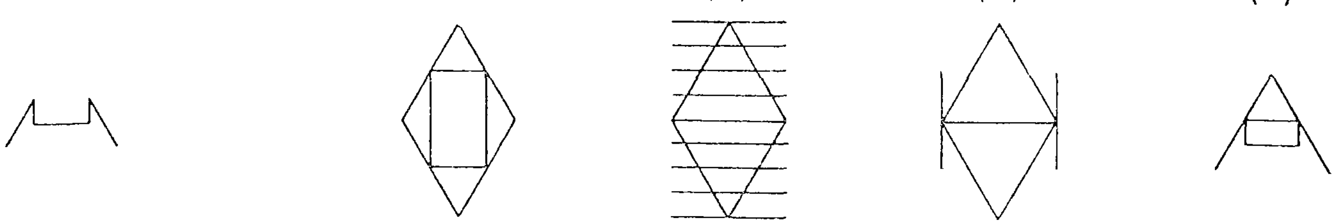

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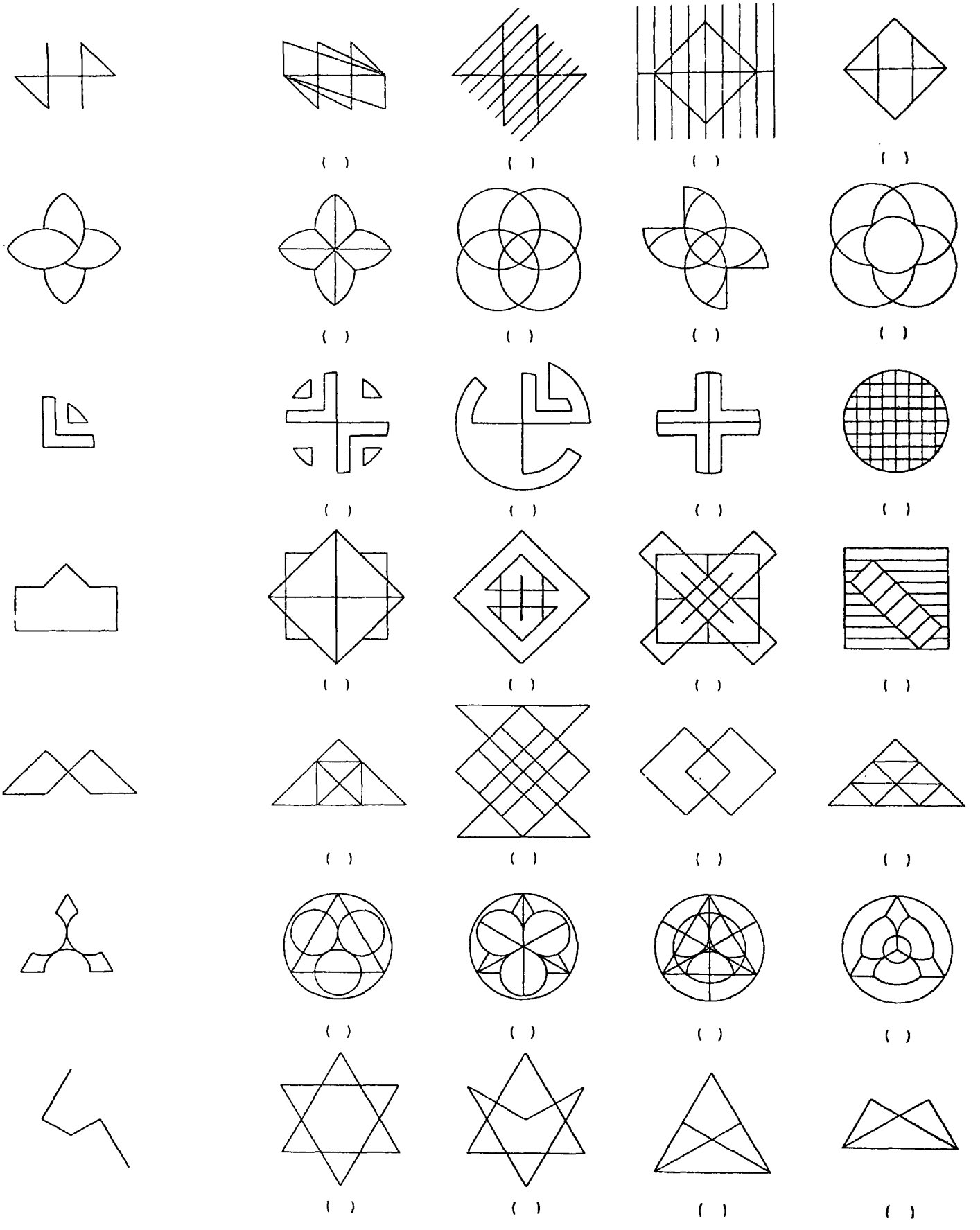

