# AGE AND VERBALIZING-VISUALIZING COGNITIVE STYLES DIFFERENCE AMONG HEARING IMPAIRED STUDENTS

**IFFAT BATOOL, NUSRAT BATOOL, FAKHER ELAHI, SHAHRUKH TARIQ**
Department of Psychology, GC University, Lahore.

**CORRESPONDENCE: IFFAT BATOOL,** E-mail: dr.iffatbatool@gmail.com

## ABSTRACT

### OBJECTIVE

The present research aims to identify the individual difference in cognitive styles and age groups of hearing impaired students.

### STUDY DESIGN

Cross-sectional research design.

### PLACE AND DURATION OF STUDY

This study was conducted at Government College for the Deaf and Dumb, Gung Mahal, Gulberg, Lahore in approximately one year.

### SUBJECTS AND METHOD

Thirty one (n = 31) hearing impaired students participated in the research through purposive sampling technique. The mean age of sample was 21.2 years (SD = 1.92; age range 19-27).

### RESULTS

Results indicated significant mean difference existed between the cognitive styles that hearing impaired used, but no significant mean difference on cognitive styles was found between the age groups in hearing impaired.

### CONCLUSION

The study explored mean differences in cognitive styles and age groups of hearing impaired students on a computerized Verbal Imagery Cognitive Style (VICS) test. The results indicate that hearing impaired students exhibit significant differences in cognitive styles which are used in education for learning, comprehension, and reading.

### KEY WORDS

Cognitive styles, Verbalizing-visualizing Cognitive styles, Hearing impaired.

## INTRODUCTION

Cognitive style describes the distinct but consistent ways, which are observable when an individual processes information[1]. Some professionals elaborated it as a theoretical concept that has been settled to describe the process of conciliation between the presentation of a stimulus and the initiation of a responses[2].

It is asserted that styles are not natural abilities, but how a person uses these abilities in everyday interactions with his/her environment. Styles are not the magnitude of human intelligence, but the ways a person uses it. The style perspective has strongly suggested that the information can be coded either in verbal or in visual way, and people deliberately pick one claim, for the verbal-imagery aspect. Verbalizers favor, and are at ease on verbal tasks, while visualizers are easy on tasks in an illustrative form. It has been found that where cognitive styles of information processing are incompatible, the performance on the task would surely decrease[3].

Paivio claimed that there were two different styles which a person can adopt in the learning process of material in a learning environment. The first type emphasizes the importance of visualization. The other practice of description is the creation of a visual image to symbolize a word[4]. The importance of imagery in the cognitive processes of human being has been passed over in favor of verbal processing, but research Pivio conducted defends the importance of imagery in learning process. He settled a research plan which directed itself towards a theory that gave the same weight to both verbal and nonverbal information processing styles[7].

Visualization is recognized as a major means of coding sizeable material for learning and later on for remembering[6]. Verbalizers are defined to be the people inclined to encode information in words. They are able to learn from words with almost no effort. Visualizers are the persons inclined to deal with information in images, they can learn quite easily from pictographic constructions[7].

Experiments that tested verbalizers-visualizers in learning situations proved that visualizers could effortlessly deal with the physical presentations and readily visualize information where as acoustically and semantically complex details pose problems for them[8]; while others preferred verbal mode of thinking[9]. The past experiences and innate abilities may play a key role in determining the cognitive style preferences[10].

Limited work is done on the cognitive styles and its relevant field in Pakistan. Whereas research hint at the importance of imagery in classroom practices and its use in examination as remembering the text material[11]. The present research is designed to investigate the cognitive styles of hearing impaired students. The main objective was to identify the individual difference in cognitive styles and age groups. The study hypotheses state that there would be significant differences among verbalizers, visualizers and little style on reaction times and there would be no significant age differences on the reaction times.

**Definitions of the Variables**
**Verbalizer.** The verbalizers are defined as the individuals who would obtain the Scores of "0"

and nearer to "0" score on of the Verbal Imagery Cognitive Style (VICS) Test.

**Visualizer.** The visualizers are defined as the individuals who would obtain 2 or above on the Verbal Imagery Cognitive Style (VICS) Test.

**Little style.** Those who don't use any style in cognitive processing.

**Verbal versus imagery ratio** (V/I ratio). Experts use imagery versus verbal ratios to allocate an individual a style preference. The Scores "0" and nearer to "0" will show the inclination towards the verbal preference and the scores "2" and above designate a tilting to a visual predilection.

