Trakia Journal of Sciences, No 2, pp 116-127, 2026

Available online at:
https://trakia-uni.bg

ISSN 1313-3551 (online) doi:10.15547/tjs.2026.02.005

Original Contribution

GENDER AND EDUCATION AS DETERMINANTS OF VERBAL – VISUAL COGNITIVE STYLES: AN EMPIRICAL INVESTIGATION IN ADVERTISING PERCEPTION

L. Spasova*

Department of Social Sciences and Business Language Training, Faculty of Economics,
Trakia University, Stara Zagora, Bulgaria

ABSTRACT

The purpose of this study is to examine the extent to which gender and education are associated with verbal–visual cognitive styles in the context of advertising perception. The research addresses an identified gap in advertising and cognitive psychology literature concerning the combined effects of demographic factors on individual differences in information processing. An empirical study was conducted using a standardized verbal–visual cognitive style questionnaire measuring visual, verbal, and imagery-based (dream) processing preferences. Independent-samples t-tests, one-way analysis of variance (ANOVA), and analysis of covariance (ANCOVA) were applied to assess the effects of gender and education on cognitive style dimensions. The findings indicate statistically significant gender differences in visual and imagery-based cognitive styles, with females demonstrating higher visual orientation and males exhibiting stronger imagery-based tendencies. Education level was associated with differences across all cognitive style dimensions, indicating differentiated patterns of information processing across educational groups. The results suggest that gender and education are relevant factors related to verbal–visual cognitive styles and should be considered in the design and evaluation of advertising messages. These findings contribute to a deeper understanding of individual differences in advertising perception and offer practical implications for more effective communication strategies.

Keywords: cognitive styles, gender differences, education level, verbal processing, visual processing, imagery, advertising perception.

INTRODUCTION

Over the past several decades, advertising research and consumer psychology have increasingly focused on individual differences in information processing and message interpretation (1,2). As contemporary advertising environments become more visually saturated and cognitively demanding, understanding how consumers perceive, encode, and respond to verbal and visual stimuli has become a central issue for both theory and practice (3–5). Within this context, cognitive styles have emerged as a key construct explaining systematic variations in how individuals organize, process, and retrieve information from persuasive messages (6,7).

***Correspondence to:** *Lyubomira Venkova Spasova, Department of Social Sciences and Business Language Training, Faculty of Economics, Trakia University, Stara Zagora, Bulgaria, e-mail: liubomira1975@abv.bg, GSM: 0886138297*

Verbal–visual cognitive styles refer to relatively stable preferences for processing information through verbal or visual modalities, including imagery-based mental representations (8). Individuals differ in the extent to which they rely on linguistic encoding, pictorial representations, or internally generated imagery when interpreting external stimuli (9,10). Prior studies have shown that these preferences influence attention allocation, comprehension, memory, and evaluative judgments, particularly in communication-rich contexts such as advertising (11–13). Despite this growing body of research, empirical evidence remains limited regarding the demographic determinants of verbal–visual cognitive styles, especially when multiple demographic factors are examined simultaneously.

Gender has long been one of the most extensively investigated demographic

variables in advertising research (14,15). Existing studies have primarily addressed gender through the analysis of role portrayals, stereotypical representations, and their social implications (16–18). While such research has provided important insights into media effects and social norms, it has often overlooked the cognitive mechanisms underlying gender-based differences in advertising perception. Empirical findings suggest that males and females may differ in their sensitivity to visual cues, imagery, and nonverbal information, as well as in their reliance on verbal processing during message evaluation (19–21). However, these differences are rarely examined within a coherent cognitive style framework, leaving an important gap in the literature.

Education represents another potentially influential, yet comparatively underexplored, determinant of verbal–visual cognitive styles. Educational attainment is closely associated with exposure to different modes of learning, abstraction, symbolic reasoning, and habitual information-processing strategies (22,23). Although cognitive styles are generally distinguished from cognitive abilities, prior research suggests that educational experiences may shape individuals' preferred modes of organizing and interpreting information (24–26). Nevertheless, few empirical studies have systematically investigated how education relates to verbal, visual, and imagery-based cognitive styles, particularly within applied domains such as advertising perception.

Moreover, previous research has largely examined gender and education in isolation, thereby limiting the explanatory power of existing findings (27). From both a theoretical and applied perspective, an integrated approach that considers the combined effects of gender and education is necessary to better understand individual differences in information processing. Such an approach is particularly relevant in advertising contexts, where verbal and visual components interact dynamically and where message effectiveness depends on cognitive congruence between stimulus characteristics and recipient preferences (28–30).

Against this background, the present study investigates gender and education as determinants of verbal–visual cognitive styles in the context of advertising perception. Using a validated measure of verbal, visual, and imagery-based processing preferences, this empirical investigation aims to clarify how these demographic factors shape cognitive style orientations. By focusing on underlying cognitive processes rather than surface-level representations, the study contributes to the literature on cognitive styles and advertising perception and provides insights relevant to the design of more effective and cognitively aligned advertising messages.

