A Comparative Analysis of Training Methods Used for the Development of Clerical Checking Skills

Daniels

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A COMPARATIVE ANALYSIS OF
TRAINING METHODS USED FOR THE
DEVELOPMENT OF CLERICAL
CHECKING SKILLS

by
Tyrone Daniels

A Thesis
Submitted to the
Faculty of the Graduate College
in partial fulfillment
of the
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INTRODUCTION

In the last three decades, a tremendous amount of experimental literature has been amassed in the field of perceptual psychology. In spite of this accumulation, some areas within perceptual psychology remain relatively unexplored and ignored. Unfortunately form perception seems to have been largely ignored by perceptual psychologists. This disregard for form perception is a prime example of man's ability to overlook the obvious, and what could be more obvious than the problem of how we identify flat and three dimensional objects.

How are we able to distinguish one alphabetical letter from another or a cat from a dog and so on? Certainly an in depth investigation of perception would examine typical daily discrimination tasks such as these, since a significant portion of the perceptual process is directed toward form recognition, which enables a subject to initiate actions that are appropriate to the environment. The above findings provided the impetus for this study, which was designed to examine form recognition and prior exposure to visual stimuli. In attempting to establish a firm basis for this study the following experimental literature dealing with form recognition and prior exposure to visual stimuli was reviewed.

Bruce R. Amble and Liegmar Nudhl (1966) conducted three experiments to determine if a reading program using phrases ranging in length from one word to five words would help students improve their reading skills. The phrase training program was designed to increase perceptual span
and help students develop habits of integrative phrase reading.

Subjects were intermediate grade school children and remedial readers. A 16-millimeter film projector was used to provide tachistoscopic type practice phrases and to test phrase-reading skill. In Experiment I, matched groups of fifth and sixth grade students each had five hours of distributed training. Experiment II was designed to cross-validate the findings of Experiment I. Experiment III investigated the use of phrase-reading training with intermediate grade and junior high school students in remedial reading programs. The researchers found that both reading and comprehension improved significantly for intermediate grade and remedial readers at all reading levels. The reading gains were maintained in follow-up testing procedures after the phrase-reading program was completed.

Ralph Haber (1965) designed three experiments to explore the possible confounding of repetition and duration in research involving the measurement of word recognition. Haber hypothesized that this confounding is caused by using the method of limits in researching perceptual recognition.

In light of this, Haber replaced the method of limits with a modified method of constant stimuli, so that each word was presented for a pre-determined number of trials, but with no changes in duration between trials. In addition to the separation of repetition and duration, a second major innovation was introduced into these experiments. The response indicator employed in nearly all other studies on word recognition has been that of guessing the entire
stimulus. In place of guessing, the subjects in this study were required to report the letters that they saw after each presentation.

In this way, the indicator provided an index of the subject's perceptions rather than his guesses.

With the changes described, these experiments began to assess the independent effects of duration and repetition on the perceptibility or clarity of the letters of words. The stimuli were always seven-letter, three-syllable pronounceable words. Immediately after each presentation, the subject was scored as having perceived a word only if on the last presentation of the word he reported seeing all seven letters.

The first experiment used 504 frequently used English words, presented at five different durations, from 1 to 25 trials each. Nine testing sessions of one hour each were required, with the first two being used to determine the duration values. These values were specified for each of the ten subjects separately by finding the highest duration at which each subject barely saw all seven letters on the first presentation.

This base duration was approximately 15 milli-seconds for each subject. The other durations were then set at 5 milli-seconds less and 5, 10, and 15 milli-seconds above this base value. The duration 5 milli-seconds rarely permitted the subject to perceive any letters, regardless of the number of trials; whereas for the highest duration, the subject perceived all of the letters on the first or second trial.

The introspective reports of each subject indicated that generally nothing was seen during the first few trials. But with further
presentations, first the beginnings of letters would appear, then whole letters, and often the entire word. The word that developed with repetition was not fuzzy or unclear, nor was it the result of a hunch or guess. It assumed a clear status, even though the subject had been unable to see anything a few presentations earlier. Many subjects reported afterward that they thought the duration or intensity of the stimulus was being increased between trials, and they were quite surprised to find that no changes had been made.

This first experiment demonstrated that repetition alone increased the probability of seeing words, independent of any changes in the duration of the presentations. Furthermore, this effect was found for a relatively large range of durations and exposures.

The ascending method of limits appeared to confound duration with repetition, since either of these manipulations alone produce increases in perceptibility. Also, it showed that the phenomenal percept of the letters increased steadily with repetition, suggesting a developmental process for the appearance of the percept. This effect was independent of the duration of exposure.

The second experiment, performed by Herschenson and Haber (1965), was designed to extend the previous findings to meaningless words. The use of meaningless words was a step toward ruling out the guessing of letters. English words were used and seven-letter, three-syllable Turkish words were used.

Ten subjects were used in this experiment in six sessions. The data indicated that repetition increased the clarity of the letters regardless of whether the subject knew the meaning of the word. The
subjects reported seeing more of the English letters on the first and each subsequent trial of the English words, as compared to corresponding trials for Turkish words. Meaning, then, seemed to play a role similar to duration in that both affected the initial perceptibility of letters and the level of the asymptotic performance, but not the rate of increase in accuracy over trials.

In the third experiment, Haber (1965) examined one aspect of meaning more directly. English words were utilized evenly divided between rarely and frequently used. However, for half of the words, immediately preceding the first trial, the word was exposed for 5 seconds whereupon the subject spelled it out loud. Then the regular trials commenced. The results of this third experiment indicated that giving prior exposure immediately before the trials of a word increased the probability of seeing its letters. A difference in perceptibility between rare and frequent words was also found, but only when no prior exposure was given.

