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Review

VALIDITY AND RELIABILITY OF A METHODOLOGICAL INSTRUMENT FOR MEASURING VERBAL-VISUAL COGNITIVE STYLES IN ADVERTISING

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ABSTRACT

This study has the following objective: to validate, adapt and modify a scale from Kirby, Moore and Schofield – VVQ, based on Richardson's scale, to be applied in measurements of advertising influence. The statistical methods applied in the study were factor analysis using principal component analysis (PCA) and Varimax orthogonal rotation with Kaiser normalization, as well as correlation analyses to establish the linear relationship between the VVQ subscales (N=425). The results of a factor analysis (PCA) indicated that a 3-factor solution was acceptable for the present data, forming 3 subscales in the following order: for dreamers, for visualizers, and for verbalizers. Visualization was found to be more pronounced than verbalization in the individuals studied, and the vividness of sleep was more important in building individuals' verbal abilities than visual abilities. The results may be useful for researchers of cognitive styles of individuals as well as their segmentation in marketing, advertising and media.

Key words: cognitive styles, individual differences, VVQ.

INTRODUCTION

The study of cognitive styles is one of the characteristics of the theory of education, however, they also approach other scientific fields, the main reasons being their wide applicability, as well as the dynamism in the understanding of cognitive style in processing information. Likewise, technological advances, the application of computer-mediated persuasion (1, 2), as well as different visual-verbal effectiveness in advertising, further complicate this dynamic environment. As with all behavioural research, there are a number of limitations that must be considered when investigating cognitive styles. The current study focuses on the effectiveness of verbal and visual cognitive styles, which are the main way to segment subjects into verbalizers and visualizers. In order to achieve this goal, it is necessary to propose a reliable tool for measuring advertising consumers segmented according to cognitive styles and, through content analysis, to evaluate different scales measuring these styles.

LITERATURE REVIEW

One of the earliest studies comparing the effects of visualization and verbalization found that people who were better at visualizing mental images were more accurate at recalling information (3), compared to people who are less able to visualize images. This is the reason why the Richardson (1977) Verbalizer-Visualizer Questionnaire (VVQ) scale (4) for measuring the verbal-visual cognitive orientation of individuals is discussed in scientific circles. According to Richardson (1977), as well as the views of other authors (5, 6), Richardson's (1977) Verbalizer-Visualizer Questionnaire (VVQ) (4), is a 15-item questionnaire or scale dividing individuals into verbalizers and visualizers, which places the two cognitive styles on a single dimension. Richardson developed the VVQ out of earlier work by Paivio (1971), who proposed an 86-item Ways of Thinking Questionnaire (7, 8). The scientific comments about A. Richardson's

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scale are that the Verbalizer-Visualizer Questionnaire (VVQ) has been examined for reliability through test–retest reliability (9), but this scale has not been applied in many scientific areas (8). It is important to clarify that the Richardson scale places subjects at two ends of a continuum, but does not make verbalizers or visualizers two opposite segments, because there is a nuance of degree of visualization and verbalization (10-13). Other researchers have also made major contributions in developing scales to measure verbalizers and visualizers, such as Riding et al. (1995), placing verbalizing and imaging (Riding's term for visualizing) as the ends of a single continuum (8). Riding's scale, called the Cognitive Styles Analysis (CSA), although widely used in his research (14-16), has not been used by other authors because it is difficult to interpret (8). In most cases, researchers argue that the two dimensions are independent of each other. It is possible for some individuals to have manifestations of either cognitive style, or to exhibit tendencies of both styles simultaneously under certain conditions. The reason for this statement is supported by the research of Kogan (1971), who claims that every person has a predisposition to both visualizing and verbalizing (17). However, there is a lack of scientific evidence whether this predisposition is acquired or innate. McGrath et al. (1989) conducted a factor analysis of Richardson's VVQ scale and found a two-factor solution: verbal fluency and vividness of visual imagery (5). Edwards and Wilkins (1981) also found two independent factors, rather than a single dichotomous scale for the VVQ (18). On the other hand, Schroeder (1989) found that the visual and verbal dimensions of the VVQ were essentially independent and not negatively correlated, as would be expected from the opposite ends of the continuum (19).

The author of the present work, after a thorough analysis of the content, decided to rationalize with the scale of Kirby, Moore and Schofield (1988), who proposed a new set of three subscales: a verbal dimension, a visual dimension and a dimension of dream vividness, each subscale touching different cognitive style with 10 true or false questions for respondents (6). As a check on the validity of the factors identified by Kirby et al. (1988), the authors made correlations appropriate to ability measures, finding that verbalizer subscale scores correlated with verbal proficiency (vocabulary, verbal reasoning, and analogies test), and visualizer scores correlated with spatial visualization ability (6). It should not be underestimated that each individual has a different predisposition to visualizing as well as verbalizing, so the authors delve into their research and interpretations by arguing that there are two independent factors rather than one dichotomous VVQ scale (18). Therefore, verbalizers and visualizers may respond independently of each other in terms of their reaction speed, because Kirby et al. demonstrated (1988) that an individual's verbal style did not predict rapid reaction, but higher visualization was positively related to reaction speed (6). This can be very cleverly used by advertisers when offering verbal and visual elements in advertisements. At a later stage, traditional approaches to visual-verbal cognitive style as a single bipolar dimension were reconsidered and instead a new three-dimensional model of cognitive style developed on the basis of modern theories of cognitive science was proposed (20). These authors distinguished object imagery, spatial imagery, and verbal dimensions. The results of confirmatory factor analysis in the research of Blazhenkova, Kolhevnikov (2009) showed that the overall fit to the data of the new three-dimensional model of cognitive style was significantly better than that of the previous model (20). The authors' contribution also consisted in validating a new questionnaire - Object-Spatial Imagery and Verbal Questionnaire (OSIVQ), (21). Despite the weaknesses found in the early years when measuring visual-verbal cognitive styles (4, 7) described the sequences and preferences in processing visual versus verbal information, a number of authors applied these scales as a starting point for research in their work. It classified individuals as visualizers, who relied primarily on imagery when attempting to perform cognitive tasks, or verbalizers, who relied primarily on verbal-analytical strategies.