LITERATURE REVIEW

Verbal–Visual Cognitive Styles and Information Processing

Cognitive styles are commonly defined as stable individual preferences in the acquisition, processing, and organization of information (31,32). Unlike cognitive abilities, which refer to levels of performance, cognitive styles describe *how* individuals approach cognitive tasks rather than *how well* they perform them (33). Within this framework, verbal–visual cognitive styles represent a fundamental dimension of individual differences, reflecting the tendency to rely predominantly on verbal codes, visual representations, or imagery-based mental simulations when processing information (34–36).

Early theoretical models of information processing emphasized the distinction between verbal and nonverbal systems, suggesting that information can be encoded through separate but interconnected representational channels (37). This distinction laid the foundation for dual-coding approaches, which argue that the simultaneous activation of verbal and visual systems enhances comprehension, recall, and recognition (38,39). Subsequent empirical research confirmed that individuals differ systematically in their reliance on these channels, giving rise to the verbalizer–visualizer dimension of cognitive style (40,41). Research using validated measurement instruments has demonstrated that verbal–visual cognitive styles influence learning outcomes, memory performance, and evaluative judgments across a variety of contexts (42–44). Visual-oriented individuals tend to process information holistically, relying on imagery and spatial representations, whereas verbal-oriented individuals favour sequential, language-based processing strategies (45). Imagery-based or "dream" cognitive tendencies further reflect the capacity to generate internally constructed mental images that extend beyond immediate perceptual input, playing a significant role in

imagination, simulation, and meaning construction (46,47).

Gender Differences in Verbal–Visual Cognitive Styles

Gender has been consistently examined as a potential source of individual differences in cognitive processing, particularly with regard to verbal, visual, and imagery-related abilities (48,49). Empirical findings suggest that females often demonstrate greater sensitivity to visual detail and nonverbal cues, whereas males tend to rely more heavily on integrated verbal–visual representations and imagery-based processing (50–52). These differences have been observed in tasks involving perception, memory, and symbolic interpretation, although their magnitude and direction vary across contexts (53).

In advertising research, gender differences have traditionally been explored through the analysis of role portrayals and stereotypical representations rather than through underlying cognitive mechanisms (54,55). While this line of inquiry has generated valuable insights into social and cultural effects, it provides limited explanation for why males and females may respond differently to identical advertising stimuli. A cognitive style perspective offers a more process-oriented approach by linking gender differences directly to information-processing preferences (56).

Studies adopting this perspective indicate that gender-related variations in advertising responses may stem from differential weighting of verbal and visual cues, as well as from distinct attentional and elaborative strategies (57–59). However, empirical investigations explicitly examining gender differences in verbal–visual cognitive styles remain relatively scarce, particularly within applied advertising contexts. As a result, the role of gender as a determinant of cognitive style orientations in advertising perception warrants further systematic examination (60).

Education and Cognitive Style Development

Education constitutes another important factor shaping individual differences in information processing. Educational attainment is associated with prolonged exposure to specific modes of learning, symbolic systems, and problem-solving strategies, which may influence preferred cognitive styles over time (61,62). Although cognitive styles are generally regarded as relatively stable traits, evidence suggests that educational experiences can reinforce or attenuate certain processing preferences (63).

Research in educational psychology indicates that higher levels of education are often linked to increased verbal abstraction, analytical reasoning, and metacognitive awareness (64–66). Conversely, visual and imagery-based processing strategies have been shown to support comprehension and retention in complex learning environments, particularly when abstract concepts are involved (67). These findings suggest that education may play a differentiated role in shaping verbal, visual, and imagery-oriented cognitive styles rather than exerting a uniform effect across all dimensions.

Despite these indications, empirical studies directly examining the relationship between education and verbal–visual cognitive styles remain limited. Existing research often treats education as a control variable rather than as a theoretically meaningful determinant of cognitive style variation (68). This gap is particularly evident in advertising research, where education is frequently used for sample description but rarely integrated into explanatory models of advertising perception (69).

Integrating Gender and Education in Advertising Perception

Most prior studies investigating demographic influences on information processing have examined gender and education independently, thereby overlooking their potential combined effects (70). From a theoretical standpoint, considering these factors jointly allows for a more nuanced understanding of how socialization, learning experiences, and cognitive preferences interact in shaping advertising perception. In advertising contexts, where verbal and visual components are dynamically integrated, such an approach is especially relevant (71,72).

Cognitive congruence theories suggest that advertising messages are more effective when their structural features align with recipients' dominant cognitive styles (73). Consequently, identifying demographic determinants of verbal–visual cognitive styles can enhance the predictive power of advertising effectiveness models and inform the design of more targeted communication strategies (74). By integrating gender and education within a cognitive style

framework, the present study responds to calls for more process-oriented and empirically grounded approaches to understanding individual differences in advertising perception (75).

RESEARCH QUESTIONS AND HYPOTHESES

Previous research has demonstrated that individual differences in verbal–visual cognitive styles play a significant role in information processing, comprehension, and evaluative judgments, particularly in communication-rich environments such as advertising (76–78). However, empirical evidence regarding the demographic determinants of these cognitive styles remains fragmented, with gender and education often examined separately or treated as control variables rather than as theoretically meaningful predictors (79). Building on the literature reviewed above, the present study adopts an integrated approach to examine gender and education as determinants of verbal–visual cognitive styles in the context of advertising perception.