**Reaction time.** It is defined as the time consumed by the respondent to respond to the items of VICS test. It consists of processing of the information, identification of the stimulus and selection of the responsee[12].

## SUBJECT AND METHOD
### Participants

Thirty one (n = 31) hearing impaired students participated in the research through purposive convenient sampling technique from Government College for the Deaf and Dumb, Gung Mahal, Gulberg, Lahore. All hearing impaired use English as a second language and had computer courses as a compulsory subject; all students had done their matriculation in English medium. These participants were identified as mild to moderate and moderate to severe hearing impaired. The hearing level was 25 to 40 Decibels (dB) on pure tone Audiometer. The mean age of the sample was 21.2 years (SD = 1.92; range 19-27).

### Instruments

*Verbal-Imagery Cognitive Styles (VICS).*
Peterson developed verbal imagery cognitive style (VICS) test to explore individual differences in verbal and imagery information processing[13]. The components of the computer test which assess cognitive style in seconds is been given below:

**Table 1**

| Verbal Imagery Cognitive Style (VICS) Test (232 Stimuli) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Verbal Task (116) | | | | | | Imagery Task (116) | | | | | |
| Words (58) | | | Pictures (58) | | | Words (58) | | | Pictures (58) | | |
| *N* | *M* | *Mx* | *N* | *M* | *Mx* | *B* | *S* | *E* | *B* | *S* | *E* |
| (26) | (26) | (6) | (26) | (26) | (6) | (26) | (26) | (6) | (26) | (26) | (6) |

Note. N = Natural, M = Man-made, Mx = Mixed, B = Bigger, S = Smaller, E= Equal

The verbal imagery cognitive style (VICS) shows high internal consistency (r = 0.7). The Scores "0" and nearer to "0" would point out a proclivity to the verbal preference and scores of "2" and above indicate a leaning for a visual preference.

### Procedure

Verbal Imagery cognitive styles test was installed on PC in Window XP. The screen resolution was set to 1024 x 768, and the monitor setting was '75Hz'. For the VICS test, the number pad keys 1, 2 and 3 were used. The keys 4, 5,6,7,8 and 9 were covered with a piece of paper. For the VICS test the letters Y, N and M were pasted on the keys 1, 2 and 3 respectively.

The participants were tested individually in a quiet room. Each participant completed the verbal imagery cognitive style (VICS) test in approximately 25 to 30 minutes. Participants had to answer the question: as "Yes", "No" and Mixed/Equal etc.

Each stimulus of the verbal imagery cognitive style (VICS) test was presented in a word form and picture form (fig 1and 2). The feedback on correctness was given after each response. Within each task the stimuli was presented in the word form (e.g., Fig. 1 and 3). Similarly figure 2 and 4 contained the items as the stimulus offered in a pictorial format.
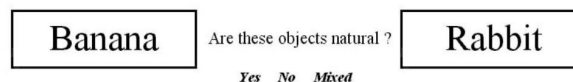


Figure 1. It is an example to assess verbal cognitive style in text form.
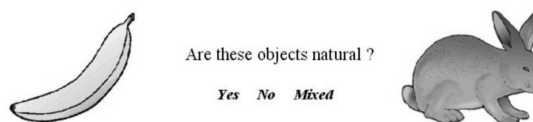


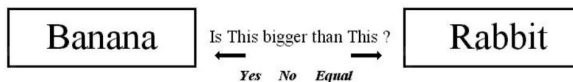Figure 2. It is an example to assess Visual cognitive style in picture form.



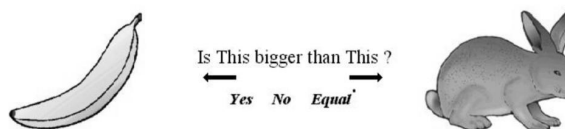Figure 3. It is an example of visual item in the text format.



Figure 4. It is an example of visual item in pictorial format.

## RESULTS

In the present study descriptive and inferential statistics were used to present the findings. SPSS version 21 was used to run the statistical analysis. The predominant sample preferred visualization style and equal proportion of sample did not prefer any specific cognitive style (see table 2). Verbalizers had reaction time bellow .8, little styles users had reaction time of .8 to 1.0, and visualizers had reaction time greater than 1. Results indicated significant mean difference for Median of VI reaction time, $F_{(2, 28)} = 10.61$, $p < .01$. It was found that individual difference exists among the cognitive styles (see Table 3). Sample has failed to produce statistically significant evidence to establish mean difference between age groups on the reaction time of all the cognitive styles on independent sample t test (see Table 4).