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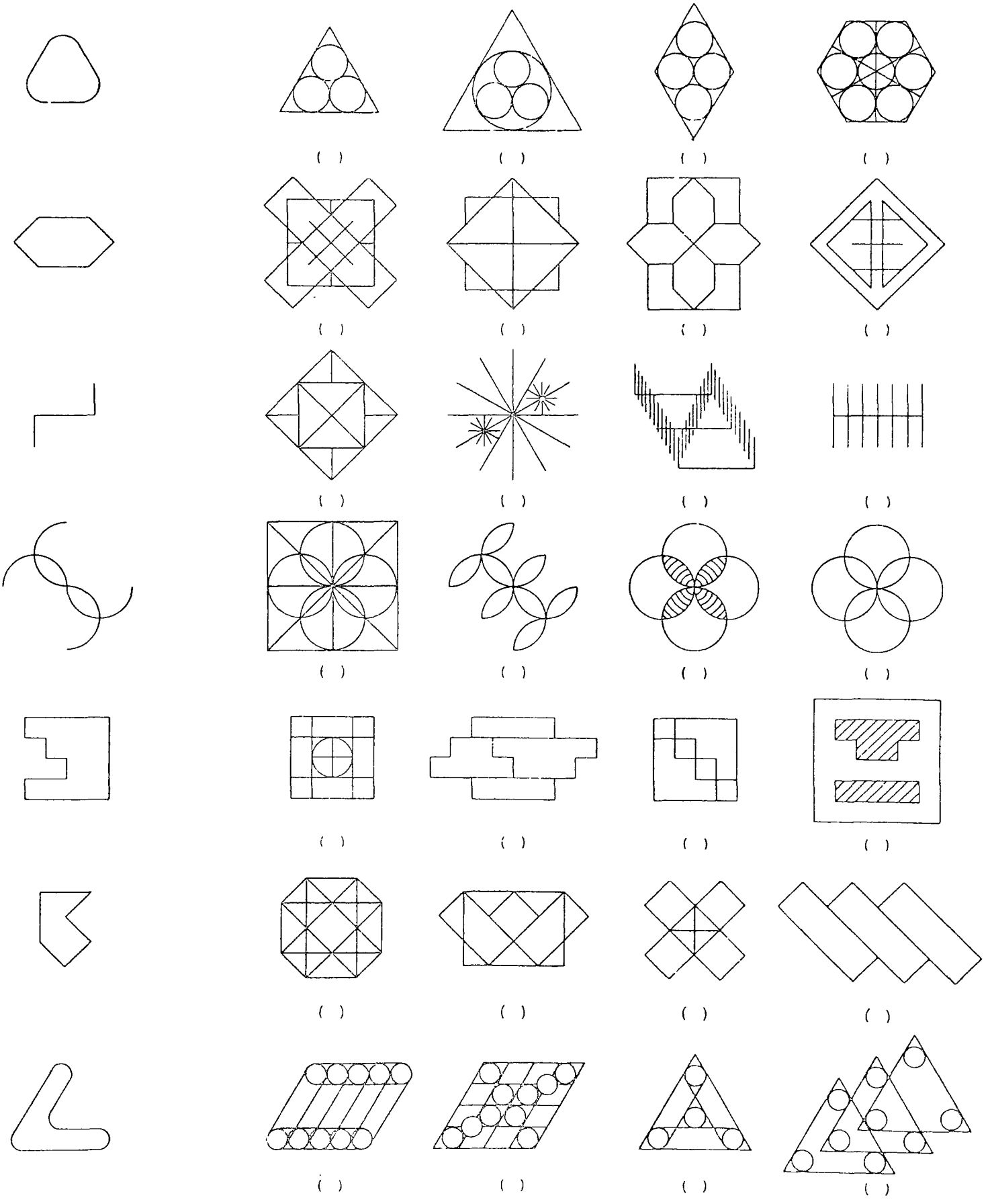