The present study is guided by the need to clarify how demographic characteristics contribute to individual differences in verbal–visual cognitive styles within the context of advertising perception. Building on prior theoretical and empirical work, the research focuses on whether gender is associated with systematic differences in verbal, visual, and imagery-based cognitive style orientations, and whether educational attainment plays a significant role in shaping these preferences. In addition, the study explores whether education conditions or modifies the relationship between gender and verbal–visual cognitive styles, thereby providing a more integrated understanding of how demographic factors jointly influence information-processing tendencies in advertising contexts (80–82).

Based on cognitive style theory and previous findings related to gender- and education-based differences in information processing, the following hypotheses are proposed:

H1: There are statistically significant gender differences in verbal–visual cognitive styles, such that females exhibit stronger visual cognitive orientation, while males exhibit stronger imagery-based (dream) cognitive orientation.

H2: Educational attainment has a statistically significant effect on verbal–visual cognitive styles, with higher levels of education associated with differentiated patterns of verbal, visual, and imagery-based information processing.

H3: Education moderates the relationship between gender and verbal–visual cognitive styles, such that the magnitude and direction of gender differences vary across educational levels.

To address the proposed research questions and to empirically test the stated hypotheses, a quantitative research design was employed. The following section outlines the materials, participants, measurement instruments, procedure, and statistical analyses used in the study.

MATERIALS AND METHODS

A quantitative research design was employed to examine the effects of gender and education on verbal–visual cognitive styles. The study sample consisted of 425 adult participants recruited through an online survey using a non-probability convenience sampling. Respondents were reached via social media platforms and email distribution lists, ensuring diversity in educational background. Inclusion criteria required respondents to be at least 18 years of age and able to complete the questionnaire in Bulgarian. Participation was voluntary and anonymous. Given the use of convenience sampling, the sample is not statistically representative of the general population and may be subject to selection bias. However, such sampling approaches are widely used in exploratory studies aimed at identifying relationships between variables rather than making population-level generalizations (83-84). The questionnaire was adapted for the purposes of the present study and translated into Bulgarian using a back-translation procedure to ensure semantic equivalence. Although a fully standardized Bulgarian version of the VVQ is not formally established, the instrument has been widely used in cognitive style research and demonstrates satisfactory psychometric properties. Internal consistency of the subscales was assessed using Cronbach's alpha, with values exceeding 0.70, indicating acceptable reliability (85). Previous research supports the construct validity of the VVQ in measuring verbal, visual, and imagery – based cognitive processing preferences (86). Data were collected using a self-administered electronic questionnaire. Participants were informed about the purpose of the study and assured of anonymity and confidentiality.

Completion time was approximately 10–15 minutes. Respondents were instructed to consider advertising-related contexts while answering the questionnaire in order to enhance ecological validity. Statistical analyses included descriptive statistics, independent-samples t-tests, one-way ANOVA, and ANCOVA. Assumptions of normality, homogeneity of variances, and independence were tested and met. Statistical significance was evaluated at $\alpha = 0.05$. The study was conducted in accordance with general ethical standards for social science research.

RESULTS CONCERNING THE EFFECT OF GENDER ON VERBAL–VISUAL COGNITIVE STYLES

To examine whether statistically significant differences exist between male and female respondents with respect to verbal–visual cognitive styles, independent-samples t-tests and a one-way analysis of variance (ANOVA) were conducted.

The results of the independent-samples t-test for the Visualizer subscale indicate a statistically significant difference between the two genders. Levene's test did not reveal a violation of the assumption of homogeneity of variances ($F = 0.671$, $p = 0.413$); therefore, results assuming equal variances were interpreted. Female respondents ($M = 3.26$, $SD = 0.79$) reported significantly higher mean scores than male respondents ($M = 3.05$, $SD = 0.82$), $t_{(423)} = -2.62$, $p = 0.009$. This finding suggests that gender is associated with differences in visual cognitive style, with a stronger tendency observed among female respondents. Similar patterns have been reported in previous studies, suggesting that women tend to demonstrate greater sensitivity to visual and nonverbal information cues during information processing and message evaluation **(**87**), (Table 1).**

Table 1. *Independent-samples t-test for the Visualizer scale by gender*

Visual Scale	**F**	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**
Equal variances assumed	0.671	0.413	-2.621	423	0.009	-0.208	0.079
Equal variances not assumed			-2.601	345.451	0.010	-0.208	0.080

In contrast, no statistically significant gender differences were found for the Verbalizer subscale. Although Levene's test indicated inequality of variances ($F = 6.317$, $p = 0.012$), the results of the t-test under both equal and unequal variance assumptions revealed no significant difference between male and female respondents ($t = -0.001$, $p = 0.999$). Mean scores were identical for both groups ($M = 2.72$), suggesting that gender **is not associated with differences in verbal cognitive orientation**. This result is consistent with prior research **indicating that verbal information processing tends to show relatively stable patterns across genders** (88, 89**), (Table 2).**

Table 2. *Independent-samples t-test for the Verbalizer subscale by gender*

Verbal Scale	**F**	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**
Equal variances assumed	6.317	0.012	-0.001	423	0.999	0.000	0.077
Equal variances not assumed							

Note: No statistically significant difference was observed between male and female respondents on the Verbalizer scale.

