

**CORRELATION OF FIELD DEPENDENCE AND
RECOGNITION MEMORY PERFORMANCE**

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CORRELATION OF FIELD DEPENDENCE
AND RECOGNITION MEMORY PERFORMANCE

An Abstract
Presented to
the Graduate Council of
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In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Judy Richardson Thomason

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ABSTRACT

This study was an investigation of field-dependence/field-independence as a factor in incidental learning. Witkin (1962, 1974) found that people with a field-independent or analytical approach to learning would perform better in an incidental learning situation. Other studies, such as those of Messick and Damarin (1964) and Eagle, Goldberger, and Breitman (1969), support the idea that field-independent people ordinarily pay less attention to social cues than field-dependent people; therefore, they probably acquire less social information unless their attention is specifically focused on the social cues.

This study correlated performance on Witkin's Group Embedded Figures Test (GEFT) with performance on a recognition memory task in an incidental learning situation. An orienting task also was employed in an attempt to focus the attentional processes of the field-independent subjects on the social cues of the task.

The findings of this study support Witkin's generalization that overall subjects with a field-independent approach to learning perform better in an incidental learning situation. The orienting task did not focus effectively the attentional processes of the field-independent subjects on the social stimuli. However, the orienting task did provide a differential effect. The regression slopes for the group receiving no orienting instructions and the group receiving orienting

instructions were significantly different ($p < .05$). The exact nature of this difference could not be determined from the data gathered in this study.

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May, 1984

To the Graduate and Research Council:

I am submitting herewith a Thesis written by Judy Thomason entitled "Correlation of Field Dependence and Recognition Memory Performance." I have examined the final copy of this paper for form and content, and I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

Earland E. Bliss
Major Professor

We have read this thesis
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Chapter 1

REVIEW OF THE RELATED LITERATURE

Degree of differentiation is an important characteristic of the structure of any system. In very broad terms, differentiation refers to the complexity of a system's structure. A less differentiated system is in a rather homogeneous structural state, and a more differentiated system is in a relatively heterogeneous state. In psychology, the differentiation concept has most often been used in a developmental context. The psychological system is in its most undifferentiated state early in development. Infancy is an example of a very low level of differentiation, while adulthood is a state of higher differentiation. Early in development children experience themselves and their environment primarily as a continuous mass. As children continue to develop, they begin to perceive boundaries between their body and the outer world. In addition to the formation of boundaries, children develop an awareness of their body parts and their relationship.

An important stage of differentiation is the movement away from the state of "oneness" children share with their mothers toward some degree of separation. As children move away from mother, they begin to identify and internalize certain values and standards which help determine their view of themselves.

The formation of "self" involves the development of an

"inner core" of experience and the separation of the core from the field. Children proceed from an initial state that is relatively unstructured to a more structured state with greater segregation of self. As the self develops, it becomes more differentiated.

The achievement of a relatively differentiated self implies that in the area of where the person's activities and attributes are the source, experience is relatively articulated. It is analyzed and structured rather than being global. If the source of experience is the field outside, the person may be thought of as showing development toward greater articulation. Early in development, perception of parts of field probably will be dominated by the organization of the immediate context or field in which the parts are embedded. However, as development progresses, the influence of the context is reduced. As children develop, objects become more discrete and they begin to use complex principles of field integration which result in an increase in the articulateness of experience. The individual who experiences stimuli in an articulate manner can perceive items as discrete from their backgrounds. They can impose their organization on a previously organized field or impose structure and organization on a field which appears to have little or no structure.

In short, experience of the body field in early development is basically global, but during development it becomes increasingly more articulated so that body, self, and objects

are experienced as separate. Witkin, Dyk, Faterson, Goodenough, and Karp (1962) proposed their hypothesis of differentiation. The hypothesis proposed an association among the characteristics of greater or more limited differentiation, identified in early and late functioning in each of several psychological areas: degree of articulation of experience of the world; degree of articulation of experience of self; and extent of development of specialized structured controls and defenses. Thus, greater inner differentiation is associated with greater articulation of experience of the world.

Witkin, et al. believed that a field-dependent or field-independent way of perceiving was one of a large constellation of interrelated characteristics which together compose an individual's level of differentiation. Field-dependence or independence is considered to be one expression of a more general individual difference dimension, defined at one end by a global mode of field approach to stimulus and at the other end by an articulated mode of field approach. People who exhibit a relatively global approach (field-dependent) are governed by the organization of the field and have difficulty extracting parts from an embedding context. Field-independent people, on the other hand, exhibit a relatively articulated cognitive style and can analyze and structure experiences in a new way. They are not as dependent upon the organization of the field given, but can restructure it.