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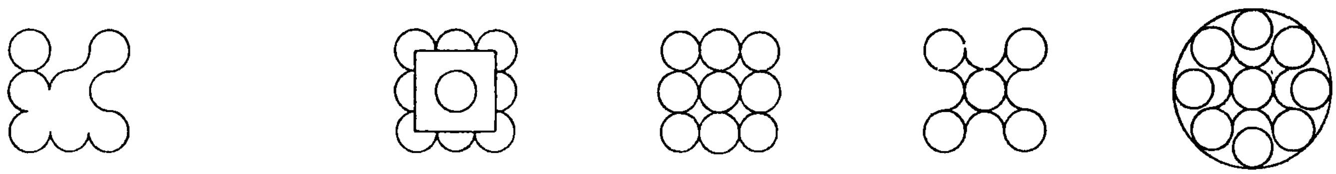

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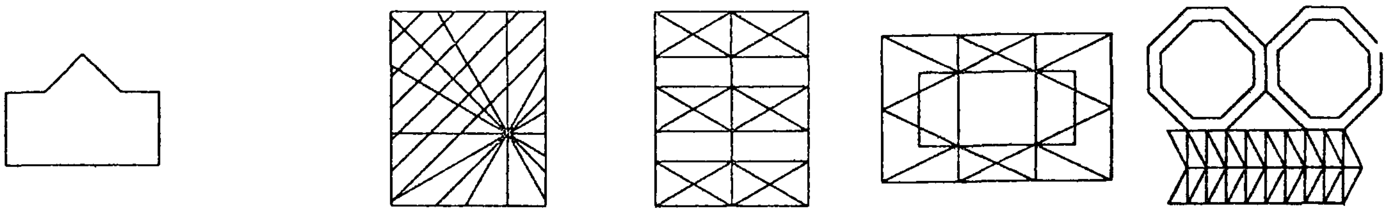

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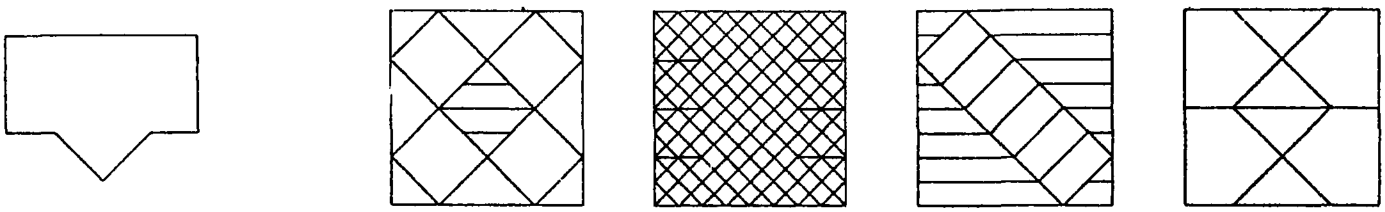

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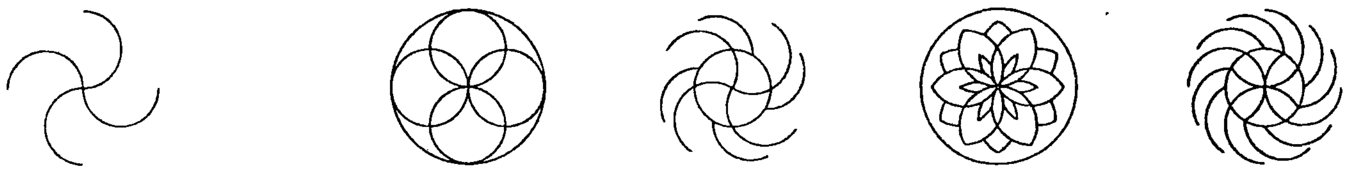

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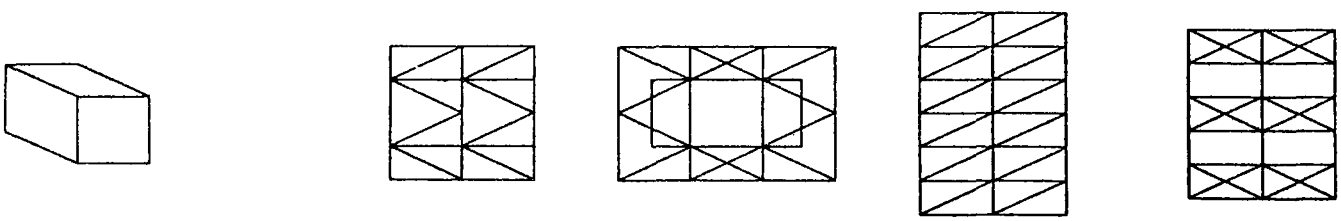