A different pattern emerged for the Dreamer (imagery-based processing) subscale. The results demonstrate a statistically significant gender difference, with no violation of variance homogeneity (Levene's test: $F = 0.678$, $p = 0.411$). Male respondents ($M = 3.03$, $SD = 0.75$) exhibited higher mean scores than female respondents ($M = 2.82$, $SD = 0.80$), $t_{(423)} = 2.72$, $p = 0.001$. This finding indicates that gender **is associated with differences in imagery-based cognitive processing**, with males **showing a stronger tendency toward mental imagery (90,91)**. Comparable findings have been reported in studies emphasizing men's greater reliance on **spatial and**

imagery-based strategies when forming mental representations **(87)**, **(Table 3).**

Table 3. *Independent-samples t-test for the Dream Scale by gender*

Dream Scale	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	0.678	0.411	2.718	423	0.001	0.211	0.077
Equal variances not assumed							

Note: Male respondents scored significantly higher than female respondents on the Dreamer scale.

The results of the one-way ANOVA further corroborate these findings. A statistically significant effect of gender was observed for the Visualizer subscale ($F = 6.87$, $p < 0.01$) and for the Dreamer subscale ($F = 7.39$, $p < 0.01$), whereas no significant effect was found for the Verbalizer subscale ($F = 0.003$, $p = 0.999$). These results clearly indicate that female respondents tend to exhibit greater visual orientation, while male respondents tent to demonstrate stronger imagery-based cognitive processing, whereas verbal orientation does not differ by gender **(Table 4).**

Table 4. *Effect of gender on verbal–visual cognitive styles (ANOVA)*

Independent Variable	Dependent Variable	Mean (Male)	Mean (Female)	F	p-value
Gender	Visualizer Scale	3.05	3.26	6.87	< 0.01
Gender	Verbalizer Scale	2.72	2.72	0.003	0.999
Gender	Dreamer Scale	3.03	2.82	7.39	< 0.01

Note: Gender has a statistically significant effect on the Visualizer and Dreamer subscales, but not on the Verbalizer subscale.

In summary, the findings suggest that gender is associated with differences in visual and imagery-based cognitive styles, but not verbal cognitive style. These results support a differentiated approach to the analysis of verbal–visual cognitive styles and underline the importance of considering specific cognitive dimensions when examining gender differences in advertising perception (85, 86). Such findings align with process-oriented models of information processing, which emphasize the role of individual cognitive preferences in shaping responses to advertising stimuli (88).

RESULTS CONCERNING THE EFFECT OF EDUCATION ON VERBAL–VISUAL COGNITIVE STYLES

In order to examine whether educational attainment is associated with differences in verbal–visual cognitive styles, a one-way analysis of variance (ANOVA) was conducted for each cognitive style dimension. Education was operationalized across five levels: secondary education, secondary specialized education, bachelor's degree, master's degree, and doctoral degree. This approach allows for the examination of potential differences in information-processing preferences associated with educational background, as suggested in prior research on cognitive styles and learning environments.

Table 5. *Effect of education on verbal–visual cognitive styles (ANOVA)*

Independent Variable	Dependent Variable	Mean (Secondary)	Mean (Secondary specialized)	Mean (Bachelor)	Mean (Master)	Mean (PhD)	F	p-value
Education	Visualizer Scale	3.07	2.98	3.05	3.59	3.36	11.20	< 0.001
Education	Verbalizer Scale	2.83	2.63	2.89	2.57	2.99	3.73	< 0.005
Education	Dreamer Scale	2.94	3.02	2.76	2.71	3.10	3.74	< 0.005

Following the results presented in **Table 5,** statistically significant effects of education were observed across all three cognitive style dimensions. The strongest effect emerged for the Visualizer Scale, where respondents holding a master's degree reported the highest mean scores. This finding is consistent with previous research suggesting that higher levels of education may be associated with increased reliance on visual representations when processing complex or abstract information (83).

Significant differences were also found for the Verbalizer and Dreamer scales. Respondents with doctoral degrees demonstrated higher mean scores on both dimensions, indicating stronger verbal and imagery-based processing tendencies. These results **suggest that advanced educational experience may be associated with greater cognitive flexibility and the use of multiple information-processing strategies** (87, 88).

COMBINED EFFECTS OF GENDER AND EDUCATION (ANCOVA)

To examine whether educational attainment is associated with differences in the relationship between gender and verbal–visual cognitive styles, an analysis of covariance (ANCOVA) was conducted, with gender entered as a fixed factor and education treated as a covariate. This approach allows for the examination of gender differences in cognitive styles while statistically controlling for educational background, as recommended in prior research on demographic influences on information processing and cognitive development.

