

A PERCEPTUAL STYLE CORRELATE
OF LIPREADING ABILITY

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There is long standing controversy over whether a good lipreader relies on analysis (Bruhn, 1929) or synthesis (Nitchie, 1912) of the stimulus complex as a basis for his superior performance. Kitchen (1968), Kitson (1915), and Simmons (1959) have demonstrated empirical relations between synthetic abilities and lipreading performance. Logic suggests, however, that before an individual can synthesize (construct a whole from its parts) in the lipreading situation, he must first identify and extract the relevant parts, i.e., analyze the stimuli.

There would appear to be a relative absence of reported studies which investigate directly the relation between perceptual analysis and lipreading ability. There have been studies however, which demonstrate empirical relations between lipreading ability and variables which presuppose perceptual analysis of the stimuli. O'Neill and Davidson (1956) found a significant relationship between performance on a filmed lipreading test and performance on a task requiring subjects to sort twenty-two blocks of five different colors and four different shapes into four categories. The specific tests employed were a film developed for lipreading training by Mason and the Hanfmann-Kasanin Test. In addition, Fielder (1957), employing deaf subjects, showed lipreading performance to be significantly related to performance on the Marbleboard Test, where the task was to copy designs made with colored marbles. Fielder rated her subjects on lipreading performance in terms of school achievement in an oral school for the deaf. Finally, Simmons (1959) employing hard-of-hearing subjects, found a significant relation between performance on the Block Design subtest of the Wechsler-Bellevue Adult Intelligence Scale and lipreading performance as measured by both the Utley filmed lipreading test and an interview.

One factor reported as antecedent to the successful reproduction of designs is the ability to "break up the reference" (Goodenough and Karp, 1961). Briefly, it is suggested that the subject must be able to analyze the field, to consider each part independently and out of the total context. Hence, it might be argued that perceptual analysis of the

stimulus complex is a necessary precondition for the successful completion of each of the tests presented above: Hanfmann-Kasanin, Marbleboard, and Block Design.

Purpose

The purpose of the present study was to investigate a perceptual style variable (field independence) which is presumed to be related to lipreading ability. It was hypothesized that performance on a filmed lipreading test would be linearly related as an ascending function to performance on a field independence measure.

Field Independence

The theory of field independence has grown from a body of research started in 1940 under the direction of Witkin (1954). The original purpose of the program was to determine the factors responsible for an individual's maintenance of a proper orientation toward the upright position in space. Witkin's early research considered whether maintenance of the upright position was due to the individual's reference to the visual framework in the environment, to his body position, or to both the visual framework and body position.

Normative data gathered from the standardizations of the early tests, i.e., the Rod and Frame Test and the Tilting Room and Tilting Chair Test, indicate that subjects vary widely in their ability to adjust a focal object (a rod, a room, or the subject's own body) to an upright position when the object is surrounded by a perceptual field which conflicts with the requirements of the task either visually or kinesthetically. Moreover, subjects who are able to successfully bring one of the central objects to an upright position are also more likely to bring the other two objects to an upright position (Witkin, 1948). Witkin hypothesized that the consistent individual differences among subjects across the tests are due to differences in the subjects' abilities to perceive the central or focal object independent of the surrounding field which he suggested presented an embedding context. This hypothesis was examined with the Embedded Figures Test (EFT) (Witkin, 1950).

The EFT requires that the subject locate simple geometrical figures which are hidden in more complex designs. Normative data obtained from the EFT standardization shows that the subjects who are able to identify the simple figures are predominately those subjects who are able to bring objects to an upright position. On the basis of these data, Witkin

identifies subjects as being relatively field dependent or field independent if they score on the extremes of these measures. Witkin suggests that the more field independent subjects use internal cues which enable them to react to the focal objects as items distinct from the background, i.e., they are able to separate the object from its field. The more field dependent subjects however, are said to be influenced by irrelevant cues from the surrounding field when reacting to the focal objects. In summary, Witkin asserts that the field dependent subjects perceive the field as a whole and do not break it down or analyze its separate parts.

METHOD

Instruments

The 16 mm film of the Utley lipreading test, How Well Can You Read Lips?, (Form A) was the measure of lipreading ability. The instrument consists of three parts. Part I is a sentence test containing 31 sentences and common expressions. Part II is a word test of 36 words drawn from 1000 frequently used words. Part III consists of six short stories with five questions following each story. Previous studies have shown that the Utley test discriminates levels of lipreading performance within groups of normal hearing subjects (Utley, 1946; DiCarlo and Kataja, 1951). The test is scored by giving one point for each correct word in Part I and one point for each correct answer in Parts II and III. Homophenous words are accepted as correct only in Part II. The maximum score is 191.