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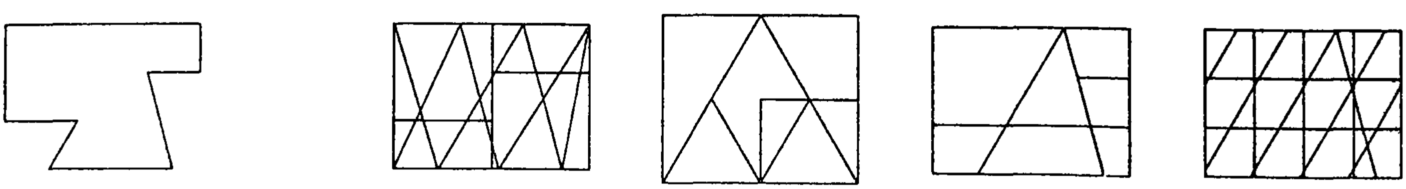

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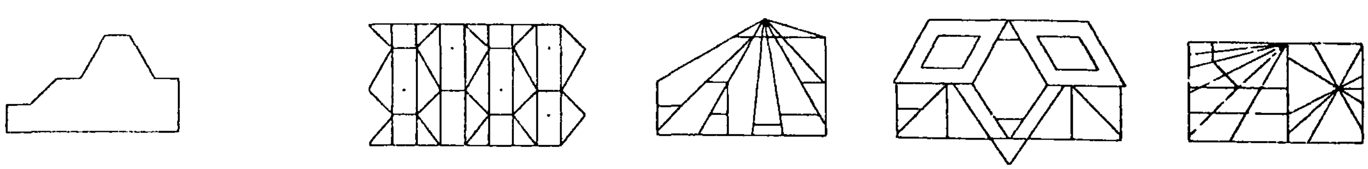

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STOP HERE -- WAIT FOR FURTHER

APPENDIX 6

DISTRIBUTION OF MEASURES OF FIELD-DEPENDENCE-INDEPENDENCE IN RAW SCORES

Score	M	F	Total	Score	M	F	Total	Score	M	F	Total	Score	M	F	Total
130		1	1	92	1	2	3	54	1	4	5	16	1		
129				91		1	1	53				15	1		1
128				90	1	1	2	52	5	4	9	14	1		1
127				89		1	1	51	2	1	3	13	1		1
126				88				50	3	3	6	12			
125				87				49	2	1	3	11			
124				86	1	1	2	48	4	3	7	10			
123				85		2	2	47	1		1	9			
122				84	3	1	4	46	1	8	9	8			
121				83		1	1	45	1	2	3	7			
120				82				44	3	1	4	6		1	1
119				81		1	1	43	1	1	2	5			
118				80		2	2	42	3	2	5	4			
117				79	1	1	2	41				3			
116				78	2	1	3	40	2	4	6	2			
115				77	2	1	3	39		2	2	1			
114				76	2		2	38	4	2	6	0			
113				75	1	2	3	37	2		2	-1			
112				74		4	4	36				-2			
111				73	2	2	4	35	1	1	2	-3			
110		1	1	72		3	3	34	2		2	-4			
109				71		1	1	33				-5			
108		1	1	70	3	1	4	32		2	2	-6			
107				69	1	2	3	31	2		2	-7			
106	1		1	68	6		6	30	1		1	-8		1	1
105				67	1	2	3	29		1	1				
104				66	2	1	3	28		1	1				
103				65	2	1	3	27	1		1				
102				64	1	1	2	26	1	1	2				
101				63	1	2	3	25	1		1	Male:		102	
100				62	2	2	4	24		2	2	Female:		107	
99				61	1	1	2	23							
98		1	1	60	3	1	4	22				Total:		209	
97	1		1	59	2	4	6	21							
96				58	3	2	5	20	1	2	3				
95	1		1	57	1	1	2	19							
94	1		1	56	2	1	3	18							
93	1	1	2	55		2	2	19	1		1				