The data suggest that as long as the differential frequency of usage of the words was not eliminated by prior exposure, this difference affects the clarity of ability to see the letters directly, not just the ability to guess the highly redundant letters. Furthermore, specific prior exposure did not facilitate the rate of increase in seeing letters; it affected the amount of clarity. Therefore, prior exposed words were seen more frequently. On the other hand, the rate of increase of seeing letters as a function of repetition was not affected by prior exposure.

These results indicate that repeated exposures of a stimulus increases the clarity of the stimulus until it is perfectly
perceivable. In essence, perception of even highly familiar stimuli (words) is not immediate at all, unless the initial presentation allows it to be.

Marchbanks and Levin (1965) conducted an exploratory study to tease out the essential variables children used to recognize words. Fifty kindergarten and fifty first-grade children were used. A delayed recognition task was constructed with three-letter and five-letter nonsense words. Each subject was shown a word on a stimulus card, then the card was withdrawn from sight. Then the subject was asked to pick out the word or the one most like it, from a group of randomly arranged words on a second card (response card). Three cues were systematically examined; shape of the word, the first letter, and the third letter. Shape was defined by whether the letters were below, above or on the written line. Their results indicated that almost all subjects followed the pattern of using the first letter as the most salient cue. This study did not support theories which propose that beginning readers recognize words as wholes by their shape. Instead this study indicates that recognition is based on individual letters, especially the first letter, and then the second letter.

I. Kohler (1962) conducted several studies fitting subjects with goggles containing prisms or special lenses which produced known optical distortions. Perceptual tests were conducted at the beginning of this period and at successive intervals. Finally the goggles were removed, and perceptual tests were continued. The first series of tests charts the course of adaptation to the optically produced
distortions. The second series of tests examines the nature and strength of the previous treatment.

Kohler concluded that sense organs are variable systems, the functioning of which is itself subject to variation. Thus, if a sensory system is exposed to a new and prolonged stimulus situation that departs from the one normally experienced, the system can be expected to undergo a fundamental change in its normal mode of operation.

Kohler (1951) concluded that the practice of viewing words or groups of words will increase a subject's performance in a test situation on word recognition.

A series of experiments by Gottschildts (1926, 1929) was concerned with the effects of prior exposure to a form on subsequent detection of that form when it was embedded in a more complex form. Gottschildts concluded that prior experience or practice is practically without influence upon subsequent experience. Instead, the perception of forms is determined by internal principles of figural organization which have their basis in unlearned cortical field processes. These conclusions were vigorously endorsed by Koffka (1935) and Zuckerman and Rock (1957).

Henawalt (1942) conducted four experiments that examined: repetition, time delays and various durations of exposure. Henawalt concluded that:

1. There is genuine improvement with practice in finding concealed designs. This is shown by a decrease in time and errors and also a decrease in time and errors and also by an increase in the number of responses made in two seconds or less.
2. The amount of elapsed time between trials appears to be unimportant. It appears that the amount of experience is the important factor, and that the benefits of such experiences are carried over long periods of time.

3. There is positive transfer of ability with practice. The greater the difference in the amount of experience between two groups of Ss, the greater is the advantage of the more experienced group on a series of new material. Although general experience is not without effect, it is not as advantageous as more specific practice. (p. 148)

Along these same lines, the studies of Djang (1937) confirm that general practice is inferior to practice of a specific nature.

Gibson, Walk, Pick, and Tghe (1958) conducted two experiments in an attempt to discover whether exposure of visual patterns on cage walls has a specific facilitating effect on the visual discrimination learning of rats, or whether facilitation is of general sort. In one experiment the effect of pattern exposure was tested by discrimination of identical patterns and of similar patterns. In the other, the exposure pattern and the pattern to discriminated were varied as much as possible.

Exposure of visual patterns on the cage walls was found to facilitate learning a discrimination between the same and similar patterns, but not identical patterns. On the other hand, when the cage pattern and test pattern were very different, no significant transfer effects were found. The examiners concluded that prior exposure does facilitate form discrimination. The studies of Gibson and Walk (1956) and Kerpelman (1965) confirm the same general conclusion.

Therefore, based on the literature reviewed, practice seems to
increase form perception. Furthermore, an increase in the perception of form seems to be characterized by certain critical variables. These variables are: form recognition by the use of first and last letters as opposed to the whole word, repetition of stimulus, a base stimulus duration level, and a lengthening of the perceptual span.

Thus, the experimental teaching method of the present study was based on the following concepts:

1. Form recognition is based on individual letters as opposed to whole words, especially the first and last letters. (Gabrielle, 1965).

2. The lengthening of perceptual span is introduced in order to increase speed of processing and reduce duration along with number of repetitions.

3. Repetition: functions as an independent variable that increases perceptual clarity.

4. Duration: functions as an independent variable that increases perceptual clarity.

5. Invariance: the subject perceives a stimulus by cueing into invariance (that which remains constant) of the stimulus. (Gibson, 1966).

The area of form perception was approached through an experimental teaching method, couched in the above assumptions on form perception. Likewise, the examiner's overall position on form perception was based on the presumption that in form perception it is not necessary for the subject to name or classify the stimulus. The essential function at
a very elemental level requires a same or difference discrimination based on the critical variables of form perception and the invariant properties of the stimulus.

The definition of form perception developed by Fred Altneave (1967) was utilized: form is a set of properties that are invariant over certain transformations. These transformations are brightness, color, spatial discontinuities, and contours. Altneave fully realized that these transformations do not come close to defining form.

