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The Relationship Between Cognitive Styles and Learning Strategies of Secondary School Students in Lahore, Pakistan

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Abstract

Cognitive styles and learning strategies are widely assumed to be closely linked, and this assumption underpins advice that teachers should match instruction to students' styles. This study examined whether such a link exists among secondary school students in Pakistan. A descriptive correlational survey design was used. Data were collected from 152 students in public and private secondary schools in District Lahore, selected through simple random sampling (250 questionnaires distributed; 60.8% usable return). Students completed a 15-item paired-statement Cognitive Style Questionnaire and a 40-item adapted version of the Learning Style Survey covering ten strategy dimensions. Data were analysed using descriptive statistics, Pearson correlation and standard multiple regression. Students reported frequent use of all ten strategy dimensions (M = 3.54 to 3.92 on a 0–4 scale). However, the overall correlation between cognitive style and learning strategies was negligible and non-significant (r = .025, p = .763). Only two dimensions showed weak significant correlations with cognitive style: use of physical senses (r = −.166, p = .041) and dealing with multiple inputs (r = .177, p = .029). Together, the ten dimensions explained 13% of the variance in cognitive style (R^2 = .13, adjusted R^2 = .07, F(10, 141) = 2.09, p = .029). The findings suggest that, for these learners, strategy use is largely independent of cognitive style. Strategy instruction may therefore benefit all students, regardless of style.

Keywords: Cognitive Style, Learning Strategies, Learning Styles, Secondary Education, Pakistan.

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1. Introduction

Students in the same classroom take in, organise and remember information in noticeably different ways. Educational psychologists have described these differences using two related but separate concepts: cognitive styles and learning strategies. A cognitive style is a relatively stable, often unconscious, way in which a person perceives and processes information (Riding & Cheema, 1991). A learning strategy, by contrast, is a deliberate action or plan a learner chooses in order to acquire, store, retrieve and use information (Oxford, 1990). Styles describe how a learner tends to think; strategies describe what a learner does.

Many scholars have argued that the two are closely connected, with learners selecting strategies that fit their underlying style (Ehrman & Oxford, 1990; Brown, 2007). This argument has shaped teaching advice internationally and in Pakistan, where teacher-training materials often encourage instruction matched to students' styles. Some empirical studies support it. For example, Shi (2011) found that several cognitive style dimensions correlated with nearly every learning strategy used by Chinese university students of English.

However, this evidence comes mostly from university students and language-learning settings outside Pakistan. More recent work has also questioned whether style labels predict how students actually study (Pashler et al., 2008; Husmann & O'Loughlin, 2019). In Pakistan, research on secondary school students has focused mainly on learning styles and achievement (e.g., Amin et al., 2024). The relationship between cognitive style and the strategies secondary students use has received little attention. Secondary education is a critical stage at which study habits are formed and examination pressure is high, so understanding this relationship has practical value for teachers, parents and curriculum planners.

1.1 Objectives of the Study

The study aimed to:

1. identify the cognitive style preferences of secondary school students;
2. identify the learning strategies used by secondary school students;
3. examine the relationship between cognitive style and learning strategies; and
4. determine whether learning strategy dimensions predict cognitive style.

1.2 Hypotheses

H_o1: There is no significant relationship between cognitive style and learning strategies of secondary school students.

H_o2: Learning strategy dimensions do not significantly predict the cognitive style of secondary school students.

2. Literature Review

2.1 Cognitive Styles

The study of cognitive styles began with Allport's (1937) observation that people show consistent personal patterns in how they perceive and solve problems. The most influential early model was Witkin's field dependence–independence dimension (Witkin et al., 1977). Field-independent individuals tend to separate details from their surrounding context and to analyse information. Field-dependent individuals tend to perceive the whole, rely on contextual cues and favour social

learning. Other dimensions followed, including reflection versus impulsivity, levelling versus sharpening, and analytic versus global processing.