In order to apply the formative, validated scale of A. Richardson (1977), adapted and modified by Kirby, Moore and Schofield (1988), as well as measuring more rigorous theoretical principles to assess users' segmentation with the visual-verbal cognitive style, a different way of operationalizing is proposed in the present work (4, 6). Although most of the previous studies of visual-verbal cognitive style are based on a general idea of the existence of two different visual and verbal processing systems, they are

neither motivated by a cognitive theory that specifies how information is processed in the brain, (14, 22), nor have more rigorous theoretical principles been tested to assess the dimension accurately (8). In the present work, different scales are proposed for analysis and evaluation, which rely on certain analytical strategies, and the selection of respondents is made according to the scale of A. Richardson (1977) - Verbalizer-Visualizer Questionnaire (VVQ), improved by Kirby, Moore and Schofield (1988), (4, 6).

Another example of objective measures to assess the visual-verbal dimension is the Mathematical Processing Instrument (MPI), (23-25), developed to measure the tendency to use visual versus verbal-analytic strategies in solving mathematical problems. Examples of these questionnaires include: 1) the Individual Differences Questionnaire (IDQ), (7), 2) the Verbalizer–Visualizer Questionnaire (VVQ), (4) and 3) the Style of Processing (SOP), (4, 26), some of which have already been discussed. The main problems of these questionnaires are their relatively low internal reliability (10) and poor predictive validity (11, 27). For example, factor analyses of Individual Differences Questionnaire (IDQ) items identified not only imagery and verbal factors but also a number of other factors (28). In turn, principal components analysis of the Richardson (1977) scale did not indicate that the VVQ items form a homogeneous scale (11). In addition, some later studies have contradicted earlier ones by showing a moderate correlation between the verbal subscale of such self-report instruments and performance on verbal ability tests (29). Therefore, the reliability and validity of Richardson's (1977) scale, as modified and adapted by Kirby, Moore and Schofield (1988), to be applied in the present work, as well as its degree of consistency, must first be established. The essential part of scientific studies is that "cognitive styles" have given media and advertising scholars a new way of looking at responses to mass media and advertising messages (8), which is why they are being researched. The presence of a large body of evidence that individual differences in personality and cognitive styles influence how variables in the environment affect the perception of information from the surrounding world (29) is a reason to consider a set of concepts including cognitive skills and strategies, demographics, and cognitive styles (30). The research literature on verbalization and visualization is interested in both images and text, but not least, how both types of information are used by the user (8). Therefore, the various authors who propose universal classifications of the two concepts, applying them in different scientific fields, also find a place in media and advertising communication. **Table 1,** in which a comparison is made between a large number of scales, chronologically arranged according to the years of their origin, indicates a number of research questions that arise in the process of work, (**Table 1**). Most of the studies have investigated the reactions of individuals to individual verbal or to visual components when dealing with different tasks, while also presenting other cognitive skills of individuals to establish the relationship between belonging to a cognitive style and processing of offered information. Each of the scales presented in **Table 1** contributes differently to the establishment of individual differences in personality and the formation of cognitive styles influencing how variables in the environment affect its perception (29). The author of the present paper sought to validate Richardson's (1977) - Verbalizer-Visualizer Questionnaire (VVQ) scale, which goes beyond measures of imagery ability (8), but with further adaptation and modification of Kirby, Moore and Schofield (1988), established the personality's belonging to the different dimensions (6) and made an accurate segmentation of the targeted groups (**Table 1**).

Cognitive styles are a psychological dimension that represent sequences in how an individual acquires and processes information (20, 37). There is a body of scientific evidence that explains the power of their influence. Some of the styles are conceptualized as typical responses to certain stimuli, and other styles are considered cognitive principles that underlie human behaviour (8). Although there is a wide variety of cognitive styles with different verbal and visual components, most of them not motivated by a particular theoretical framework that defines the dimensions along which cognitive processing can vary. As a result, some arbitrary distinctions or overlapping results are observed in the proposed empirical evidence. This is the reason why only some of these scales continue to exist and are applied to other scientific fields (Mendelson, A. L., & Thorson, E., 2004).