In light of these findings, there are many questions left unanswered, such as the effect of the spatial discontinuities of form and difference in perceiving a solid as opposed to a flat form. In the final analysis Altneave concluded that the lack of clarity of the definition of form as a concept acts as an impediment to research in the perception of form. Subsequently, the lack of a well-defined concept of form was a hindrance in this study since it is critical that the properties that make up certain tasks be known and clearly defined before an effective teaching method can be designed to develop the abilities associated with form perception.

The concept of invariance is more nebulous than form. It is well agreed upon by a number of psychologists in the field (Altneave 1967, Gibson 1956, Walk 1956) that there are certain invariant properties that exist with a given object. This invariance enables a subject to recognize the stimulus in various backgrounds and orientations.

Gibson (1966) states that it is the attuning of these invariants that enables the subject to recognize an object. In spite of this
explanation, invariance or the invariant properties of any object remain unknown.

Kohler (1951, 1962) put forth the theory that perception can be changed through artificially produced transformations which cause the subject to make various changes until he hit upon a suitable adaption. Thus, Kohler hypothesizes that perception seems to be learned or at least can be changed through learning. In light of this, the examiner decided to examine the possibility that perception can be changed through a specific experimental teaching method. After reviewing the literature and gaining some understanding, the examiner concluded that no systematic and comprehensive statement of form perception existed in the literature. This condition probably exists because the current theories are a result of a growing together of bits of data, as opposed to the development of theories based on a logical formulated synthesis of the data backed by experimentation.

With this in mind this study was designed without a specific hypothesis. Instead the study addressed itself to whether or not invariance and perceptual span could be developed into an experimental teaching method. A method that would be significantly superior to a traditional teaching method, characterized by repetition. The experimental method was designed to increase a subject's ability to discriminate between flat forms. In essence this study attempted to converge two prominent theories on form perception and test their validity in an applied situation.
METHOD

Subjects

The subjects in this experiment were forty females disadvantaged as defined by federal standards who were in training at the Lincoln Skill Center. The subjects ranged in age from 18 to 50 and did not report prior research participation.

Setting

The Lincoln Skill Center is a Manpower Development Training Center, charged with the training of disadvantaged persons in vocational skills. The skill center is housed in Lincoln Elementary School which is a part of the Kalamazoo Public School System. Skill center classes are conducted in regular class rooms with three shop areas along with a clerical room set up for clerical training.

The students entering the skill center are indigenous persons of Kalamazoo County, most of whom are at an eighth grade educational level, with few employable skills. Approximately fifty percent of the students read on a third to fifth grade level, thereby making some remedial basic education necessary. Therefore the skill center attempts to improve the students' academic abilities through basic education and their employability through vocational training.
Apparatus

The stimuli were presented by means of an 8 x 11 sheet of typing paper placed in a Spotlight Opaque Projector model Is-4. The stimuli were typed in all capital letters and centered on the white typing paper. A white screen was used.

Procedure

The subjects were pre-tested and post-tested with the Minnesota Clerical Examination, and divided into Traditional, Experimental, and Control treatment groups. The vocational clerical class at the Skill Center comprised the Traditional and Experimental treatment groups. The vocational machine shop class at the center comprised the Control group.

The traditional treatment group received training in discriminating flat forms by practicing similar items that appeared on the pre-test and would appear on the post-test. In essence the Traditional treatment was merely repetition of discriminating flat forms.

The Experimental treatment was based on the concepts of invariance, recognition of individual letters as opposed to whole words, and the lengthening of perceptual span. In order to improve form perception to achieve this objective the subjects were given a special set of instructions (see Appendix B) that attempted to develop in them a mental set that was founded in the above theories. The instructions were used to attempt to sensitize the subjects to the point where they might generalize and use the method in a testing situation.
The Control group did not receive any training; instead they were given instructions and a rationale for not receiving training. The group attended their regular class as did the other two groups.

The subjects (Ss) were told that the Minnesota Clerical Examination measured a perceptual ability used by clerical and other workers in the performance of their jobs. Perception in this situation was defined as the ability to judge differences or similarities by comparing one item with a standard item.

The examiner told the subjects that it was necessary for them to take the test so that he could determine their strengths in this area. If a subject proved to be weak in this perceptual ability, the examiner told them that he had two perceptual training methods that could improve this ability and subsequently make their job easier. Through the use of these instructions (see Appendix B) the examiner intended to increase motivation and to focus attention on the teaching method as opposed to the examiner and what he is doing.

Matching

The Minnesota Clerical Examination was administered to the two clerical classes, which made up the Experimental and Traditional treatment groups. The examiner then assigned Ss to the two groups by matching on the basis of test scores with a maximum allowable variance of five points difference between Ss within each matched pair.

An alternating schedule was used to assign the highest score to
either the Traditional or Experimental group. This resulted in the
Traditional and Experimental groups having mean raw scores varying by
15 points, while the Control group deviated by less than 10 raw
score points.

The subjects of the Traditional and Experimental groups, along
with their instructors, were told that the pre-test scores were a
little low, and it would be necessary to conduct training sessions
in order to remove this deficiency. The examiner told the subjects
that there are two methods available and a different method would be
used on each group to determine which method is superior.

The Experimental group was subjected to a special training
program designed to increase perceptual form discrimination along
with a short test on number and name checking (see Appendix C) every
second training session. The stimulus was a letter group in all caps
centered on an 8 by 11 inch sheet of typing paper. A Pica-type, Royal
typewriter was used. Three hundred and twenty stimulus items were
used in four training sessions (80 stimuli per session).

The stimuli were presented in pairs; each pair consisted of either
the standard and one of the comparison letter groups (difference trial)
or two standards (match trial). On every trial the letter groups
remained in view for 3 seconds with a 12-second delay between trials.
Therefore, the trials were presented at a rate of four a minute. The
standard always appeared as the left member of the pair.