**Table 2**

| Frequency for Verbal-Imagery (N = 31) | |
|---|---|
| VI Group | f (%) |
| Verbalizers | 7 (22.6) |
| Little Style | 12 (38.7) |
| Visualizer | 12 (38.7) |

**Table 3**

| Variable | Verbalizers | | Little Style | | Visualizers | | F(2, 28) | p |
|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | M | SD | | |
| MedVRT | 1.94 | .83 | 2.41 | .34 | 2.89 | 1.77 | 1.46 | .251 |
| MedIRT | 2.68 | 1.03 | 2.68 | .50 | 2.24 | .66 | 1.48 | .245 |
| MedVIRT | .68 | .18 | .90 | .07 | 1.25 | .41 | 10.61 | .000 |
| MeanVRT | 2.49 | .39 | 2.89 | .51 | 4.15 | 2.44 | 3.08 | .062 |
| MeanIRT | 3.46 | 1.43 | 3.23 | .86 | 2.69 | .90 | 1.48 | .244 |

*Note.* Med = median, V = verbal, I = imagery, RT = reaction time.

**Table 4**

*Mean Differences on the Reaction Time of Cognitive Tasks between Age Groups*

| | 19-20 years (n = 14) | | 21-27 years (n = 17) | | | | 95 % CI | | |
|---|---|---|---|---|---|---|---|---|---|
| Variable | M | SD | M | SD | t(29) | p | LL | UL | Cohen's d |
| MedVRT | 2.61 | 1.75 | 2.39 | .48 | .49 | .63 | -.69 | 1.12 | .18 |
| MedIRT | 2.39 | .75 | 2.60 | .69 | -.78 | .44 | -.73 | .33 | .29 |
| MedVIRT | 1.03 | .48 | .95 | .19 | .60 | .55 | -.18 | .34 | .22 |
| MeanVRT | 3.54 | 2.11 | 3.08 | 1.25 | .75 | .46 | -.79 | 1.70 | .28 |
| MeanIRT | 2.98 | 1.04 | 3.15 | 1.07 | -.43 | .67 | -.94 | .61 | .16 |

*Note. CI* = confidence interval. *LL* = lower limit. *UL* = upper limit. *N* = 31

## DISCUSSION

The present study hypothesized that there would be significant mean differences among visualizers, verbalizers and the little style. The results showed that visualizers and little style users were equal in number in the sample while the number of verbalizers was lesser than these. Previously, a number of researches agree with the results that people use different information processing styles at the same time and they may or may not show preference for a specific style[3-6,9]. As for reaction time is concerned significant mean difference for hearing impaired was seen for the three groups of sample in the median reaction time of the items that had both verbal and visual contents.

The second hypothesis of this study was that there would be no mean difference between age groups on the reaction times. The result shows that the age groups are not significantly different on the reaction time. In present study, the age group that was less than 20 year of age and greater than 20 years of age were not significantly different in their performance, and it was an indication that these verbalizer-visualizer cognitive styles were inborn. A longitudinal research needs to be done to explore the connection between cognitive styles and age[13].

The present research showed that individuals have different cognitive styles. Paivio first of all developed the visualizer-verbalizer cognitive style dimension and later on he anticipated that the cognitive system may be divided in two components[5]. The postulation that the two codes are superior to and far easier than one code is to be studied in the next part of the research. This dual coding suggests that these two codes are interconnected but also have their own unique technique of processing; the new non-verbal system and the verbal system are connected to instructive phenomena.

## SUGGESTIONS

- The principles of preferred cognitive style should be in mind while planning educational practices.
- Future researches should use larger sample size to improve the generalizability of the research findings.

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| Sr # | Name | Affiliation | Contribution | Signature |
|---|---|---|---|---|
| 1 | Iffat Batool | Department of Psychology GCU, Lhr. | Conception, Execution & Analysis of the study | |
| 2 | Nusrat Batool | National Agricultural Research Council (NARC). | Data Collection | |
| 3 | Fakhar Illahi | Department of Psychology GCU, Lhr. | Planning, Report writing and proof reading | |
| 4 | Shahrukh Tariq | Department of Psychology GCU, Lhr. | Statistical Analyses Interpretation | |