Table 1. *Scales for measuring cognitive styles*

Researcher / year	Scales for Measuring Cognitive Styles – basic research questions	Scales
Paivio, (1971)	The 86-item Individual Differences Questionnaire (IDQ) was designed to measure a person's imaginative and verbal thinking habits and skills (7). It is related to dual coding theory, which attempts to give equal weight to verbal and nonverbal processing, (31).	1.Individual Differences Questionnaire (IDQ)
Marks, (1973)	Vividness of Visual Imagery Questionnaire (VVIQ), which consists of 16 statements arranged in 4 subscales. The main goal is to identify impactful subjects that present images of exceptional brightness. The effect of luminance on the variances and on the mean scores of "good" and "bad" visualizers was investigated, taking into account a number of verbal elements as part of the imaging techniques (32).	2. Vividness of Visual Imagery Questionnaire (VVIQ)
Richardson, (1977)	Visualizer-Verbalizer Questionnaire (VVQ) containing 15 statements placing the two cognitive styles on a single dimension to establish individual differences in personality (4). Subjects are placed at one of two opposite ends of the continuum as variations on the two concepts (10, 11,12).	3.Verbalizer - Visualizer Questionnaire (VVQ) (15 items)
Lean, Clements, (1981)	Mathematical Processing Instrument (MPI) developed to determine the tendency to use visual versus verbal-analytical strategies in solving mathematical problems (23,24,25). The goal is to establish the degree of visuality when using visual decisions versus verbal-logical strategies.	4.Mathematical Processing Instrument (MPI)
Childers, Houston, Heckler, (1985)	Style of Processing (SOP) (26) to measure individual differences in visual and verbal information processing. The scale is a 22-item adaptation of the VVQ that separates visualization and verbalization factors into an even distribution (11).	5. Style of Processing (SOP)
Kirby, Moore, Schofield, (1988)	An adapted and modified version of Richardson's (1977) - Visualizer-Verbalizer Questionnaire (VVQ), which includes a new set of three scales, i.e. 30 statements (Verbal items, Visual items and Dream vividness - Dream items) and was developed by Kirby, Moore, Schofield (1988) (4,6). Each scale taps a different learning style with 10 statements that colour appropriately with measures of ability (8).	6.Verbalizer Visualizer Questionnaire (VVQ) (30 items)
Riding, (1991)	Cognitive Styles Analysis (CSA) is a Rididng (1991) scale that places verbalization and imagery (Rididng's term for visualization) as the ends of a continuum (14). The Cognitive Styles Analysis (CSA), (33) is a computer-presented test that identifies an individual's position on two dimensions of cognitive style—the wholes analytic (WA) and the verbaliser-imager (VI) dimensions. A high score on the WA dimension indicates an analytical style and vice versa (34).	7. Cognitive Styles Analysis (CSA)
Rididng, Cheema (1991)	Verbal-Imagery Subtest of Cognitive Styles Analysis (VISCSA) - Subtest as part of verbal imagery (35). Style aims to develop objective measures to assess visual-verbal cognitive style, such as reaction time when solving tasks that require visual or verbal thinking (20).	8. Verbal-Imagery Subtest of Cognitive Styles Analysis (VISCSA)
Peterson, Deary, Austin, (2005)	Verbal Imagery Cognitive Style Questionnaire (VICS) (36), which contains imagery as well as verbal semantics, dividing subjects into verbalizers and visualizers.	9. Verbal-Imagery Cognitive Style (VICS)
Blajenkova, Kozhevnikov, Motes (2006)	Object-Spatial Imagery Questionnaire (OSIQ) (21), which consists of two independent scales: (1) an object imagery scale that assesses preferences for representing and processing colour and pictorial object images and (2) a spatial imagery scale that assesses preferences for representing and processing schematic images, spatial relations between objects, and spatial transformations (21).	10. Object-Spatial Imagery Question naire (OSIQ)

Although verbal-visual cognitive styles are not sufficiently motivated by cognitive theory (20), they are widely used in educational psychology, in which a connection is sought between learners' preferences: verbally with words and listening, or visually with graphics and charts. Some cognitive-psychological research on picture and word processing (38) suggests that the co-presence of verbal and visual representations of an object can facilitate memory for that object (39). Alternatively, some theorists argue that the brain uses dual coding with separate systems for visual and verbal information (7).

The issue of dual coding in advertising through visual and verbal cues is a fruitful topic of research that includes both visual-verbal representation of advertising elements and the role of cognitive processing as a prerequisite for human experience during or after exposure to advertising (39). On the other hand, it is the modelling role of the complexity and relevance of advertising, realizing advertising effect on different consumers (40, 41). In the scientific literature, Phillips (2000) found that the verbal anchoring (verbalization) of visual metaphors (visualization) affected the understanding and attitude towards advertising in different ways, therefore a strong positive relationship was found between the two influencing elements (41). There are a lot of evidences that general interpretation of the cognitive processing of an advertising (42, 43) or time spent viewing an advertisements increases recognition, as more complex encoding leads to better retention in human memory (Lang et al., 2002). Any "fixation" of an advertising element (44) that triggers cognitive processing and is associated with distinct meaningful visualizations in the consumer's mind can trigger the construction of lasting images, as well as meaningful messages about products and services (45). This is the reason why researchers are interested in the number of fixations for overt and covert advertisings (45) and create a reliable and validated instrument to measure users' cognitive styles.

Based on the content analysis of cognitive style measuring instruments investigating the verbal-visual orientation of participants, it is clear that, unlike most visual-verbal self-report questionnaires, some of the presented scales are based on more specific and limited measures that can be verified under certain conditions. For example, advertising communication is part of mass communication, and also the impact of verbal and visual components is achieved through direct contact with advertising media of companies, researchers must take into account a number of circumstances in the measurements. Regarding consumer reaction time, which is related to information processing, it depends on other factors such as the distraction interval from the moment of influence to the moment of making a purchase decision. Therefore, the preferences of users - visualizers and verbalizers, and according to the scale of Kirby et al. (1988) and dreamers, as well as according to their specific information processing mode would become a reliable tool for determining the cognitive orientation of individuals, if it fulfils all necessary requirements.