A white projection screen was set up in the middle of the room
with an opaque projector used to project the stimuli on the screen.
The shades were drawn and the door covered to achieve maximum darkness.
A sample stimulus presentation was used to insure that the subjects could see the stimulus and allow time for dark adaptation.

The examiner presented two columns each containing one row of letters arranged in nonsense form. (See Appendix C.) The subjects viewed the stimulus and judged whether they matched or did not match. The examiner began with three letters in each row, all of which were the same letter in the same capital type face. Randomly, one new letter of the same type was added to each row. It was the subject's task to judge which row had more letters. This step was designed to broaden perceptual span. At this point, a new letter was introduced which replaced one of the six letters of each group. On each trial, the letters were changed and a new letter added until all six letters in both groups were either completely different or exactly the same. Subjects indicated a match or mismatch by using a verbal response. If someone missed an item, it was repeated. In the last training session, closure was achieved by presenting meaningful words as the stimulus item. The examiner used a stopwatch to time trials and the delay between trials.

The training included four sessions of 20 minutes each and included the pre-test and post-test sessions. On the second and fourth sessions, six minutes were used for short testing. The short test was an 80 item name and number checking test (see Appendix D).

The Traditional group was given the same reasons for the importance of pre-testing. The Traditional group was given an exercise sheet (see Appendix D). Each training session was for eight minutes.
After the eight minutes were up, the subjects would score the sheet and then go back through the items making corrections and noting errors. The exercise sheet was composed of numbers and names requiring a judgement of difference or sameness. Each training session was 20 minutes in duration. Therefore, the Traditional training included four sessions of 20 minutes each not including the pre-test and post-test sessions. On the second and fourth sessions six minutes were used for short testing.

In order to measure progress, the Experimental and Traditional groups were tested with a name and number checking test (see Appendix D). These tests were administered on the second and fourth practice sessions. The examiner established the pre-test means for both groups as a base level of deficiency, using the two practice sessions as a measure of progress. The post-test means were used as a measure of overall progress.

The Control group was given the same reasons for pre-testing. The examiner worked with the Control group as a teacher aid for four sessions, 20 minutes each, to control for the Hawthorne effect, and to match each group on the basis of the examiner's presence. In so doing, all three groups were adequately matched. Therefore, the control group would serve as an adequate comparison between the two training methods and no training.
RESULTS

The results of the _t_-test for significant differences between groups on the pre-test means were non-significant (refer to Table 1). These results seemingly indicate that the groups were adequately matched. The results of the _t_-test for significant differences within group means indicated that the Experimental treatment did not result in a significant change, _t_=1.68, df=10, _p_>.05 (refer to Table 2). In comparison, the _t_-test for significant differences within group means for the Traditional group was significant to the .05 level of confidence _t_=2.40, df=10, _p_<.05 (refer to Table 2). This indicates that a statistically significant change occurred between the pre-test and post-test periods.

The _t_-test for significant differences between the Traditional and Experimental groups, using the post-test means, resulted in a non-significant difference _t_=0.03, df=18, _p_>.05 (refer to Table 3). The _t_-test for significant differences between the Experimental and Control groups using post-test means, was not significant, _t_=1.11, df=15, _p_>.05 (refer to Table 3). Likewise, the _t_-test for significant difference between the Traditional and the Control groups, using post-test means was not significant, _t_=.98, df=15, _p_>.05 (refer to Table 3).
<table>
<thead>
<tr>
<th>COMPARISON</th>
<th>MEAN DIFF.</th>
<th>S.E.</th>
<th>df</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental and Traditional</td>
<td>2.10</td>
<td>7.00</td>
<td>18</td>
<td>0.28</td>
</tr>
<tr>
<td>Control and Experimental</td>
<td>9.87</td>
<td>8.88</td>
<td>15</td>
<td>1.23</td>
</tr>
<tr>
<td>Control and Traditional</td>
<td>7.77</td>
<td>14.03</td>
<td>15</td>
<td>0.64</td>
</tr>
</tbody>
</table>
Table 2

PRE AND POST-TEST DIFFERENCES WITHIN GROUPS ON MINN. CLERICAL EXAM

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE</th>
<th>POST</th>
<th>S.E.</th>
<th>df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>104.60</td>
<td>124.80</td>
<td>8.1</td>
<td>10</td>
<td>2.40*</td>
</tr>
<tr>
<td>Experimental</td>
<td>106.70</td>
<td>125.10</td>
<td>10.7</td>
<td>10</td>
<td>1.68</td>
</tr>
<tr>
<td>Control</td>
<td>96.82</td>
<td>112.71</td>
<td>17.5</td>
<td>7</td>
<td>.85</td>
</tr>
</tbody>
</table>

*Significant at the .05 level of confidence.
Table 3

POST-TEST DIFFERENCES AND MEAN DIFFERENCES BETWEEN GROUPS ON MINN. CLERICAL EXAM

<table>
<thead>
<tr>
<th>GROUP</th>
<th>POST</th>
<th>POST</th>
<th>MEAN DIFF.</th>
<th>S.E.</th>
<th>df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trad. &amp; Exp.</td>
<td>124.80</td>
<td>125.10</td>
<td>.30</td>
<td>8.33</td>
<td>18</td>
<td>.03</td>
</tr>
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<td></td>
<td>traditional</td>
<td>experimental</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exp. &amp; Con.</td>
<td>125.10</td>
<td>112.71</td>
<td>12.38</td>
<td>11.70</td>
<td>15</td>
<td>1.11</td>
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<tr>
<td></td>
<td>experimental</td>
<td>control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Con. &amp; Tra.</td>
<td>112.71</td>
<td>124.80</td>
<td>12.08</td>
<td>12.23</td>
<td>15</td>
<td>.98</td>
</tr>
<tr>
<td></td>
<td>control</td>
<td>traditional</td>
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</table>
DISCUSSION

The $t$ values between groups on the pre-test means were non-significant (refer to Table 1). This lack of significance indicated an adequate degree of matching which was deemed more appropriate than randomized assignment of subjects to the treatment groups, because of the small number of available subjects.