APPENDIX 7

DISTRIBUTION OF MEASURES OF FIELD-DEPENDENCE-INDEPENDENCE IN STANDARD SCORES

Score	M	F	Total	Score	M	F	Total
73		1	1	47	2	3	5
72				46	6	8	14
71				45	7	5	12
70				44	6	11	17
69				43	5	4	9
68				42	5	6	11
67				41	4	4	8
66		1	1	40	3	1	4
65		1	1	39	2	2	4
64	1		1	38	3	2	5
63				37	2	1	3
62				36	1	2	3
61	1	1	2	35			
60	4	3	7	34	1	2	3
59	1	3	4	33	2		2
58				32	2		2
57	4	5	9	31	1		1
56		1	1	30			
55	3	4	7	29			
54	4	4	8	28		1	1
53	2	9	11	27			
52	4	4	8	26			
51	9	3	12	25			
50	4	4	8	24			
49	6	4	10	23			
48	6	7	13	22			
				21		1	1

Male: 102
Female: 107

Total: 209

APPENDIX 8

STATISTICAL INFORMATION ON THE IEA FRENCH LISTENING TEST (POPULATION II) ON PARTICIPATING SCHOOLS AND CLASSES

School	Class	Sum	Mean	S.D.	Variance	N
A	8-1	488.000	20.333	5.451	29.710	24
	8-2	558.000	16.909	6.023	36.273	33
	8-3	424.000	14.621	7.590	57.601	29
B	8-1	317.000	11.741	4.712	22.199	27
	8-2	318.000	11.778	3.130	9.795	27
	8-3	262.000	9.704	3.821	14.601	27
C	8-1	440.000	14.667	8.511	72.437	30
	8-2	405.000	14.464	8.067	65.073	28
	8-3	327.000	13.080	7.141	50.993	25

APPENDIX 9

SCORES ON THURSTONE'S CFT (FORM A) AND THE IEA FRENCH LISTENING TEST (POPULATION II) FOR FIELD-DEPENDENT MALES

S	Group	CFT		IEA	
		Raw	Standard	Raw	T-
1	A1	44	43	16	42.05
2	A2	17	33	11	40.19
3	A3	44	43	8	41.28
4		46	44	11	45.23
5	B1	15	32	12	50.55
6	B2	45	43	9	41.12
7		44	43	7	34.73
8		42	42	9	41.12
9		34	39	14	57.10
10		31	38	16	63.49
11	B3	43	43	9	46.16
12		42	42	3	32.45
13		38	41	11	53.39
14		35	40	7	42.92
15		30	38	13	58.63
16		26	37	8	45.54
17	C1	42	42	9	43.34
18		40	42	13	48.04
19		38	41	8	42.17
20		34	39	10	44.52
21		27	37	7	40.99
22		20	34	9	43.34
23	C2	40	42	-	
24		37	40	11	45.71
25		37	40	17	53.14
26		25	36	15	50.66
27		16	33	-	
28	C3	38	41	10	45.69
29		38	41	28	70.89
30		31	38	13	49.89
31		14	32	4	37.28
32		13	31	21	61.09

APPENDIX 10

SCORES ON THURSTONE'S CFT (FORM A) AND THE IEA FRENCH LISTENING TEST (POPULATION II) FOR FIELD-INDEPENDENT MALES

S	Group	CFT		IEA	
		Raw	Standard	Raw	T-
33	A1	93	60	23	54.89
34		90	59	26	60.40
35		84	57	25	58.56
36		84	57	18	45.72
37		86	57	15	40.22
38		78	55	16	42.05
39		76	54	15	40.22
40		73	53	11	32.88
41		69	52	16	42.05
42		68	51	14	38.38
43	A2	95	60	16	48.49
44		76	54	16	48.49
45		77	54	21	56.80
46		73	53	16	48.50
47		68	51	11	40.19
48	A3	106	64	5	37.32
49		70	52	14	49.18
50	B1	97	61	13	52.67
51		94	60	19	65.41
52		77	54	12	50.55
53		75	54	6	37.82
54		70	52	25	78.14
55	B2	78	55	12	50.71
56	B3	92	60	9	48.16
57		68	51	4	35.07
58		68	51	9	48.16
59		68	51	-	-
60	C1	68	51	-	47.19*
61	C2	70	52	10	44.47
62	C3	84	57	-	-
63		79	55	9	44.29

*Originally missing, 'statistically derived' from the average of the other 8 scores in the same cell.