METHODOLOGY

The purpose of the present study is to propose a reliable and valid instrument for measuring the verbal-visual cognitive style of individuals, indicating the degree of importance of cognitive orientation as a factor for processing verbal-visual information. To achieve this goal, an exploratory analysis is made regarding the results of other researchers by comparing the data with the results of the present study. The study included 425 respondents who answered the Verbalizer-Visualizer Questionnaire (VVQ), (6) to determine their cognitive orientation. The total sample contains 425 respondents, which are 39.3% men (167 people) and 60.7% women (258 people), aged 18 to 65 years (M=32.19). The respondents are divided by age group - 17.6% (75 people) are aged 18 to 20, 25.6% (109 people) are aged 21 to 24 and 19.1% (81 people) are were aged 25 to 35 years, 18.1% (77 people) were aged 36 to 45 years, 12.9% (55 people) were aged 46 to 55 years, 6.6% (28 people) are aged 56 to 65 years.

A frequency distribution by education was made, and the participants in the survey were divided into the following educational groups: 11.8% (50 people) - graduated from secondary education, 39.3% (167 people) - graduated from secondary education special or higher degree, 18.1% (77 people) - completed a bachelor's degree, 22.8% (97 people) - completed a master's degree, 8% (34 people) - completed a doctoral degree. This distribution of respondents is extremely important for the present study. A basic requirement in the selection of advertising users is that the users belong to one of the imaging groups, have used

or are using the products or use products from the advertisements proposed for evaluation.

In the present study, Kirby, Moore and Schofield's scale (1988) is applied, which consists of 30 statements, with 10 statements identifying high verbalizers, 10 - high visualizers, and 10 - high dreamers. Research methods are related to several studies (Hair et al., 2009): 1) Reliability of the Verbalizer-Visualizer Questionnaire (VVQ) according to Kirby, Moore and Schofield, (1988) - a questionnaire for measuring belonging to cognitive styles (6); 2) Validity of the Verbalizer-Visualizer Questionnaire (VVQ) according to Kirby, Moore and Schofield, (1988) (6); 3) Distribution of Verbalizers, Visualizers and Dreamers users on the validated scale of Kirby, Moore and Schofield, (1988) - participants in the present study. Respondents answered all modules of the Kirby et al. (1988) questionnaire, which is available in paper format for more accurate completion, using a five-point Likert-type scale that includes ratings from 1 - Disagree to 5 - I agree. To determine whether the adapted and modified scale of Kirby, Moore and Schofield, (1988), (6) applied in the study was suitable for analysing the data obtained, a confirmatory factor analysis was carried out using a method of principal components (PCA) and orthogonal rotation using the Varimax method with Kaiser Normalization (46). Three factors were determined as in the methodology of Kirby, Moore and Schofield, (1988). In addition, to calculate the reliability of the scale, only the data of the variables that form it, but not its value, are needed (47).

RELIABILITY OF VERBALIZER-VISUALIZER QUESTIONNAIRE (VVQ)

Since one of the aims of the study is to determine the internal validity of the Verbalizer-Visualizer Questionnaire (VVQ) according to Kirby, Moore and Schofield, (1988) - a questionnaire for measuring belonging to cognitive styles (Kirby, Moore and Schofield, 1988) (6), the author administered the scale to N = 425 participants. All participants completed the 30-item Verbalizer-Visualizer Questionnaire (VVQ) of Kirby, Moore and Schofield, (1988). In order to examine whether the 10 statements from the verbalizer subscale of the Kirby, Moore and Schofield (1988) Verbalizer-Visualizer Questionnaire (VVQ) form a reliable subscale, Cronbach's coefficient alpha was measured. The reliability of the Verbalizers subscale was $\alpha = 0.722$ for the whole sample (N = 425). Correlations for all statements were greater than 0.300 except the second item - r=0.246 and the sixth items - r=0.275. The requirement is to be greater than 0.400, but according to Ganeva, for larger samples, item values less than 0.300 are acceptable (47). For this purpose, the values of the items in the last column of the table are observed - Cronbach's Alpha, if Item Deleted, as alpha α for all items is above 0.600, (**Tables 2**), (47).

Table 2. *General statistics for verbalizer items*

Items	**Corrected Item-Total Correlation**	**Cronbach's Alpha, if Item Deleted**
1. I enjoy doing work that requires the use of words.	,375	,702
2. I enjoy learning new words.	,246	,719
3. I can easily think of synonyms for words.	,323	,709
4. I read rather slowly.	,301	,714
5. I prefer to read instructions about how to do something rather than have someone show me.	,340	,708
6. I have better than average fluency in using words.	,275	,717
7. I spend little time attempting to increase my vocabulary.	,472	,685
8. I dislike word games like crossword puzzles. [R]	,459	,688
9. I dislike looking words up in dictionaries. [R]	,468	,687
10. I have a hard time remembering the words to songs.	,561	,670

The reliability of the Verbalizers subscale was α = 0.722 for the entire sample (N = 425), and the value was quite satisfactory for a larger sample (over 300 respondents). In the Cronbach's Alpha column, if Item Deleted, all statements have values greater than 0.600, with some statements having values greater than 0.700, which is quite satisfactory and the scale is considered to be constructed correctly, but only the second and sixth statements do not contribute enough for its reliability and can be removed (**Table 2**), (47). The mean value of the Verbalizers subscale was as follows: Mean=27.16, SD=7.78 in our study. For the subscale measuring verbalizers according to Kirby et al. (1988), Mendelson and Thorson (2004) used five statements, with Cronbach's Alpha being α = 0.710, that is, the value was lower, with the number of respondents being N = 123. The participants in the study were had an average score on the subscale - Mean= 23.67, SD = 8.35 (8). In the study by Kirby and colleagues (1988), Cronbach's Alpha was α = 0.700, that is, the lowest, with the number of respondents being N = 119.