The ANCOVA results provide insight into combined effects of gender and education on verbal–visual cognitive styles. After controlling for education, gender remains a statistically significant factor associated with differences in the Visualizer Scale ($F = 6.45$, $p < 0.01$) and the Dreamer Scale ($F = 7.02$, $p < 0.01$). In contrast, no statistically significant gender effect is observed for the Verbalizer Scale once education is included as a covariate ($F = 0.01$, $p = 0.99$). These results **suggest that educational attainment does not fully account for gender-related differences** in visual and imagery-based cognitive processing, while verbal cognitive orientation **appears to remain relatively stable across genders** when educational background is taken into account.

This pattern is consistent with theoretical perspectives that conceptualize cognitive styles as relatively enduring individual predispositions rather than outcomes determined solely by formal education. Although education contributes to the development and refinement of information-processing strategies, prior studies suggest that cognitive styles represent stable modes of perceiving, organizing, and transforming information that persist across contexts and over time (88). The persistence of gender differences in visual and imagery-based cognitive styles after statistical control for education is also consistent with previous empirical findings on gender-related differences in nonverbal sensitivity, mental imagery, and visual–spatial processing (84,85,88).

From a communication and advertising perspective, these findings are in line with process-oriented models of mediated message processing, which emphasize the interaction between individual cognitive predispositions and message characteristics in shaping attention, interpretation, and evaluative responses to advertising stimuli (89).

DISCUSSION

The present study contributes to the growing body of research on verbal–visual cognitive styles by offering an integrated examination of gender and education as key demographic determinants within the context of advertising perception. The findings suggest that gender-related differences persist primarily in visual and imagery-based cognitive orientations, while verbal cognitive style appears comparatively stable across demographic groups. These results are consistent with contemporary cognitive style theories, which conceptualize verbal and visual processing preferences as partially independent dimensions rather than as mutually exclusive or uniformly distributed traits (88).

The observed tendency for females to exhibit stronger visual cognitive orientation is consistent with previous research indicating women's greater sensitivity to visual and nonverbal cues during information processing and communication (84,85). Previous studies in advertising and consumer research similarly report that female consumers tend to be more responsive to visual imagery, aesthetic attributes, and symbolic representations in mediated messages (87). Such findings have been associated with differences in attentional focus, nonverbal decoding accuracy, and

holistic processing tendencies, which may enhance the salience of visual advertising elements for female audiences.

In contrast, the stronger imagery-based (dreamer) cognitive orientation observed among male respondents is in line with research suggesting men's greater reliance on spatial, integrative, and imagery-based strategies when constructing mental representations (88). Studies in cognitive psychology indicate the imagery-based processing may facilitate the synthesis of complex information into coherent mental models, particularly in contexts involving abstract or symbolic content. Within advertising environments, such processing tendencies may support narrative engagement, imaginative elaboration, and associative thinking, which are often activated by symbolic or metaphorical advertising formats.

Notably, the absence of significant gender differences in verbal cognitive orientation is consistent with prior findings suggesting that verbal information processing exhibits relatively stable patterns across genders, especially in standardized or text-based communication contexts (85). This is in line with the gender similarities hypothesis, which posits that men and women are more alike than different across many cognitive domains, particularly those shaped by formal education and shared linguistic environments (86). The present findings therefore **highlight the importance of avoiding** overgeneralized assumptions regarding gender differences in verbal processing preferences.

The results concerning education further underscore the role of cognitive experience and learning environments in shaping verbal–visual cognitive styles. The association between higher educational attainment and differentiated cognitive processing patterns is consistent with research suggesting that advanced education may promote cognitive flexibility and the strategic use of multiple information-processing modes. Individuals with higher levels of education may develop greater capacity to adaptively shift between verbal, visual, and imagery-based processing depending on task demands, message complexity, and contextual cues.

Importantly, the combined analysis of gender and education suggests that while educational attainment may contribute to the refinement of cognitive strategies, it does not fully account for gender-related differences in visual and imagery-based cognitive styles. This finding **is consistent with theoretical perspectives that conceptualize** cognitive styles as relatively enduring predispositions, shaped by both biological and socio-cultural influences, rather than as outcomes determined solely by formal education. Prior research similarly emphasizes that cognitive styles tend to remain stable across time and contexts, even as individuals acquire new knowledge and skills (88).

From an advertising and communication standpoint, these findings have meaningful implications. Process-oriented models of mediated message processing emphasize that audience responses are shaped by the interaction between message characteristics and individual cognitive predispositions (89). Visual and imagery-based cognitive styles, in particular, have been shown to be associated with attention allocation, message elaboration, memory retention, and persuasive outcomes (92,96). Consequently, advertising strategies that rely exclusively on demographic segmentation without considering underlying cognitive style differences may overlook important sources of variability in message effectiveness.

Overall, the present study supports a more nuanced, multidimensional approach to understanding advertising perception. By demonstrating that gender and education jointly shape verbal–visual cognitive style orientations, the findings suggest that future research could benefit from moving beyond isolated demographic predictors and toward more integrative models that account for cognitive diversity among consumers. Such approaches may enhance both theoretical precision and practical effectiveness in the design and evaluation of advertising messages.