The perceptual style measure chosen for the present study was an embedded figures test with a multiple-choice format which allows the test to be administered to a group of subjects. The validity of using a group embedded figures test to measure visual analysis of the perceptual field has been confirmed by Jackson, Messick, and Myers (1964).

Parts I and II of the Hidden Figures Test (HFT) were employed in this study. Each form of the HFT consists of sixteen achromatic complex designs and five simple figures. The format is multiple-choice with the five simple figures appearing at the top of each page. The subject is required to indicate which simple figure is contained in each complex design. Each form of the HFT is scored by giving one point for each correct identification within a ten minute time limit. The scores are then corrected for guessing by subtracting a fraction of the number wrong. In the present study, Form I of the HFT was employed as a warm-up activity.

Goldstein and Chance (1965) and Jackson, Messick, and Myers (1964) have all suggested that a warm-up effect is characteristic of performance on embedded figures tests. The scores on Form II were used as the criterion values for this test.

Subjects

Twenty male volunteers enrolled in an undergraduate psychology course served as subjects. All subjects possessed normal hearing and normal visual acuity. The average age of the subjects was 19.75 years. The age range was from 17.9 years to 26.1 years. The subjects were screened for hearing at 20 dB ISO at all octaves from 250 Hz through 2000 Hz and at the half octave of 3000 Hz. Screening was done in a quiet classroom. A Snellen Chart score of 20-20 was required for visual acuity clearance. The subjects' affirmations that they had received no prior lipreading instruction or experience with either the Utley test or an embedded figures test were also required.

Procedure

All qualified subjects were tested in groups of six or less. All testing was done in one session for each group. Subjects sat within a rectangular area facing a screen. The leading edge of the rectangle was three feet from the screen and the back edge was nine feet from the screen. The length of the rectangle was six feet. The Utley film was administered first to all groups, followed by Part I and then Part II of the HFT. Since both tests contain complete instructions for administration, it was only necessary to instruct subjects to read them carefully.

RESULTS AND DISCUSSION

Pearson Product Moment correlation coefficients were calculated between performance on the Utley test and performance on the HFT to evaluate the proposed hypothesis. The correlations between the two measures are presented in Table 1.

Inspection of Table 1 indicates that the most general variables, i.e., performance on the total lipreading test and on Part II of the HFT were significantly related. In addition, performance on Part II of the Utley test was significantly related to performance on Part II of the HFT. Performance on Parts I and III of the Utley test were not significantly related to performance on Part II of the HFT.

TABLE 1
CORRELATIONS BETWEEN PERFORMANCE ON THE UTLEY
LIPREADING TEST AND PERFORMANCE ON THE HIDDEN FIGURES TEST

Part II HFT	
Total Utley Test	.47*
Part I	.43
Part II	.54*
Part III	.09

*significant at or beyond the 0.05 level of confidence

The theory of field independence suggests that only the most field independent of subjects are able to easily identify focal objects presented in an embedding context. Therefore it follows that a measure of field independence should correlate with tasks presupposing analytic ability. In this study the HFT would be expected to correlate with sections of the Utley test which primarily require subject reliance on analysis of the stimulus complex.

In Part II of the Utley test the subject views isolated words which he is required to identify. Moreover, in Part I of the Utley test the subject views a complete sentence - where the identity of one or more words may be suggested by another word in the sentence. Finally, in Part III of the Utley test the subject views related sentences presented in appropriate background settings which present additional visual cues. Since the subject views the fewest associated cues in Part II of the Utley test, it could be assumed that this section is the most analytic part of the Utley test. Assuming that additional visual cues may serve to mask analysis of the stimulus complex, Part I and Part III of the Utley test would be expected to follow Part II in strength of relationship with the HFT.

The theoretical considerations discussed above are consistent with the empirical data of the present study. The HFT correlated most strongly with Part II of the Utley test.

The correlations of Part I and Part III of the Utley test showed decreasing relationships with the HFT in the predicted direction.

As previously mentioned, the studies of Kitchen (1968), Kitson (1915), and Simmons (1959) all suggest that some amount of perceptual synthesis is needed for the development of good lipreading ability. The results of the present study however, have shown that analytic ability is an important variable related to achievement on the Utley lipreading test. To the extent that the Utley test is a valid measure of everyday lipreading ability, the results of the present study indicate that visual analysis of the stimulus complex is probably a precondition for lipreading.

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