Witkin, et al. (1962) conducted a very comprehensive

review of field-dependence/independence and found that people who perceive analytically in one situation tend to be analytical in other perceptual tasks also, while people who perceive global usually will take the organization of the field as it is given. They will not attempt to reorganize or restructure the field.

In recent years, there have been a number of studies linking the differentiation concept of field-independence/dependence to learning. One area of study has concentrated on the effect of cue salience in concept learning. The hypothesis that if field-dependent individuals accept the organization of the field, then they should be dominated by the most salient cues in concept attainment has been supported by Kirschenbaum (1968). Kirschenbaum found that hypotheses formulated by field-dependent subjects showed preferences for certain cues, while field-independent subjects sampled a wider variety of cues in formulating their hypotheses. This result also has been reported by Dickstein (1968).

Relying upon cue salience may impair or accelerate concept attainment. If the salient cues are relevant, then field-dependent subjects possibly could learn the concept faster than field-independent subjects. However, if the salient cues are irrelevant to the concept, then performance could be impaired. Since there are usually only a small number of relevant cues among the total number of cues available, the chances of the most salient cues being relevant are small.

Since the chances of the most salient cues being irrelevant are very high, it is believed by some that field-dependent people are less adept in concept attainment than field-independent subjects who sample a wider variety of attributes. This result was found in two recent studies: Ruble and Nakamura (1972) and Dargel and Kirk (1971).

Field-dependent and independent subjects also differ in the types of strategy used to formulate hypotheses. In employing a wholist strategy, subjects would consider all attributes as relevant for concept attainment, while subjects using a partist strategy would use only some attributes in constructing an initial hypothesis. Kirschenbaum (1968) found field-dependent subjects tended to use the partist strategy more often than field-independent subjects since field-dependent people tended to ignore nonsalient cues and attended to the most salient cues.

Nebelkopf and Dreyer (1973) believe that field-dependence is a concept that better describes not how much people learn, but simply how they learn. They believe that the learning process for field-dependent and independent subjects could be illustrated best in terms of continuity and discontinuity of learning curves. Since the field-dependent subject most often is thought of as a spectator in the learning process, the learning curve probably would be continuous. Each trial adds to the learning process and there would be gradual advancement until the criterion is achieved. Each trial appears to impart

a new "piece of the puzzle." The field-independent subject, on the other hand, would exhibit a discontinuous learning curve. The subject will test hypothesis after hypothesis, but his/her performance will not improve until the person discovers the correct hypothesis.

Nebelkopf and Dreyer (1973) found that there was no significant difference between field-dependent and field-independent subjects in the number of trials required to learn concepts. The difference exhibited was in the approach to concept learning and not in the effectiveness of participant over spectator approach. Nebelkopf and Dreyer (1973) found that field-independent subjects appear consistent over time in utilizing a participant approach, while field-dependent subjects appear bound to a spectator approach.

The role of attentional processes of field-dependent and field-independent individuals can be examined through an incidental learning task. Witkin, et al. (1962) found that individuals with a global or field-dependent approach to learning limited their attention and, therefore, their learning of the task put to them, while individuals with an analytical or field-independent approach attended to stimuli that are external to the immediate task. In short, Witkin, et al. (1962) found that field-independent individuals were better at incidental learning. Other studies, such as those of Goodenough and Karp (1961) and Schimek and Wachtel (1969), support Witkin's generalization that field-dependent people overall show less

incidental learning than field-independent people. However, the results in this area of study have been inconsistent.

Witkin's generalization, however, did not consider the type of information given in the learning task. For example, in some studies it has been found that incidental learning of socially relevant information is better among field-dependent people, while incidental learning of nonsocial stimuli is superior among field-independent people.

The idea that field-dependent individuals tend to be more attune to social stimuli than field-independent individuals has created two kinds of hypotheses about field-dependence and learning. The first hypothesis is that field-dependent people pay more attention to their social surroundings and, consequently, obtain more social information than field-independent people. The second hypothesis is that field-dependent subjects pay more attention to social stimuli only if it is relevant.