The reliability of the Visualizer subscale in our study was α = 0.739 for the entire sample N = 425, with no missing data. In the Item Total Statistics table, it can be seen that the correlation varies, only statements 11 and 12 have a smaller value, that is, smaller than r=0.300, so look at the next column Cronbach's Alpha, if Item Deleted, (**Table 3**). In the Cronbach's Alpha column, if Item Deleted, all statements have values greater than 0.600 and above, which is completely satisfactory and the scale is considered to be constructed correctly, but only items 11 and 12 do not contribute enough to its reliability and may be removed (**Table 3**), (47). The mean value of the Visualizers subscale in our study was as follows: Mean=31.74, SD=8.04. When compared with other studies, it was found that the final subscale of visualizers according to Kirby et al. (1988) (6), contains six items, the value of Cronbach's Alpha is α = 0.770 (N = 123), that is, the values of this subscale are higher in the study of Mendelson and Thorson (2004) to the values in our study, with higher scores on the Visualizers subscale indicating a greater preference for visual learning. In the study by Kirby et al. (1988) Cronbach's Alpha was α = 0.590, that is, the lowest, with the number of respondents being N = 119 (6).

Table 3. *General statistics for visualizer items*

Items	**Corrected Item-Total Correlation**	**Cronbach's Alpha, if Item Deleted**
11. I don't believe that anyone can think in terms of mental pictures. [R]	,291	,733
12. I find illustrations or diagrams help me when I'm reading.	,217	,752
13. I have a hard time making a "mental picture" of a place that I've only been to a few times.	,366	,717
14. I seldom use diagrams to explain things.	,477	,699
15. I like newspaper articles that have graphs.	,482	,701
16. I don't like maps or diagrams in books.[R]	,430	,708
17. When I read books with maps in them, I refer to the maps a lot.	,438	,707
18. The old saying "A picture is worth a thousand words" is certainly true for me.	,439	,706
19. I have always disliked jigsaw puzzles.[R]	,486	,699
20. I tine maps helpful in finding my way around a new city.	,458	,703

The reliability of the subscale measuring daydreaming in our study—the final component of Kirby, Moore and Schofield's (1988) scale in the Verbalizer-Visualizer Questionnaire (VVQ) was also examined. Reliability is α = 0.734 for the entire sample N = 425, and of the total number of observations 425 are valid, that is, there are no observations with missing data. In the Item Total Statistics table, it can be seen that the correlation is for some of the statements greater than 0.400, but there are also those with smaller values (**Table 4**). The values in the

Cronbach's Alpha, if Item Deleted column are observed, which shows that the statements have values of 0.600 and above. The scale is considered to be properly constructed and that each statement contributes to its reliability, the lowest values are items 22 and 23, which can be removed, (**Table 4**), (47). The mean value of the Dreamers subscale is as follows: Mean=29.01, SD=7.86.

Table 4. *General statistics for dreamer items*

Items	**Corrected Item-Total Correlation**	**Cronbach's Alpha, if Item Deleted**
21. My dreams are sometimes so vivid I feel as though I actually experience the scene.	,313	,728
22. My powers of imagination are higher than average.	,279	,728
23. I seldom dream.	,239	,734
24. My dreams are extremely vivid.	,401	,712
25. My dreams are rather indistinct and hazy.	,347	,720
26. I seldom fantasize.	,376	,715
27. I enjoy daydreaming.	,490	,698
28. I often dream about things I'd like to be.	,488	,698
29. I can hardly ever remember my dreams.	,496	,696
30. I seldom daydream.	,518	,693

Cronbach's alpha was used to test the reliability of the Kirby, Moore and Schofield, (1988) VVQ, finding that each of the subscales could be used to measure individuals' cognitive orientation due to high reliability. In the studies of Kirby et al. (1988) (6), Cronbach's Alpha was $\alpha = 0.730$, which is approximately the same as in our study, with the number of respondents being N = 119. For the entire sample, Cronbach's alpha was $\alpha = 0.783$. Since the values are close to or exceed the minimum recommended value of $\alpha=0.700$ (48), the internal consistency for the respective subscales is sufficiently high, i.e. the elements that compose them form a common scale.

