

The Role of Cognitive Styles in Anagram Solution

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Abstract: The present experiment studied the difference between field independents/field dependents on problem solving task among 160 school students selected on the basis of their scores on embedded figure test. A 2x2 experimental design for anagrams problem solving task was adopted. The findings support the hypothesis that field-independents are better problem solvers than field dependents.

Key Words: Cognitive Styles; Field-dependence-independence; Anagrams.

1. Introduction

Field-dependence-independence is one of the most popular and fertile constructs which has generated numerous studies. The heuristic value of field dependence-independence is evident from the fact that it has been explored in such diverse domains as learning (Davis and Frank, 1979), problem solving (Neimark, 1976), memory (Coward and Lange, 1979), career choice (Goodenough et al. 1979) and driving behaviour (Clemant and Jonah, 1984).

Originally field dependence-independence was defined "in terms of degree of dependence on the structure of the prevailing visual field, ranging from great dependence, at one extreme, to great ability to deal with the presented field analytically or to separate an item from the configuration in which it occurs, at the other (Witkin et al. 1954). Subsequently to accommodate evidence that field independence was associated with proficiency in problem solving (Witkin, et al. 1962), the construct was regarded as a "Cognitive style."

Frank and Noble (1985) investigated the hypothesis that field-independent individuals are more efficient in their use of cognitive restructuring skills than are field-dependent individuals. Consistent with the finding, field dependent students perceived the anagram task as being significantly more difficult than did field-independent students.

Alan (1986) investigated the interactive effects of situational task demands and interpersonal group environment and hypothesized that field dependent subjects would perform task more efficiently than would field-independent subjects when the task environment provided the structure. But contradictory to the hypothesis the field-independent had the fastest completion times than field-dependent subjects. Davis (1987) found that field-independent subjects were significantly associated with correct solution of word anagrams but not with nonsense anagrams. Nonsense anagrams were easier to solve than word anagrams. Howard, Watson and Allen (1993) found

significant differences between field-independent and dependents in solving logo programming problems in all-4 quadrates, from each of the 4-sides perspectives. Both groups had trouble taking on opposite perspective in solving problems with a top-down solution.

The scientific literature is replete with cognitive styles and simple word anagrams - which leads to functional fixity. To circumvent these, anagrams with shifts would be used to test the ingenuity and restructuring calibre of field of dependent and independents. The present study has been designed on these lines.

2. METHOD

2.1 Design

A 2x2 factorial design with 2 groups of each variable i.e. cognitive styles, field-dependents/field-independents and males and females were used in this study to see how they differ in solving anagrams problem. Embedded Figure Test (EFT, Witkin, Oltman, Raskin and Karp, 1971) for cognitive styles and problem solving task consisting of jumbled up words (Dominowski, 1966) were used.

2.2 Sample

500 students studying in 8th and 9th grades in Shimla and Mandi districts schools (H.P.) were selected for the present study and were administered EFT individually. 160 subjects scoring above and below $\bar{x} \pm \frac{1}{2}$ SD were selected on the basis of their scores on EFT as field-dependents and field independents respectively and were administered the anagram solving task and in the light of their performance the results were computed.

2.3 TOOLS

(1) **Embedded Figure Test:** (EFT, Witkin et al., 1971). The test consists of two forms i.e. A and B. In the present study, form A of EFT was used because adequate reliability and validity can be maintained with a 12 figure test (Witkin et al., 1962). Thus, the test used in this investigation had 12 trials, and 3 minutes time limit format.

(2) **Anagrams Problem Solving Task:** (Dominowski, 1966). Anagrams have been used to test the ability of the subjects. 30 anagrams with single, double and triple shifts were used.

3. RESULTS

3.1 Interpretation and General Discussion

The salient features of the present results are that the F-ratio on the variable of cognitive styles is significant, $F = 66.54^{**}$, $p < 0.01$. The mean for field independent (12.78) clearly indicates that field independents are better than field dependents (8.98). The F-ratio for the variable of sex is .933 which is insignificant. No interaction was reportedly significant.

The present results are in accordance with the general trend of results reported in earlier researches that field-independents perform better in solving anagrams (Ronning, McCurdy and Ballinger, 1984; Niaz 1989 and Rozencwajg 1991), more independent the subjects, more they use synthetic strategy to solve their problems. Their verbalizations are closely connected with their behaviour. Antonietti and Gioletta (1995) contented that field independent subjects were more likely to be analogical solvers than were field-dependents and the results suggested that cognitive styles rather than abilities were involved.

The better performance of field independents can be due to their level of intellectual functioning because they separate the objects from the field and consequently can be more "analytic" and articulate about their experiences (Zhang and Sternberg, 2006). In contrast the field-dependent person who is intellectually "global" and "subjective" in his approach lacks articulation and is not able to separate the object from the field thereby performs poorly in the task (Wang, Wang and Ren, 2003) as field dependents get easily misled by external cues in the perceptual field and extends beyond the perceptual area.

In the typical concept-attainment problem, stimulus composed of a number of attributes is used. It has been suggested that problem of this sort may require perceptual analysis of the stimulus complex into its attribute component, a requirement that is more easily met by field-independents than field-dependent subjects (Dickstein, 1968 and Ates and Erdat, 2007).