The first hypothesis is supported by the Messick and Damarin (1964) study in which field-dependent subjects did better than field-independent subjects in recognition of incidentally learned pictures of strangers. Fitzgibbons, Goldberger, and Eagle (1965) and Eagle, Goldberger and Breitman (1969) also reported that field-dependent subjects were superior in incidental learning of social words. However, the studies of Eagle, Fitzgibbons and Goldberger (1966), Fitzgibbons and Goldberger (1971), and Adcock and Webberly (1974) reported

nonsignificant findings that do not support this hypothesis.

Studies that support the second hypothesis that field-dependent subjects pay more attention to social stimuli if it is relevant are Devaris (1962) and Crutchfield, Woodworth and Albrecht (cited in Watchel, 1971). DeVaris asked subjects to identify cutout photographs of their own facial parts and found that field-dependent subjects were much better at recognizing their own facial parts than field-independent subjects. Crutchfield, et al. (cited in Watchel, 1971) reported that field-dependent Air Force officers were much better than field-independent officers at identifying photos of men they had met previously.

There have been two schools of thought on incidental learning. The early research by Postman and Mechanic in the 1950's and 1960's usually contrasted intentional and incidental learning with the emphasis on intentional learning. Postman believed that very little incidental learning occurred unless preceded by an intentional task or set to learn.

The second school was proposed by Hyde and Jenkins (1969), but many ideas have also been contributed by Craik and Lockhart (1972). This contemporary theory maintains that incidental learning is important in its own right since most learning can be regarded as incidental in the sense that we are not asked to formally recall what we learn in our day to day activities. Craik and Lockhart argue that incidental learning is of importance because of the potential control it offers over a subject's processing activities.

Hyde and Jenkins (1969) obtained results in a study that contradicted the Postman theory that intentional learning is far superior to incidental learning. In their study, incidental learners performed an orienting task and intentional learners either performed the same orienting task or did not carry out an orienting task which made them "pure intentional learners." The types of orienting tasks used were rating pleasantness, detecting the presence of the letter "e" in list words, and estimating the number of letters in each word.

Free recall was better after the performance of a semantic orienting task like pleasantness rating than after nonsemantic tasks like "e" checking for both intentional and incidental learners. In fact, the recall performance for intentional and incidental learners who had performed the same orienting task was very similar. These results seem to suggest that it is the processing activities associated with the performance of the orienting tasks that determine recall performance. Other evidence also indicates that memory performance is determined far more by the kinds of processing activities engaged in by the subject while performing the orienting task rather than the intent to learn (Bobrow & Bower, 1969; Rosenberg & Schiller, 1971).

The differences in learning by field-dependent and field-independent individuals could be explained in terms of Craik and Lockhart's (1972) level of processing theory. Many researchers believe an incidental learning paradigm is the

most appropriate way to study the processing of stimulus material. Craik and Lockhart (1972) stated:

Under incidental conditions, the experimenter has a control over the processing the subject applies to the material that he does not have when the subject is merely instructed to learn and uses an unknown coding strategy. (p. 677)

Processing in the incidental learning situation is controlled by means of an orienting task which must be performed on each stimulus item. Craik and Lockhart found that the distinguishing characteristic of any orienting task was the depth of processing that it involved. They referred to depth of processing as a hierarchy of processing stages where greater "depth" implies a greater degree of semantic or cognitive analysis. Once recognized, the stimulus may undergo further processing by enrichment or elaboration. It may elicit associations, images or stories of the subject's past experiences. Since field-dependent individuals have difficulty separating the stimulus from the field in which it is embedded, it would seem that the further processing by enrichment or elaboration would be more characteristic of a field-independent individual.

Recall of sentences after an orienting task that required semantic processing has been shown to be superior to recall of equivalent sentences that were processed nonsemantically in studies by Rosenberg and Schiller (1971) and Bobrow and Bower (1969). These results support the idea that semantic

processing implies deeper processing and, consequently, better recall performance. If stimuli are only partially analyzed or processed, their record in memory is short. From studies done on field-dependence, a more shallow level of processing of salient cues appears to be more characteristic of field-dependence than field-independence. Field-independent individuals tend to be more analytical and sample more fully from the cues available. Therefore, levels of processing could explain the difference in incidental learning between field-dependent and field-independent subjects. Overall, field-independent subjects appear to be more effective learners of incidental material unless the material is social in nature. Since field-dependent subjects have been shown to be more attune to social stimuli, particularly relevant social stimuli, they may show a superiority effect unless the attentional processes of the field-independent subject are focused on the social material by some means such as a semantic orienting task.