APPENDIX 11

SCORES ON THURSTONE'S CFT (FORM A) AND THE IEA FRENCH LISTENING TEST (POPULATION II) FOR FIELD-DEPENDENT FEMALES

S	Group	CFT		IEA	
		Raw	Standard	Raw	T-
64	A1	46	44	20	49.39
65		46	44	27	62.23
66		40	42	28	64.07
67	A2	46	44	32	75.06
68	A3	46	44	10	43.91
69		46	44	28	67.63
70		40	42	12	46.55
71		38	41	12	46.55
72		29	38	11	45.23
73	B1	45	43	16	59.04
74		41	41	22	71.77
75		-8	21	7	39.94
76	B2	42	42	12	50.71
77		32	39	12	50.71
78		24	36	19	73.07
79		20	34	12	50.71
80	B3	46	44	6	40.31
81		35	40	-	
82	C1	46	44	14	49.22
83		42	42	9	43.34
84		40	42	10	44.52
85		39	41	8	92.17
86		20	34	10	44.52
87	C2	46	44	15	50.66
88		45	43	24	61.82
89		40	42	7	40.75
90		32	39	15	50.66
91		24	36	18	54.38
92	C3	46	44	13	49.89
93		43	43	7	41.49
94		39	41	-	-
95		28	38	10	45.69
96		26	37	13	44.89
97		6	28	-	-

APPENDIX 12

SCORES ON THURSTONE'S CFT (FORM A) AND THE IEA FRENCH LISTENING TEST (POPULATION II) FOR FIELD-INDEPENDENT FEMALES

S	Group	CFT		IEA	
		Raw	Standard	Raw	T-
98	A1	91	59	24	56.73
99		80	55	13	36.55
100		80	55	-	-
101		77	54	27	62.23
102		74	53	16	42.05
103		71	52	21	51.22
104	A2	130	73	-	-
105		98	61	18	51.81
106		92	60	17	50.15
107		90	59	13	43.50
108		83	57	16	48.50
109		81	56	16	48.50
110		73	53	12	41.85
111		69	52	19	53.47
112	A3	85	57	10	43.91
113		75	54	21	58.40
114		74	53	10	43.91
115		73	53	13	47.86
116		69	52	20	57.09
117	B1	110	66	12	50.55
118		84	57	14	54.79
119	B2	92	60	14	57.10
120		89	59	-	-
121		75	54	9	41.12
122		72	53	12	50.71
123		74	53	11	47.51
124	B3	86	57	10	50.77
125		74	53	17	69.09
126		70	52	13	58.63
127	C1	108	65	16	51.57
128		72	53	16	51.57
129		72	53	7	40.99
130	C2	93	60	7	40.75
131		78	55	13	48.19
132		79	55	9	43.23
133	C3	85	57	-	50.17*

*Originally missing, 'statistically derived' from the average of the other scores in the same cell.

APPENDIX 13

T-SCORES USED IN ANALYSIS OF VARIANCE (ANOVA) OF RESULTS

F-DM	F-DF	F-IM	F-IF
42.05	58.56	45.54	49.76
40.19	75.06	48.49	48.25
43.26	49.97	43.25	49.63
50.55	56.92	56.92	52.67
47.51	56.30	50.71	49.11
46.85	40.31	43.80	49.46
43.73	44.76	49.19*	48.04
49.84	51.66	44.47	44.47
52.97	46.74	44.29	50.17*

*Originally missing, 'statistically derived' from the average of the other 8 scores in the same cell.

APPENDIX 14

ABSTRACT OF

Field-Dependence-Independence and Second Language Achievement in Grade 8[1]

The present study was inspired by two theories: the theory of psychological differentiation postulated by Witkin and his associates on the one hand; the sociopsychological theory of second language learning advanced by Gardner and Lambert on the other. Its central purpose was to investigate the relationship between achievement in French as a second language and field-dependence-independence. In this connection, it was hypothesized that field-dependent students would be higher achievers in second language learning than field-independent students.

The research sample included 209 Grade 8 students (102 boys and 107 girls) chosen from 3 classes each of 3 English-speaking schools in Ottawa. None of these students was of French origin or normally spoke French at home, so that French was really being learned as a second language.

All the 209 subjects were given Thurstone's Closure Flexibility Test (Form A), on the results of which their

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1 Hon-wing Lee, M.A. Thesis presented to the School of Graduate Studies of the University of Ottawa, Canada, 1974.

APPENDIX 14

relative positions on the field-dependence-independence were determined. For statistical computation purposes, the bottom 32% and the top 32% were respectively classified as being field-dependent and field-independent. French achievement scores were then provided by the Ottawa Board of Education which had administered the IEA French Listening Test (Population II) to all eighth-graders during the period from September to October 1973.

The results obtained from an analysis of variance (ANOVA) at the .05 level of significance employing the group rather than the individual as the experimental unit failed to confirm the research hypothesis.