In the pre-test and post-test comparison within groups, the Traditional training resulted in a statistically significant difference at the 5% level of confidence. The same comparison with the Experimental and Control groups did not result in a significant difference. Taken together, these results indicated that the Traditional treatment was probably superior to both the Experimental treatment, and to no training at all (Control group). The $t$ values between groups on the post-test means were non-significant (refer to Table 3). This result does not support the possible superiority of the Traditional treatment over the Experimental treatment, or no training at all.

On the second and fourth practice sessions the Traditional and Experimental groups were tested with a short name and number checking test (see Appendix D). These short name and number checking test sessions were used to measure progress. The obtained means from these practice tests for both groups were lower than the pre-test means indicating no progress.
The post test means were used as a measure of overall progress. The post-test means were higher than the pre-test means (see Table 1), indicating a performance increase. These results seemingly indicate that both groups fail to demonstrate a performance increase during the practice testing sessions. These same results do indicate that both groups experienced a performance increase in the post-testing situation.

The three groups experienced a performance increase of at least 14.3 percent thereby substantiating the position that prior exposure improves perceptual abilities. Furthermore, the control group which did not receive any formalized perceptual training, but was prior exposed since the same test was used in the pre-test and post-test situation, experienced a marked increase in performance. This performance increase was comparable to the increased performance of the Traditional and Experimental groups. The findings of Gibson and Walk (1965) provide an explanation of why the Control group experienced an increase in performance. In their study they concluded that prior exposure does facilitate form discrimination.

The studies of Kerpelman (1965), Gibson and Walk, and Pick and Tghe (1958) support the same general conclusion. Most of the reviewed literature supports the hypothesis that prior exposure to visual forms facilitates discrimination between forms. The degree of facilitation will depend in part to the extent to which the subject attends to the forms during pre-exposure.

In conclusion, form perception seems to be improved by general practice and/or prior exposure when it involves stimuli that is
identical to the critical task. Motivation, repetition, and duration of the stimuli seem to affect form perception. In any event, the critical variables involved in form perception and their effect remain in question.

There were four factors that may have influenced the results of the entire study. First, it would have been better to use an equivalent form of the testing instrument for the post-testing situation, thereby minimizing the practice effect. Assuming that the testing instrument really measures form perceptual abilities that change as a result of training, thus the post-testing would probably be a truer measure of an actual change in performance, thereby possibly reducing unwanted contamination. Secondly, the sample size was too small, thereby placing constraints upon the reliability and validity of the study. Thirdly, the Traditional group had more actual practice experience than the Experimental group because of the time delays between presentation of the stimulus.

The Control group was matched with the Traditional and Experimental groups on educational level, age, and pre-test performance, but was not matched in clerical training. The Control group was comprised of females receiving machinist training, because of the availability of subjects. It would have been advisable to have all three groups more adequately matched.

It is quite possible that the Experimental group did not experience a significantly superior increase over the Traditional group for the following reasons:
A. The Traditional group had more practice because of the time delays between presentations of the stimulus to the Experimental group. The Traditional group had an advantage in total practice time over the Experimental group.

B. The amount of information transmitted through the channel\(^1\) is based upon the amount of information the organism can process (channel capacity) and the way this process is modified by the organism. In this study, perhaps the task was too simple and well within the channel capacity of the subjects; which therefore allowed mastery of the criterion task within a few trials, which possibly obliterated any initial difference between subjects within a few trials, because the task was too easy.

Anyone of these stated conditions could have affected the performance of the Experimental group relative to the Traditional group. The above remarks are offered as possible suggestions as to why the Experimental method did not prove to be superior to the Traditional group.

If a similar study were to be done, the examiner would suggest increasing the sample size along with randomization as a preliminary step. Secondly, the time delays between stimulus presentations should be taken into consideration, to insure the equating of actual practice time for both groups.

\(^1\)Mode of receiving information; i.e., eyes, ears, touch, smell.
In terms of future work needed in the area of form perception, the examiner has the following suggestions: A number of exploratory empirical observations should be made of subjects in an unmanipulated environment; an environment that involves a variety of tasks that require form perception. Emphasis in an unmanipulated environment may possibly lead to a new definition of form perception, along with a description of the pertinent variable involved. Secondly, extensive work with very young subjects (at birth) in a longitudinal study, noting the perceptual patterns at developing age levels, could be of considerable benefit. Studies of a longitudinal nature would possibly describe the developing process of form perception. This would allow an examination of the process for the purpose of discovering perceptual principles. And, lastly, the manipulation of form perceptual stimuli in exploratory research, noting the adaptive behavior of the subject.
SUMMARY

The primary purpose of this study was to investigate the possibility of finding differences in learning between an Experimental and Traditional method of teaching form perception. The Experimental method was based on prominent assumptions exposed by Gibson (1966), Kohler (1962), and Hanawalt (1942), on form perceptions; while the Traditional method was characterized by repetition of the critical task involved.

Forty female subjects were pre-tested with the Minnesota Clerical Examination and divided into Experimental, Traditional and Control groups on a matched basis. The Minnesota Clerical Examination was administered in the Pre-test, Post-test situation, and the t-test to measure significant differences was used to analyze the results. The t-test for within group means (pre-test and post-test means) was significant at the .05 level of confidence for the Traditional group, but was non-significant for the Experimental group. The t-test of significant differences between the Traditional and Experimental groups, using the Post-test means was non-significant at the .05 level. Thus, neither the Traditional or the Experimental group clearly indicated a superiority over the other.