VALIDITY OF VERBALIZER-VISUALIZER QUESTIONNAIRE (VVQ)

In order to assess whether the scale proposed by Kirby, Moore and Schofield, (1988) to analyse individuals' cognitive orientation, could be applied and analysed with the data, a principal component factor analysis (PCA) was used. Three factors corresponding to the number of subscales in the methodology of Kirby, Moore and Schofield (1988) (6) were applied. To ensure the suitability of the data collected with the 30-item scale for factor analysis, several well-known diagnostic checks were performed: 1) 30 statements exhibited correlations above 0.500 or higher with other items in the VVQ 2) The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.697 for the entire sample (N = 425), which is above the recommended value of 0.600, (46). 3) Bartlett's test of sphericity was statistically significant for all subjects ($\chi2_{(435)} = 4115.9$, $p < 0.000$, (49). The measure of adequacy was checked, as was the adequacy for each subscale of the VVQ questionnaire, and the following values were obtained: for the verbalizer subscale, the KMO was 0.689; for the visualizer subscale, the KMO was 0.734; for the dreamer subscale, the KMO was 0.612. Bartlett's tests of sphericity for each subscale were also statistically significant for all subjects ($p < 0.000$), (49). Principal component analysis (PCA) method with Varimax rotation was used to analyse data. The extracted communalities ranged from 0.381 to 0.758 for all samples, which was considered satisfactory (**Table 5**). Factor loadings greater than 0.300 were considered. Rotations were performed with 1, 2, and 3 factors, but the author adopted the 3-factor solution, based on the latent variables representing the 3 subscales used to construct the components of the VVQ questionnaire (Kirby, Moore, and Schofield, 1988). After applying Principal Component Analysis (PCA), it was found that a 3-factor scale could be accepted, as the obtained factor loadings ranged from r=0.372 to r=0.758, which is acceptable for forming each factor, (**Table 5**).

Table 5. *Results of factor analysis of the VVQ scale*

Items	Factor 1	Factor 2	Factor 3
28. I often dream about things I'd like to be.	**,758**		
29. I can hardly ever remember my dreams.	**,742**	,161	
30. I seldom daydream.	**,695**		
27. I enjoy daydreaming.	**,582**		,124
24. My dreams are extremely vivid.	**,485**		,173
21. My dreams are sometimes so vivid I feel as though I actually experience the scene.	**,381**	-,369	
1. I enjoy doing work that requires the use of words.	**,377**	-,174	,280
3. I can easily think of synonyms for words.	**,372**		,301
26. I seldom fantasize.	**,369**		,212
2. I enjoy learning new words.	**,329**	-,260	
23. I seldom dream.	**,207**	-,196	,174
19. I have always disliked jigsaw puzzles.[[R]		**,653**	
15. I like newspaper articles that have graphs.	,193	**,600**	-,131
18. The old saying "A picture is worth a thousand words" is certainly true for me.		**,591**	
14. I seldom use diagrams to explain things.		**,584**	
17. When I read books with maps in them, I refer to the maps a lot.		**,574**	
16. I don't like maps or diagrams in books.[R]	-,136	**,568**	
20. I tine maps helpful in finding my way around a new city.	-,128	**,561**	-,243
22. My powers of imagination are higher than average.	,403	**-,477**	
13. I have a hard time making a "mental picture" of a place that I've only been to a few times.	-,144	**,376**	-,251
12. I find illustrations or diagrams help me when I'm reading.		**,202**	
6. I have better than average fluency in using words.	,163		**,754**
7. I spend little time attempting to increase my vocabulary.		-,152	**,654**
9. I dislike looking words up in dictionaries. [R]	,121		**,618**
8. I dislike word games like crossword puzzles. [R]			**,616**
4. I read rather slowly.			**,538**
5. I prefer to read instructions about how to do something rather than have someone show me.		-,251	**,422**
25. My dreams are rather indistinct and hazy.	,326		**,393**
11. I don't believe that anyone can think in terms of mental pictures. [R]		,330	**-,333**
10. I have a hard time remembering the words to songs.	,295		**,316**

The first factor (total of 11 statements) includes 6 statements measuring the vividness of dreams, the second factor (total of 10 statements) combines 6 statements for visualizers, and the third factor (total of 9 statements) is formed from 6 for verbalizers. The remaining statements, which are of lower factor loading and do not form a factor, are not included. According to some authors, only statements with factor weights greater than 0.500 should be analysed, that is, these are statements with the greatest weight and should play an important role for subsequent measurements (47). Factor 1 explained 11.4% of the variance, Factor 2 explained 22.6% of the total variance, and Factor 3 – 32.9% of the total variance. Factor 1, which measures dreamers (statements 21 to 30), starts with the highest factor loading - r=0.758, Factor 2, which measures visualizers, starts with factor loading - r=0.653, and Factor 3,

which measures verbalizers, starts with factor loading - r=0.754, (**Table 5**). Considering the positive indications presented above from the conducted exploratory factor analysis, including all 30 items that were applied, a 3-factor solution is adopted for the surveyed respondents - N = 425. **Figure 1** shows the eigenvalues of all factors, such as the refraction takes place between the value of 3 and 2, which also gives grounds for accepting a decision with 3 factors, (**Figure 1**). The total cumulative variance explained by all 3 components of Kirby, Moore and Schofield Verbalizer-Visualizer Questionnaire (VVQ) scale was 52%, which is in the general range for multidimensional constructs (6,47).