CONCLUSION

The present study examined the role of gender and education as factors associated with verbal–visual cognitive styles within the context of advertising perception. By adopting an integrated analytical approach, the research suggests that demographic characteristics may contribute to individual differences in information-processing preferences. The findings indicate that gender is associated with systematic differences in visual and imagery-based cognitive styles, whereas verbal cognitive orientation appears comparatively stable across genders.

In addition, the results suggest that educational attainment is associated with differences across all dimensions of verbal–visual cognitive styles, indicating that cognitive processing preferences **may be influenced not only by inherent predispositions but also by accumulated learning experiences**. However, the persistence of gender-related differences in visual and imagery-based cognitive orientations after controlling for education suggests the relative stability of these cognitive styles over time.

From a theoretical perspective, the study is consistent with multidimensional models of cognitive styles that emphasize the interaction between individual predispositions and socio-demographic factors. From a practical standpoint, the findings highlight the potential importance of considering cognitive style diversity when designing and evaluating advertising messages, as reliance on demographic segmentation alone may be insufficient to capture variability in advertising perception and effectiveness. Overall, the study contributes to a more nuanced understanding of how gender and education jointly shape verbal–visual cognitive styles and offers a foundation for future research exploring cognitive diversity in mediated communication contexts.

REFERENCES

1. Cronbach, L. J.; Snow, R. E., *Aptitudes and Instructional Methods: A Handbook for Research on Interactions*. Irvington, New York, NY, USA, 1977.
2. Messick, S., Individuality in learning. *J Individ Psychol*, 32:4–16, 1976.
3. Lang, A.; Borse, J.; Wise, K.; David, P., Captured by the world wide web: Orienting to structural and content features of computer-presented information. *Commun Res*, 29:215–245, 2002.
4. Rayner, K.; Castelhano, M. S., Eye movements during reading, scene perception, and visual search. *Q J Exp Psychol*, 61:120–141, 2008.
5. Graesser, A. C.; McNamara, D. S.; Louwerse, M. M.; Cai, Z., Coh-Metrix: Analysis of text on cohesion and language. *Behav Res Methods*, 36:193–202, 2004.
6. Kozhevnikov, M., Cognitive styles in the context of modern psychology: Toward an integrated framework of cognitive style. *Psychol Bull*, 133:464–481, 2007.
7. Jonassen, D. H.; Grabowski, B. L., *Handbook of Individual Differences, Learning, and Instruction*. Lawrence Erlbaum Associates, Hillsdale, NJ, USA, 1993.
8. Kirby, J. R.; Moore, P. J.; Schofield, N. J., Verbal and visual learning styles. *Contemp Educ Psychol*, 13:169–184, 1988.
9. Paivio, A., *Imagery and Verbal Processes*. Holt, Rinehart and Winston, New York, NY, USA, 1971.
10. Paivio, A., *Mental Representations: A Dual Coding Approach*. Oxford University Press, Oxford, UK, 1986.
11. Riding, R. J.; Douglas, G., The effect of cognitive style and mode of presentation on learning performance. *Br J Educ Psychol*, 63:297–307, 1993.
12. Riding, R. J.; Ashmore, J., Verbalizer–visualizer cognitive style and learning performance. *Educ Stud*, 6:1–14, 1980.
13. Lagerwerf, L.; van Hooijdonk, C.; Korenberg, A., Processing visual metaphors: A dual-task experiment. *Metaphor Symbol*, 27:180–195, 2012.
14. Courtney, A. E.; Lockeretz, S. W., A woman's place: An analysis of roles portrayed by women in magazine advertisements. *J Mark Res*, 8:92–95, 1971.
15. McArthur, L. Z.; Resko, B. G., The portrayal of men and women in American television commercials. *J Soc Psychol*, 97:209–220, 1975.
16. Goffman, E., *Gender Advertisements*. Harper & Row, New York, NY, USA, 1979.
17. Eisend, M., Gender roles. In: *Handbook of Research on Gender and Marketing*; Zotos, Y.; Eisend, M., Eds.; Edward Elgar Publishing, Cheltenham, UK, pp 65–82, 2019.
18. Grau, S. L.; Zotos, Y., Gender stereotypes in advertising: A review of current research. *Int J Advert*, 35:761–770, 2016.
19. Hall, J. A., *Nonverbal Sex Differences: Communication Accuracy and Expressive Style*. Johns Hopkins University Press, Baltimore, MD, USA, 1984.
20. Levy, S. J.; Sternthal, B., Gender differences in information processing: A selectivity interpretation. *J Consum Res*, 18:66–74, 1991.
21. Putrevu, S.; Gentry, J. W.; Fisher, J. E., The moderating role of gender in advertising processing. *J Advert*, 43:403–418, 2014.
22. Snow, R. E., Aptitude-treatment interactions as a framework for research on individual differences in learning. *Educ Psychol*, 24:205–218, 1989.