In this view, field-dependent subjects are dominated by the salient (most noticeable) attribute of the stimulus, which may achieve a figural quality against the ground provided by other aspects of the stimulus configuration. The field-independent is able to restructure the field as required by the task rather than field-

dependents. Thus, that is the reason behind the better performance of field-independents in anagram problem-solving. They easily find the solution of jumbled up words and give right responses frequently (Malhotra, 2000).

In the course curriculum, the attributes of the problem need to be emphasized so that analysis of the pupils could be modified especially those who in spite of their intelligence make slower progress to obtain solutions to moderately difficult and complex tasks (Makkar, 2006 and Deyoung et al. 2008).

From the very beginning i.e. right from kindergarten the pupils need to be taught open mindedness to look at situations from different angles which would not only inculcate creativity but also field independence. All this helps in acquiring cognition styles which are proficient in decision-making (Malhotra, 1999).

REFERENCES

- Alan, R.D. (1986). Problem solving in triads composed of varying numbers of field-dependent and field-independent subjects. *Journal of Personality and Social Psychology*, 51, 749-53.
- Antonietti, A. and Gioletta, M.A. (1995). Individual differences in analogical problem solving. *Personality and Individual Differences*, 8, 611-19.
- Ates, S. and Erdat, C. (2007). The effects of students' cognitive styles on conceptual understandings and problem solving skills in introductory mechanics. *Research in Science and Technological Education*, 25(2), 167-78.
- Clemant, R. and Jonah, B.A. (1984). Field-dependence, sensation seeking and driving behaviour. *Personality and Individual Differences*, 5, 87-93.
- Coward, R.T. and Lange G. (1979). Recall and Recall organization behaviour of field-dependent and field-independent children. *Psychological Reports*, 44, 191-97.
- Davis, J.K. and Frank, B.M. (1979). Learning and memory of field-independent-dependent individuals. *Journal of Research in Personality*, 13(4), 469-79.
- Davis, M.P. (1987). Field-dependence and the solution of word and nonsense anagrams. *Personality and Individual Difference*, 8(2), 269-327.
- Deyoung, C.G., Flanders, J.L. and Peterson, J.B. (2008). Cognitive abilities involved in insight problem solving: An individual differences model. *Creativity Research Journal*, 20(3), 278-90.
- Dickstein, L.S. (1968). Field-independence in concept attainment. *Perceptual and Motor Skills*, 27, 635-42.
- Dominowski, R.L. (1966). Anagram solving as a function of letter sequence information. *Journal of Experimental Psychology*, 76, 78-83.
- Frank, B.M. and Noble, J.P. (1985). Field-independence-dependence and cognitive restructuring. *Journal of Personality and Social Psychology*, 43(5), 1129-35.
- Goodenough, D.R., Oltman, P.K., Friedman, F., Moore F.A., Witkin, H.A., Owen, D. and Raskin, E. (1979). Cognitive styles in the development of medical carriers. *Journal of Vocational Behaviour*, 14, 341-51.
- Howard, J.R., Watson, J.A. and Allen, J. (1993). Cognitive style and the selection of logo-problem solving strategies by young black children. *Journal of Educational Computing Research* 9 (3), 339-54.
- Makkar, M. (2006). Field-dependence, field-independence, cognitive styles and imagery variables in memory and problem solving. Unpublished Thesis, Himachal Pradesh University, Shimla.
- Malhotra, D.K. (1999). Perceptual strategies in short term memory. *Studia Psychologica*, 41(3), 231-38.
- Malhotra, D.K. (2000). Imagery variables in problem solving. *Journal of Community Guidance and Research*, 17(1), 31-37.
- Neimark, E.D. (1976). Unresolved issues in research on field-dependence-independence. *Journal of Social Behaviour and Personality*, 13(2), 119-25.

- Niaz, M. (1989). Mobility fixity dimension in Witkin's theory of field-dependence-independence and its implications for problem solving in science. *Perceptual and Motor Skills*, 65(3), 755-64.
- Ronning, R.R., McCurdy, D. and Ballinger, R. (1984). Individual differences: A third component in problem solving instruction. *Journal of Research in Science Teaching*, 21(1), 71-82.
- Rozencwajg, P. (1991). Analysis of problem solving strategies on the Kohs Block Design Test. *European Journal of Psychology of Education*, 6(1), 75-88.
- Wang, L., Wang, X., and Ren, M. (2003). Field-dependent-independent cognitive styles in solving dynamic problems. *Psychological Reports*, 92(3), 867-80.
- Witkin, H.A., Dyk, R.B., Faterson, H.F., Goodenough, D.R. and Karp, S.A. (1962). *Psychological Differentiation*, Wiley: New York.
- Witkin, H.A., Lewis, H.B. and Hetzman, M., Machovek; Meissnes, P. and Wapner S. (1954). *Personality Through Perception*, West Port, Conni Green Word Press.
- Witkin, H.A., Oltman, P.K., Raskin, E., and Karp, S.A. 1971). Manual for embedded figures test, children's embedded figure test and group embedded figures test. *Consulting Psychologists Press*, Palo Alto, C.A.
- Zhang, L.F. and Sternberg, R.J. (2006). "The nature of intellectual styles." Mahwah, NJ: Laurence Erlbaum.