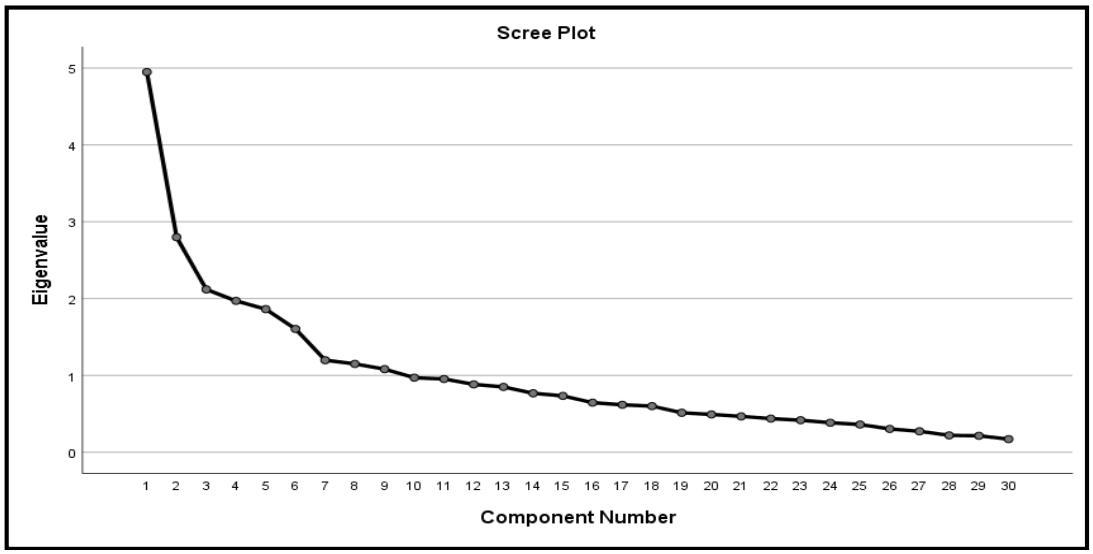

Figure 1. The eigenvalues of each of the extracted components

Scree plot magnification is seen from component 3, indicating correct fit of a three-factor solution. This is explained by the fact that three of the factors, that is, three subscales are formed by a large part of their own statements. The one-factor solution proposed by A. Richardson (1977) included one factor out of a possible 15 items on Visualizers Verbalizers (VVQ) Questionnaire (Richardson, A., 1977). A content analysis revealed two problems with Richardson (1977), (4): very low loadings on statements 8 and 9, and two of the three components of a 15-item scale addressing visual problems that do not involve dreams or imagination. If the purpose of the single factor is to capture both visual and verbal tendencies, and in the visual to include both dream vividness and more conscious mental imagery, then a single-factor solution is unacceptable (6,10). In our research, statements 8 and 9 have a sufficiently satisfactory weight and are included in the formation of factor 3 - a subscale for verbalizers (**Table 5**). According to Kirby et al. (1988) (6), as well as the research of other more recent authors such as Meldenson and Thorson (2004) (8), only visual and verbal statements can be used, since the dream scale does not seem theoretically appropriate for some scientific fields (8). This is also consistent with Kirby et al. (1988) who indicated that it is acceptable to use only the two-scale version of the VVQ instead of the three-scale version (Kirby, Moore, & Schofield, 1988). In the present scientific study, these views were rejected because the first factor that was formed was mainly constructed from the statements measuring dreamers. Measurements continued with the determination of respondents' orientation regarding degree of visualization and degree of verbalization as calculated on the adapted and modified Kirby, Moore, and Schofield (1988) Verbalizer-Visualizer Questionnaire (VVQ) scale, the results of which are presented in the following table, (**Table 6**).

According to the results of crossing the two variables, it can be seen that for the whole sample (N = 425), high verbalization respondents are 65.8% (73 people) and high visualization users are 39.4% (43 people), that is, the visualization is more pronounced than verbalization among the studied individuals (**Table 6**). Study participants had a mean visualizer score of M=31.74, SD = 8.04 on the subscale, which ranged in our study from 10 to 50, with 50 being the most visual dimension. The most visual individual in the sample scored 46 and the least visual scored 10.

Table 6. *Crossable for the entire sample for Visualizer by Verbalizer Levels to VVQ*

			Visualizers			**Totals**
			Low	Moderate	High	
Verbalizers	**Low**	Count	11	27	**73**	111
		% within Verbalizer Levels	9,9%	24,3%	65,8%	100,0 %
		% within Visualizer Levels	8,6%	14,8%	63,5%	26,1%
	Moderate	Count	74	106	25	205
		% within Verbalizer Levels	36,1%	51,7%	12,2%	100,0 %
		% within Visualizer Levels	57,8%	58,2%	21,7%	48,2%
	High	Count	**43**	49	17	109
		% within Verbalizer Levels	39,4%	45,0%	15,6%	100,0 %
		% within Visualizer Levels	33,6%	26,9%	14,8%	25,6%
Totals		Count	128	182	115	**425**
		% within Verbalizer Levels	30,1%	42,8%	27,1%	100,0 %
		% within Visualizer Levels	100,0%	100,0%	100,0%	100,0 %

For the verbalizer scale, the mean was Mean=27.16, SD=7.78 on the corresponding scale, which also ranged from 10 to 50, with 10 being the least verbal, and 41 is the most verbal. In contrast to our results, Mendelson and Thorson's (2004) study (N = 123) found that participants in their study had a mean visualizer score of Mean=23.67 (SD = 8.35) on the corresponding scale, which ranged from 10 to 70, with 10 being the most visual, with the most visual individual in the sample scoring 10 and the least visual scoring 53. For the verbalizer scale Mean=30.59 (SD = 9.34) on a scale that ranges from 10 to 70, with 10 being the most verbal (8). Therefore, the subjects in their study were more verbalizers and less visualizers. More importantly, the correlations between the subscales in our study were statistically significant, with the correlation between the Verbalizers subscale and the Dreamers subscale being r = 0.423; p< 0.000, the correlation between the verbalizers subscale and the visualizers' subscale is r = -0.272; p< 0.000, and the correlation between visualizers and the dreamers' subscale is r = -0.246; p< 0.000, (**Table 7**).