In the final analysis the Control, Traditional and Experimental groups experienced a raw score increase, demonstrating that the general practice or prior exposure seems to improve form perception. The Minnesota Clerical Examination was used in the Pre-test and the Post-test situation. Each group experienced a statistically significant
raw score increase thereby substantiating the position that prior exposure and/or practice seems to improve form perception.
REFERENCES


Cited:


Cited:


Introduction. This subchapter deals with Human Resources Development (HRD) methods, techniques, tools, and procedures which are applicable to the disadvantaged in Employment Service operations.

In addition to the information contained in this subchapter, the procedures, tools, and techniques related to the handicapped, in minority groups, youth, older workers, women, and veterans also apply to serving the disadvantaged where and when applicable.

Definition. A disadvantaged person, for manpower program purposes, is a poor person who does not have suitable employment and who is either (1) a school dropout, (2) a member of a minority, (3) under 22 years, (4) 45 years of age or over, or (5) handicapped.

The test to determine if an individual is disadvantaged is:

--member of a poor family, AND
--unemployed, underemployed, or hindered from seeking work, AND
--has one or more of the following characteristics:
  - school dropout
  - minority member
  - under 22 years of age
  - 45 years of age or over
  - handicapped

The five basic combinations of the definition are:

- Poor school dropout without suitable employment
- Poor minority member without suitable employment
- Poor youth without suitable employment
- Poor older worker without suitable employment
- Poor handicapped worker without suitable employment

Clearly, any one individual might meet several of the tests at once; e.g., the poor unemployed, Negro handicapped, teen-age dropout.
Meaning of Terms in Definition.

A. Member of Poor Family.

A person is deemed "poor" for the purposes of the definition of disadvantaged if a member of a family:

1. Which receives cash welfare payments, OR

2. Whose annual net income in relation to family size and location does not exceed the following criteria.

DEPARTMENT OF LABOR
MICHIGAN EMPLOYMENT SECURITY COMMISSION
7310 Woodward Avenue
Detroit, Michigan 48202

December 1, 1969

TO: STATE OFFICE ADMINISTRATIVE STAFF, DISTRICT SUPERVISORS, AND BRANCH OFFICE MANAGERS

FROM: WILLIAM R. FORD, DIRECTOR

SUBJECT: REVISED INCOME POVERTY GUIDELINES

The income poverty guidelines used to determine program eligibility for all OEO funded manpower programs have recently been revised. These same income thresholds are used to determine "poor" in the definition of the term "Disadvantaged Individual."

The revised poverty guidelines, by family size and location are:
<table>
<thead>
<tr>
<th>Family Size</th>
<th>Non-Farm</th>
<th>Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1,800</td>
<td>$1,500</td>
</tr>
<tr>
<td>2</td>
<td>2,400</td>
<td>2,000</td>
</tr>
<tr>
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<tr>
<td>4</td>
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<td>3,000</td>
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<tr>
<td>5</td>
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<tr>
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<td>4,000</td>
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<tr>
<td>7</td>
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<tr>
<td>8</td>
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<tr>
<td>10</td>
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<td>6,000</td>
</tr>
<tr>
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<tr>
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<td>7,000</td>
</tr>
<tr>
<td>13</td>
<td>9,000</td>
<td>7,500</td>
</tr>
</tbody>
</table>

For families with more than 13 members, add $600 for each additional member in a nonfarm family and $500 for each additional member in a farm family.

These new guidelines are effective immediately. Those sections of all operating procedure containing the above chart are being revised.

Destroy all existing copies of Form 8220 (Guide for Identifying Disadvantaged Applicants). An initial distribution is being made of this revised form. The State Office Stockroom has additional copies.
Persons registering through a component of any manpower program will be deemed to be engaged in job seeking activity, even though the application may be for training, etc., rather than an immediate job.

NOTE: Workers in farm families with less than $1,000 annual net family income shall be considered unemployed.

2. Underemployed. Underemployed individuals are those working their skill capacity, or those who are, or have received notice that they will be working less than full time in their industries or occupations, or those who have received notice they will be unemployed because their skills are becoming obsolete. Underemployed also includes individuals working at part-time jobs who desire full-time work and individuals who involuntarily worked less than a full year during the preceding 12 months. Persons working essentially full-time in occupations which pay less than poverty level income may be considered to be working at less than their skill capacity if they are deemed capable, on the basis of mental and/or physical attributes.

3. Persons Hindered from Seeking Work. This category recognizes that there are some people who are not seeking work but who would enter the labor force if given appropriate assistance in overcoming barriers to employment. Whether or not persons should be considered potential labor force participants depends in part on their attitudes toward labor force participation and in part on whether or not overcoming the hindrance from which they suffer is a part of current manpower policy.

Examples of persons who would fall into this category are those who would be looking for a job or working if they thought jobs, transportation, or child care facilities were available. Also included in this category would be persons, not otherwise handicapped, who do not seek employment because of their attitudes or motivational problems. Not included in this category would be persons who do not require employment assistance because they are over the retirement age, are too severely handicapped, or are fully-occupied homemakers.
B. Characteristics of Individuals.

An individual must be either a school dropout, a member of a minority, under 21 years of age, 21 years of age or over, or handicapped to be classified as disadvantaged.

1. School dropout is a person who was not graduated from high school. In nearly all high schools, graduates have completed 12 years of school.