The purpose of this research was to test the following hypotheses:

1. Overall field-independent subjects would perform better than field-dependent subjects on the recognition memory test in an incidental learning situation.
2. The use of an orienting task would increase effectively recognition memory performance for all subjects.
3. Field-independent subjects would perform better on recognition tasks when the stimulus material is nonsocial.

4. Field-dependent subjects would perform better on the recognition task of social stimulus material when there are no orienting instructions.

5. Field-independent subjects would perform better on the recognition tasks of social stimulus material when orienting instructions are given. The orienting instructions would focus the attentional processes of the field-independent subjects on the social cues of the task.

Chapter 2

METHOD

Subjects

The subjects were 48 college students enrolled in psychology classes at Austin Peay State University. Some students received extra credit in their psychology class for participation in the study, while others volunteered their time. There were 29 females and 19 males participating in the study and their ages ranged from 18-47 years. Twenty-two of the subjects were placed in the group that did not receive orienting instructions, while 26 subjects were given orienting instructions.

Instrument Administered

Each subject was given the Group Embedded Figures Test (GEFT) to determine field dependency. Witkin, Oltman, Raskin, and Karp (1971) designed the GEFT to provide a group administered adaptation of the original individually administered Embedded Figures Test. The GEFT contains 18 complex figures. The subject's task on the GEFT is to find a particular simple figure within a larger complex figure and trace the simple figure. Colored patterns are superimposed to make the task more difficult. The subject is prevented from simultaneously seeing the simple form and the complex figure containing it. The simple forms are printed on the back cover of the GEFT booklet and the complex figures are on the booklet pages so

that both simple forms and complex figures cannot be exposed simultaneously. However, the subject may look at the simple forms as often as necessary.

The first section contains 7 very simple items and the subjects are given 2 minutes to complete this section. This section is primarily for practice; it is not included in the subject's score. The second and third sections each contain 9 more difficult items and five minutes are allowed for each section. The score on the GEFT is the total number of simple forms correctly traced in the second and third sections.

The norms were based on men and women college students from an eastern liberal arts college. Men performed significantly better than women. The mean for men was 12.0 and the mean for women was 10.8.

Reliability estimates were based on the correlation between parallel forms of the test. Correlations between the first section scores and the second section scores were computed and corrected by the Spearman-Brown formula. The resulting reliability estimate was .82 for both males and females.

Validity of the GEFT was assessed by correlating it with other established measures of differentiation. Correlation with its "parent" form, EFT, yielded a -.82 validity coefficient for males and -.63 for females. Correlation with the Portable Rod and Frame Test (PRFT) yielded -.39 for males and -.34 for females. The r 's with EFT and PRFT are negative because the tests are scored in reverse fashion from the GEFT.

procedure

Subjects signed up for testing appointments with 7 morning sessions and 1 afternoon session available. The size of the groups tested ranged from 3 to 11 subjects. They were told that they would be asked to perform two types of tasks--to view slides and take the standardized GEFT. The subjects were not told that they would be asked to view a second set of slides for recognition performance.

The subjects were first presented with 16 slides for 10 seconds each. The slides were of two types. Eight slides were pictures containing people and eight slides contained only objects. They were presented in alternating fashion: people, object, people, object, etc.

Twenty-two of the subjects were given no orientation, while 26 of the subjects were given an orientation task. The subjects were asked to mentally compose a theme or descriptive statement for each slide as it was presented.

Immediately after presentation of slides, the subjects were administered the GEFT. The GEFT was administered at this time to prevent rehearsal of slides.

The recognition task was presented last. The subjects were told that this time they would be viewing 16 groups of slides. Each group would contain 4 similar slides. One of the four slides in each group would be a slide that they had seen in Task 1, while the other three slides were distractors. The slides for each group were numbered 1-4. The subjects'

task was to select the slide originally shown in Task 1 for each group and record the slide number on the answer sheet provided. Each group and slide number was called aloud as they were presented to eliminate recording errors.

RESULTS

There are three ways to analyze the data resulting from this study. One way is in terms of correlations of GEFT scores and recognition memory for the different types of stimulus material. Another way to examine the data is to compare the means and standard deviations of each group. The third way to look at the data is in terms of multiple regression of GEFT, group, and interaction on the predictor variable recognition memory for total slides, object slides, and people slides.