23. Lesser, G. S., *Psychology and Educational Practice*. Scott, Foresman, Glenview, IL, USA, 1971.
24. Riding, R. J.; Sadler-Smith, E., Type of instructional material, cognitive style and learning performance. *Educ Stud*, 18:323–340, 1992.
25. Jackson, C. J.; Lawty-Jones, M., Explaining the overlap between personality and learning styles. *Pers Individ Dif*, 18:293–300, 1995.
26. Blazhenkova, O.; Becker, M.; Kozhevnikov, M., Object–spatial imagery and verbal abilities. *Int J Psychol*, 46:32–42, 2011.
27. Ashmore, R. D.; Del Boca, F. K., Conceptual approaches to stereotypes and stereotyping. In: *Cognitive Processes in Stereotyping and Intergroup Behavior*; Hamilton, D. L., Ed.; Lawrence Erlbaum Associates, Hillsdale, NJ, USA, pp 1–35, 1981.
28. Lang, A.; Zhou, S.; Schwartz, N.; Bolls, P. D.; Potter, R. F., The effects of edits on arousal, attention, and memory for television messages. *Media Psychol*, 2:1–25, 2000.
29. Rossiter, J. R., Visual imagery and advertising. *J Consum Res*, 14:473–479, 1988.
30. Dobni, D.; Zinkhan, G. M., In search of brand image: A foundation analysis. *Adv Consum Res*, 17:110–119, 1990.
31. Jonassen, D. H.; Grabowski, B. L., *Handbook of Individual Differences, Learning, and Instruction*. Lawrence Erlbaum Associates, Hillsdale, NJ, USA, 1993.
32. Riding, R. J.; Cheema, I., Cognitive styles—An overview and integration. *Educ Psychol*, 11:193–215, 1991.
33. Messick, S., The nature of cognitive styles: Problems and promise in educational practice. *Educ Psychol*, 19:59–74, 1984.
34. Kozhevnikov, M.; Kosslyn, S. M.; Shephard, J. M., Spatial versus object visualizers: A new characterization of visual cognitive style. *Mem Cognit*, 33:710–726, 2005.
35. Blazhenkova, O.; Kozhevnikov, M., The new object–spatial–verbal cognitive style model. *Psychol Aesthet Creat Arts*, 3:80–93, 2009.
36. Clark, J. M.; Paivio, A., Dual coding theory and education. *Educ Psychol Rev*, 3:149–210, 1991.
37. Richardson, A., *Mental Imagery*. Springer Publishing, New York, NY, USA, 1969.
38. Riding, R. J.; Rayner, S., *Cognitive Styles and Learning Strategies*. David Fulton Publishers, London, UK, 1998.
39. Riding, R. J.; Douglas, G., The effect of cognitive style and mode of presentation on learning performance. *Br J Educ Psychol*, 63:297–307, 1993.
40. Mayer, R. E.; Massa, L. J., Three facets of visual and verbal learners. *J Educ Psychol*, 95:833–846, 2003.
41. Plass, J. L.; Chun, D. M.; Mayer, R. E.; Leutner, D., Cognitive load in reading a foreign language text with multimedia aids and the influence of verbal and spatial abilities. *Comput Hum Behav*, 19:221–243, 2003.
42. Kosslyn, S. M.; Thompson, W. L.; Ganis, G., *The Case for Mental Imagery*. Oxford University Press, New York, NY, USA, 2006.
43. Pearson, J.; Naselaris, T.; Holmes, E. A.; Kosslyn, S. M., Mental imagery: Functional mechanisms and clinical applications. *Trends Cogn Sci*, 19:590–602, 2015.
44. Halpern, D. F., *Sex Differences in Cognitive Abilities*. Lawrence Erlbaum Associates, Hillsdale, NJ, USA, 2000.
45. Hyde, J. S., Gender similarities hypothesis. *Am Psychol*, 60:581–592, 2005.
46. Hall, J. A., *Nonverbal Sex Differences: Communication Accuracy and Expressive Style*. Johns Hopkins University Press, Baltimore, MD, USA, 1984.
47. Kimura, D., *Sex and Cognition*. MIT Press, Cambridge, MA, USA, 1999.
48. Voyer, D.; Voyer, S.; Bryden, M. P., Magnitude of sex differences in spatial abilities: A meta-analysis. *Psychol Bull*, 117:250–270, 1995.
49. Linn, M. C.; Petersen, A. C., Emergence and characterization of sex differences in spatial ability. *Child Dev*, 56:1479–1498, 1985.
50. Courtney, A. E.; Lockeretz, S. W., A woman's place: An analysis of roles portrayed by women in magazine advertisements. *J Mark Res*, 8:92–95, 1971.
51. Eisend, M., Gender roles in advertising. *Int J Advert*, 29:417–439, 2010.
52. Putrevu, S., Exploring the origins and information processing differences between men and women. *Acad Mark Sci Rev*, 10:1–14, 2004.