However, before World War II a few Southern schools graduated students.

e. It is not expected that sponsors or branch offices will conduct investigations as to the validity of income reported by potential enrollees or PHD applicants. Family income shall be obtained by requiring that the enrollee indicate size of the family, amount of family income, its source and the occupation(s) of the income producing member(s) of the family. Data on income of the family should appear reasonably reliable.

As a minimum, branch offices and sponsors should require that a written statement be completed that would certify that the data provided by the interviewee are accurate to the best of his or her knowledge. If the interviewee is a youth, a counter-signature by the head of the household should be required.

f. If at any time, it is discovered that an enrollee was incorrectly determined to be eligible, the enrollment of that person must be discontinued immediately.

g. A person will not be considered "poor" if his lack of income results from his refusal, without good cause, to seek or accept employment commensurate with his health, age, education and ability. Commonly accepted standards of the Unemployment Insurance Service may serve as guidelines.

B. Persons Who Do Not Have Suitable Employment.

People who do not have suitable employment are the under or unemployed, and persons hindered from seeking work.
1. Unemployed persons are those civilians (no age limit) who have no employment and are available for work, and

a. Had engaged in any specific job-seeking activity within the past four weeks. Principal activities include:

Registering at a public or private employment office; meeting with prospective employers; checking with friends or relatives; writing letters of application; or being on a union or professional register.

b. Were waiting to be called back to a job from which they had been laid off, or

c. Were waiting to report to a new wage or salary job scheduled to start within the following 30 days.

Note: Persons referred to in b and c above would not normally be considered "without suitable employment," depending upon the job and the conditions of return.

(h) Mustering out pay.

(i) Fixed-term Veterans (and survivors) educational benefit payments.

(j) Soil bank payments.

(k) Agricultural crop stabilization payments.

NOTE: As used in the above examples, "Fixed-Term" is interpreted to mean 36 consecutive months or less in duration.

PART II EMPLOYMENT SERVICE (BRANCH OFFICE) 7552(4)
7300-7999 SERVICE TO SPECIAL APPLICANT GROUPS 7-1-69

7552 MEANING OF TERMS IN DEFINITION (CONTINUED).

c. Farm or non-farm family income will be determined by location of residence as determined by the 1960 Census definition. Farm is the location category of individuals living in rural territory (outside the corporate limits of a city of 2,500 or more, or outside of an urbanized area contiguous to such a city) on places of 10 or more acres from which annual sales of farm products amounted to $50 or more or on
places of less than 10 acres from which annual sales of farm products amounted to $250 or more. Generally, the acreage/sales criteria will be satisfied by determining if the individual considers his residence to be an operating farm being worked by him or by members of his family.

d. Family income may be determined by either one of the two methods outlined below.

(1) The income may be determined by adding up the income from the various sources during the 12-month period preceding the date of the interview when a person is considered for classification as a disadvantaged individual. In instances where the head of the family has been unemployed for a period in excess of 15 weeks prior to the date of the individual's application, any income from wages earned by the family head prior to unemployment should not be counted to determine the family income. If, however, the unemployment is the result of a seasonal occupation and the family head intends to return to work in the occupation when the employment season begins, the income of the family may be determined in accordance with the family income of the preceding calendar year in which the person applies for enrollment.

(2) The income may be determined by annualizing, at the time an individual is considered for enrollment, the income of all family members for the immediately preceding three months.
APPENDIX B

VERBAL INSTRUCTIONS GIVEN TO THE TWO TREATMENT GROUPS AND THE CONTROL GROUP
General Instructions Given to Subjects Before Testing

The Minnesota Clerical Examination measures a perceptual ability used by clerical and other workers in the performance of their job. This perceptual ability allows the worker to perform his various tasks quickly and accurately. Therefore the skill center would like to administer the Minnesota Clerical Examination and offer perceptual training to persons that are deficient in this perceptual ability.

After pre-testing, the subjects were divided into groups and given the following instructions.

Verbal Instructions Given to the Experimental Group

1. In attempting to make a same or difference discrimination between flat forms (letters), it is necessary to look for the similarity between forms. In perceptual psychology, this similarity between forms is called the invariance. If two flat forms are completely invariant, they are the same. Therefore do not read, look for the invariance in form between the groups of letters.

2. Secondly look at the outside configuration of the letters and the letter grouping, not the inner detail. It is not necessary to notice each little curl or swirl on each letter. If it looks like a T on first glance, assume the letter is a T and move on to the next letter.

3. Lengthen your perceptual span by looking at groups of two letters at first and then increasing to four or six.

4. Use systematic scanning between two letter groups, by taking two letters in the first group and checking them with two letters in the second group. Continue this activity until you make a same or difference discrimination.
Traditional Group

This training procedure is based upon repetition and practice.

After you do the practice sheets each day, we will go back over them, noting errors. At the end of each session, I will attempt to answer any and all questions.
Control Group

Everyone here passed the test with flying colors. At a later date I would like to re-administer the examination in order to get a true picture of your ability.
APPENDIX C