Simple correlation of GEFT scores and recognition memory for total slides yielded an r of .299 ($p < .05$). Correlations of GEFT scores and recognition memory for people slides yielded an r of .250 ($p > .05$), while correlation of GEFT scores and recognition memory of object slides resulted in an r of .261 ($p > .05$). The means and standard deviations for each group are recorded on Table 1.

Multiple regression analysis of the independent variables GEFT scores, group and interaction on the predictor variable total slide memory performance yielded an R of .317 ($p > .05$). Other "R" values are shown on Table II.

Multiple regression for the people slides for the group receiving no orienting instructions yielded an R of .510 ($p < .05$). However, the R resulting from this regression in

the group that received orientation was not significant ($p > .05$). The orienting instructions did produce a differential effect as the slopes of the regressions of people slides on GEFT for the two groups were significantly different from each other ($p < .05$).

MEAN NUMBER OF SLIDES RECOGNIZED BY SUBJECTS

Table 1

NO ORIENTATION GROUP

| | <u>Total Slides</u> | <u>People</u> | <u>Object</u> |
|------|---------------------|---------------|---------------|
| Mean | 13.10 | 7.54 | 5.54 |
| SD | 2.27 | .80 | 1.92 |

ORIENTATION GROUP

| | <u>Total Slides</u> | <u>People</u> | <u>Object</u> |
|------|---------------------|---------------|---------------|
| Mean | 13.31 | 7.73 | 5.53 |
| SD | 1.62 | .53 | 1.39 |

MULTIPLE REGRESSION ANALYSIS

Table 2

NO ORIENTATION GROUP

| | <u>Total Slides</u> | <u>People</u> | <u>Object</u> |
|----|---------------------|--------------------|--------------------|
| R= | .332 ($p > .05$) | .510 ($p < .05$) | .180 ($p > .05$) |

ORIENTATION GROUP

| | <u>Total Slides</u> | <u>People</u> | <u>Object</u> |
|----|---------------------|--------------------|--------------------|
| R= | .277 ($p > .05$) | .034 ($p > .05$) | .360 ($p > .05$) |

Chapter 4

DISCUSSION

The simple correlation of GEFT scores and total slide scores ($r = .299$, $p < .05$) appear to support the first hypothesis that overall field-independent subjects generally perform better than field-dependent subjects on recognition memory tests in an incidental learning situation. Hypothesis II, which states that the use of an orienting task would effectively increase group recognition performance, was not supported by the data. As shown on Table I, the means for the orientation group increased only slightly over the no orientation group, and in one case, the mean for object slides in the orientation group was slightly lower than the no orientation group.

However, the orienting instructions did have a differential effect as the slopes of the regression of people slides on GEFT scores for the two groups (orientation and no orientation) were significantly different ($p < .05$). It is unclear from the data gathered the exact nature of the difference. It is possible that the semantic orienting task may have interfered with the analytical approach of the field-independent subjects, while perhaps aiding the attentional processes of some field-dependent subjects. This study, however, did not seek to evaluate the wide range of factors that jointly determine or influence individual recognition performance.

Hypothesis III, which states that field-independent subjects would perform better on recognition tasks when the stimulus material is nonsocial, also was not supported by the data. Correlations of GEFT and object slides yielded an r of .261 ($p > .05$). Regression analysis of GEFT and group on object slides yielded an R of .264 ($p > .05$).

The data yields an opposing conclusion to Hypothesis IV, that field-dependent subjects would perform better on recognition of people slides when there is no orienting task. The significant regression ($p < .05$) of GEFT scores on people slides in the no orientation group indicates the trend that field-independent subjects, rather than field-dependent subjects, tended to score higher on people slides in the no orientation group.

Hypothesis V also was not supported. The data does not show that the semantic orienting task effectively focused the attentional processes of the field-independent subjects on the social stimulus, people slides. The regression of GEFT scores and orientation group on people slides yielded an R of .034 ($p > .05$).

A future recommendation for this study would be to determine the difficulty level of the slides through the use of norm groups prior to the actual testing of subjects for the study. One possible explanation for the nonsignificant findings in this study could be that the difficulty level of the slide task was not appropriate. Witkin (1962) found no difference in the performance of field-dependent and field-independent

subjects for the simplest and the most difficult tasks. It seems that tasks of a moderate difficulty level are the most effective discriminators of performance among field-dependent and field independent subjects.

Additionally, subjects should be instructed to write their responses to the orienting instructions rather than mentally composing the response. This would enable one to determine if they had followed the orienting instructions.

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