53. Meyers-Levy, J.; Sternthal, B., Gender differences in the use of message cues and judgments. *J Mark Res*, 28:84–96, 1991.
54. Darley, W. K.; Smith, R. E., Gender differences in information processing strategies: An empirical test. *J Advert*, 24:41–56, 1995.
55. Meyers-Levy, J.; Loken, B., Revisiting gender differences: What we know and what lies ahead. *J Consum Psychol*, 25:129–149, 2015.
56. Eisend, M., Explaining the impact of gender stereotypes in advertising. *J Advert*, 48:1–13, 2019.
57. Snow, R. E., Aptitude–treatment interaction as a framework for research on individual differences in learning. *Educ Psychol*, 24:205–218, 1989.
58. Kolb, D. A., *Experiential Learning: Experience as the Source of Learning and Development*. Prentice Hall, Englewood Cliffs, NJ, USA, 1984.
59. Curry, L., An organization of learning styles theory and constructs. *Educ Res Inf Cent*, 9:1–28, 1983.
60. Anderson, J. R., *Cognitive Psychology and Its Implications*. W.H. Freeman, New York, NY, USA, 2000.
61. Bruner, J. S., *The Process of Education*. Harvard University Press, Cambridge, MA, USA, 1960.
62. Chi, M. T. H.; Glaser, R.; Farr, M. J., *The Nature of Expertise*. Lawrence Erlbaum Associates, Hillsdale, NJ, USA, 1988.
63. Mayer, R. E., *Multimedia Learning*. Cambridge University Press, New York, NY, USA, 2009.
64. Riding, R. J.; Sadler-Smith, E., Cognitive style and learning strategies: Some implications for training design. *Int J Train Dev*, 1:199–208, 1997.
65. Plakoyiannaki, E.; Zotos, Y.; Krystallis, A., Gender-based perceptions of advertising ethics. *J Bus Ethics*, 76:1–15, 2008.
66. Ashmore, R. D.; Del Boca, F. K., Conceptual approaches to stereotypes and stereotyping. In: Hamilton, D. L., Ed., *Cognitive Processes in Stereotyping and Intergroup Behavior*. Lawrence Erlbaum Associates, Hillsdale, NJ, USA, pp 1–35, 1981.
67. Lang, A., The limited capacity model of mediated message processing. *J Commun*, 50:46–70, 2000.
68. Lang, A.; Zhou, S.; Schwartz, N.; Bolls, P. D.; Potter, R. F., The effects of edits on arousal, attention, and memory for television messages. *Media Psychol*, 2:1–25, 2000.
69. Petty, R. E.; Cacioppo, J. T., *Communication and Persuasion: Central and Peripheral Routes to Attitude Change*. Springer-Verlag, New York, NY, USA, 1986.
70. Evans, J. S. B. T.; Stanovich, K. E., Dual-process theories of higher cognition. *Perspect Psychol Sci*, 8:223–241, 2013.
71. Eisend, M.; Plakoyiannaki, E., Gender roles and advertising effectiveness: A review and research agenda. *Int J Advert*, 32:1–23, 2013.
72. Riding, R. J.; Ashmore, J., Verbalizer–visualizer cognitive style and learning performance. *Educ Stud*, 6:1–14, 1980.
73. Mayer, R. E.; Massa, L. J., Three facets of visual and verbal learners. *J Educ Psychol*, 95:833–846, 2003.
74. Lang, A.; Borse, J.; Wise, K.; David, P., Captured by the world wide web: Orienting to structural and content features of computer-presented information. *Commun Res*, 29:215–245, 2002.
75. Miron, D.; Bryant, J.; Zillmann, D., Individual differences in information processing and persuasion. *Media Psychol*, 3:1–20, 2001.
76. Halpern, D. F., *Sex Differences in Cognitive Abilities*. Lawrence Erlbaum Associates, Hillsdale, NJ, USA, 2000.
77. Snow, R. E., Aptitude–treatment interaction as a framework for research on individual differences in learning. *Educ Psychol*, 24:205–218, 1989.
78. Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). Thousand Oaks, CA: SAGE Publications.
79. Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11
80. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory* (3rd ed.). New York, NY: McGraw-Hill.
81. Hall, J. A., *Nonverbal Sex Differences: Communication Accuracy and Expressive Style*. Johns Hopkins University Press, Baltimore, MD, USA, 1984.

82. Putrevu, S.; Gentry, J. W.; Fisher, J. E., Exploring the relationship between gender differences and information processing. *J Advert*, 23:41–56, 1994.
83. Hyde, J. S., The gender similarities hypothesis. *Am Psychol*, 60:581–592, 2005.
84. Meyers-Levy, J.; Sternthal, B., Gender differences in the use of message cues and judgments. *J Mark Res*, 28:84–96, 1991.
85. Kozhevnikov, M.; Kosslyn, S. M.; Shephard, J. M., Spatial versus object visualizers: A new characterization of visual cognitive style. *Mem Cognit*, 33:710–726, 2005.
86. Lang, A., The limited capacity model of mediated message processing. *J Commun*, 50:46–70, 2000.
87. Jonassen, D. H.; Grabowski, B. L., *Handbook of Individual Differences, Learning, and Instruction*. Lawrence Erlbaum Associates, Hillsdale, NJ, USA, 1993.
88. Riding, R.; Cheema, I., Cognitive styles—an overview and integration. *Educ Psychol*, 11:193–215, 1991.
89. Mayer, R. E., Multimedia learning. *Psychol Learn Motiv*, 41:85