Table 7. *Correlations of Verbalizer Visualizer Questionnaire (VVQ)*

Scales		Verbalizer Scale	Visualizer Scale	Dreamer Scale
Verbalizer Scale	Pearson Correlation	1	-,272**	,423**
	Sig. (2-tailed)		,000	,000
	N	425	425	425
Visualizer Scale	Pearson Correlation	-,272**	1	-,246**
	Sig. (2-tailed)	,000		,000
	N	425	425	425
Dreamer Scale	Pearson Correlation	,423**	-,246**	1
	Sig. (2-tailed)	,000	,000	
	N	425	425	425
**. Correlation is significant at the 0.01 level (2-tailed).				

Two subscales measuring verbalizers and visualizers in Mendelson and Thorson's studies, (2004) are significantly correlated ($r = 0.330$; $p < 0.000$) (8), which means that they are independent measures (Mendelson, Thorson, 2004, p. 93). Since a strong positive correlation was observed between dreamers and verbalizers in our study, it is assumed that the vividness of the dream has a greater significance for building the verbal abilities of individuals ($r = 0.423$; $p< 0.000$) than the visual abilities that are found a negative statistically significant correlation ($r = -0.246$; $p< 0.000$), (**Table 7**). On the other hand, Schroeder (1989) found that the visual and verbal dimensions of VVQ were essentially independent and not negatively correlated, as would be expected from opposite ends of the continuum (19). In our study, the verbalization subscale and the visualization subscale are found in a negative correlation $r = -0.272$; $p< 0.000$, (**Table 7**). Therefore, the view is confirmed that verbal skills are independent of visual skills and that each individual can develop both types of abilities in parallel. On the other hand, in their study, Kirby et al. (1988) (6), measuring belonging to verbalizers, visualizers, and dreamers, as well as the abilities displayed on these subscales, found that verbal and visual cognitive style scores were moderately related to the corresponding verbal-visual abilities of individuals. The authors empirically prove that verbal cognitive style is highly correlated with verbal abilities ($r = 0.321$; $p< 0.005$), but in contrast to this result, visual cognitive style is less correlated with spatial-visual abilities of individuals ($r = 0.270$; $p< 0.005$), ($N = 119$). Therefore, belonging to one or another cognitive style is different for individual individuals, and it can change over time with a change in the verbal-visual objective and spatial abilities of the person.

CONCLUSION

The study of cognitive styles still arouses scientific interest in various scientific fields, because qualitative research would provide greater clarity on the issues of determining individual human characteristics of personality. The present study, which focuses on proposing a valid and reliable instrument for measuring verbal and visual cognitive styles, may serve to segment subjects into verbalizers, visualizers, and daydreamers, as well as help establish new causal relationships between individuals' verbal-visual orientation. In the first studies, the most loading statements that could be present in the formation of each subscale measuring verbalizers, visualizers, and dreamers were derived. A strong presence of the statements measuring dreamers was found because the most statements were included in this subscale, which emerged first after factor analysis with the principal component method (PCA). Since the obtained factor loadings varied within completely satisfactory limits, a three-factor solution was adopted for the studied individuals ($N=425$). The first factor includes 6 statements measuring dreamers, a second factor combines 6 statements for visualizers, and a third factor is formed by 6 for verbalizers. Therefore, the distribution of the subscales should not be considered independently of each other, as the statements measuring dream vividness may involve both the visual and verbal orientation of the individuals. Although a number of researchers such as Kirby et al. (1988) (6), as well as Mendelson and Thorson (2004), have indicated that it is acceptable to use only the two-scale version of the VVQ instead of the three-scale version (6, 8), a subscale measuring dreams was also formed in the present research. From the comparative analysis, it is clear that the respondents with high verbalization are significantly more - 65.8% (73 people), and users with high visualization are less in number - 39.4% (43 people), that is, the visualization abilities are more pronounced than those for verbalization among the studied individuals. In contrast to our results, Mendelson and Thorson's (2004) (8) study found that participants were more verbalizers and less visualizers, and future studies may look for relationships with some demographic characteristics of the respondents. In conclusion, it can be added that belonging to verbalizers or to visualizers are two independent measures, have explained some scientists (8), which was also confirmed in our study, since a strong positive correlation was observed between dreamers and verbalizers. Therefore, the brightness of the dream has a greater significance for building the verbal abilities of the individuals according to the data obtained, but not so much for the visual abilities of the examined persons. In addition, the visual and verbal dimensions of the VVQ are essentially independent and not negatively correlated, as would be expected from opposite ends of the continuum (19), also confirmed in our study with a negative correlation formed. The main theoretical contribution of the present work is to offer a comparison table regarding existing

scales for measuring cognitive styles, as well as an empirical contribution to VVQ as a reliable instrument for future research work. This scientific development can serve as a starting point for measuring belonging to verbal-visual cognitive styles, then in carrying out an accurate segmentation of individuals, looking for new causal relationships between verbal-visual orientation of individuals and their positive and negative advertising responses to verbal and visual components in advertising.

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