SAMPLE SETS OF STIMULI USED IN TRAINING SUBJECTS
| 39800214620 | 39800214602 |
| 3148931 | 3149381 |
| 81202 | 81202 |
| 63210597 | 52310597 |
| 843262 | 843262 |
| 16344634 | 46344634 |
| 89191181 | 98191181 |
| 764398 | 746398 |
| 674321 | 674312 |
| 84627143 | 84627143 |
| 43 | 43 |
| 4612 | 4612 |
| 3729410 | 3279410 |
| 114937 | 114937 |
| 622 | 226 |
| 71186 | 71186 |
| 4321 | 1234 |
| 80 | 80 |
| 37427 | 34727 |
| 611 | 611 |
| 97322 | 93722 |
| 896473842 | 89748342 |
| 71404 | 74104 |
| 82 | 82 |
| 822 | 822 |
| 91414 | 91414 |
| 678943 | 678943 |
| 126427 | 124637 |
| 111 | 110 |
| 73482 | 73842 |
| 694760010 | 697460100 |
| 1557892341 | 1557892341 |
| 92176589360 | 92176589360 |
| 1657234 | 16547234 |
| 489326 | 498236 |
| 37465 | 27564 |
| 9100760 | 9010760 |
| 5742 | 5472 |
| 55567341 | 55576431 |
| 9643250 | 96432540 |
| 154230 | 152430 |
| 677 | 677 |
| 376598 | 367589 |
| 83425 | 84325 |
| 39800214620 | 39800214602 |
| 3148931 | 3149381 |
| 81202 | 81202 |
| 63210597 | 62310597 |
| 843262 | 843262 |
| 4634634 | 4634634 |
| 89191181 | 89191181 |
| 744398 | 746398 |
| 674321 | 674312 |
| 84627143 | 84627143 |
| 43 | 43 |
| 4612 | 4612 |
| 3729410 | 3279410 |
| 114937 | 114937 |
| 622 | 226 |
| 71186 | 71186 |
| 1321 | 1234 |
| 80 | 80 |
| 37427 | 34727 |
| 611 | 611 |
| 973222 | 93722 |
| 89473842 | 89674842 |
| 71404 | 74104 |
| 82 | 82 |
| 822 | 822 |
| 91414 | 91414 |
| 678943 | 678943 |
| 125427 | 124637 |
| 111 | 110 |
| 73432 | 73842 |
| 694760010 | 697460100 |
| 1557892341 | 1557892314 |
| 55567342 | 5576431 |
| 96432540 | 96432540 |
| 154230 | 152430 |
| 677 | 677 |
| 376598 | 367589 |
Stanley Dubouski - Stanley Dubouski
Irene Beaird - Irene Beard
Himel Himelhoch - Himel Himelnoch
I. G. Rodriguez - I. G. Rodriques
A. M. Souoretti - A. M. Souoretti

Emily Letcher - Emily Letcher
Carl B. Rauch - Carl B. Rauch
Quick Loan Co. - Quick Loan Corp.
I. D. Wallerman - I. D. Wolerman
Effie Young - Effie Younge

O. R. Alexander - O. A. Alexander
Francis Hiller - Frances Hiller
Jonathan Kraemer - Jonathan Kraemer
Child Oil Co. - Child Oil Co.
Lon F. Elliott - Lon F. Eliot

Diana Galvin - Diana Galvin
W. J. Hunt - W. J. Hunt
Robt. G. Mann - Robert G. Manne
D. C. McNutt - D. C. McNutt
Wm. A. Lloyd - W. A. Lloyd

W. E. Schloss - W. E. Schloss
Chas. F. Wagner - Chas. F. Wagoner
John Alday - John Aldey
Blanche Barq - Blanch Barg
Simon Bickel - Simon Bickel

Rev. C. B. Coots - Rev. C. B. Coors
Davie Cleaners - Davies Cleaners
Ruby Lang - Ruby Lang
D. A. Nickols - D. A. Nochols
Mrs. Jane Norris - Mrs. Jane Norris

Arthur Pape - Arthur Papas
Nina Poynter - Nina Poynter
B. H. Rowe - B. H. Rowe
A. J. Sebastiani - A. J. Sebastiani
L. F. Springmeier - L. F. Springmier

Lawrence Herrman, Jr. - Lawrence Herrmann, Jr.
J. Hodge Marquardt - J. Hodge Marquardt
Johanna Tobergte - Johanna Tobergte
Vaughnitza Zakem - Vaughnita Zaken
Fallis Kolkmeier - Fallis Kolkmeier
May Doubleday - May Doubledee
Edna Hardacre - Edna Hardacker
Elijah Haraszthy - Uaraszthy Elijah
Pete Nathanson - Peter Nathansen
Dorthea Sautter - Dorthea Sautter

Market Basket - Market Basket Inc.
Wm. E. Hillmer - Wm. E. Hillmer
E. J. Ossenbeck - H. J. Ossenbeck
Thomas Peckham - Thomas Peckman
Fred Mayer - Fred Mayor

Giacinto Orasatti - Giacinto Orsatti
R. Orschanski - R. O. Orschanski
P. R. Shaheen - P. R. Shahien
Robert Sheridan - Robert Sheridan
Albert R. Alpern - Albert R. Alperin

Edith Orwig - Ethel Orwig
J. J. O'Ryan - J. J. O'Ryan
J. K. Brodegsard - J. K. Brodeguard
A. Christopherson - Christopherson A.
Birdie Osborn - Birdie Osborn

M. B. Ostoich - M. B. Ostoich
Andrew Morauek - Andrew Morauec
Nathan Linden - Nathan Linden
G. M. Lindimore - G. M. Lindimore
O. B. Oechsli - A. B. Oechsle

Francis Karef - Francis Kareff
Dudley Zubiate - Dudley Zubiette
H. J. Lindatum - H. J. Lindstrum
Geo. E. Burne - Geo. E. Burn
June Siebrecht - June Siebrandt

B. H. Sidebottom - B. H. Sidebottom
F. R. Frazier - F. R. Frazier
Ralph Gaier - Ralph Gaeir
Grove H. Moor - Grove N. More
Samuel Ruiz - Samuel Riuiz

Issak Iinicki - Issak Iinicki
D. B. Douglas - D. P. Douglass
Louie Hartunian - Louie Hartunian
S. A. Gautereaux - S. A. Gauteresuz
Cecelia Pritkin - Cecelia Pritkin