Riding and Cheema (1991) reviewed more than thirty such labels. They concluded that most could be grouped into two basic families: a wholist–analytic dimension, describing whether a person organises information as a whole or in parts, and a verbal–imagery dimension, describing whether a person represents information in words or mental pictures. Cassidy (2004) noted that cognitive styles are generally treated as bipolar and value-neutral: unlike abilities, neither end of a style dimension is inherently better. Styles are thought to be fairly stable over time, although a person may adapt them to the demands of a task.

2.2 Learning Strategies

Learning strategies are conscious, goal-directed actions that learners use to make learning easier, faster and more effective (Oxford, 1990). Oxford grouped them into direct strategies (memory, cognitive and compensation strategies) and indirect strategies (metacognitive, affective and social strategies). Chamot (2005) emphasised that, unlike styles, strategies can be taught, and that explicit strategy instruction improves learning outcomes.

Cohen, Oxford and Chi (2002) developed the Learning Style Survey to help learners connect their preferences with the strategies they use. The survey covers dimensions such as use of physical senses, exposure to learning situations, handling of possibilities, dealing with ambiguity, receiving and processing information, and dealing with language rules, multiple inputs, response time and literal versus figurative meaning. It forms the basis of the learning strategies instrument used in the present study.

2.3 Relationship between Cognitive Styles and Learning Strategies

The theoretical link between styles and strategies is that learners tend to choose strategies that suit their natural way of processing information (Brown, 2007; Cohen & Weaver, 2006). Early qualitative work by Ehrman and Oxford (1990) with adult language learners supported this view. Quantitative studies have reported similar patterns. Li and Qin (2006) found that learning style dimensions, particularly the judging scale, predicted the strategies used by Chinese university learners of English. Shi (2011) reported that synthesising, sharpening, field-independent and impulsive styles correlated positively with most strategies among 170 English majors. Littlemore (2001) found that holistic and analytic learners differed in their use of communication strategies, and Zhang (2023) argued that learners with different cognitive styles respond differently to the same strategies.

Other evidence is more cautious. Li and Qin (2006) observed that high-achieving students were more flexible and often used strategies outside their preferred style. In a review of the learning styles literature, Pashler et al. (2008) found little rigorous evidence that matching instruction to style improves learning. Husmann and O'Loughlin (2019) showed that most of 426 undergraduates did not use study strategies matching their reported learning style, and that strategy use, not style, was related to achievement. In Pakistan, Amin et al. (2024) found no significant achievement differences between seventh-grade students with different learning styles, although differentiated teaching benefited all of them.

2.4 Research Gap

Most studies of the style–strategy relationship have been conducted with university students in foreign-language programmes, particularly in China and Iran. Few have examined secondary

school students, and very few have been conducted in Pakistan, where secondary learners study in a bilingual, examination-driven system. Moreover, the mixed findings above suggest the relationship may be weaker than often assumed. The present study addresses this gap by examining the relationship among secondary school students in Lahore.

3. Research Methodology

3.1 Research Design

The study followed a quantitative, descriptive correlational survey design. This design suits the aim of describing students' cognitive styles and learning strategies and measuring the strength and direction of the relationship between them, without manipulating any variable.

3.2 Population and Sample

The population consisted of students enrolled in public and private secondary schools in District Lahore, Punjab, Pakistan. Students were selected through simple random sampling. A total of 250 questionnaires were distributed, of which 152 were returned complete and usable, giving a response rate of 60.8%. The final sample was therefore 152 students. [Add the number of schools, public/private split, gender split and grade levels of respondents.]

3.3 Instruments

Two self-report instruments were used.

Cognitive Style Questionnaire. This 15-item instrument presents pairs of contrasting statements or words (for example, *logic* versus *values*, or *organise and plan in advance* versus *adapt as things happen*). Respondents divide five points between the two options in each pair, so that each item yields a score from 0 to 5. The items reflect preferences for analytic versus intuitive processing, planned versus flexible behaviour, and introverted versus extraverted interaction. A total cognitive style score was calculated as the mean of the 15 items. [Add the source of this questionnaire.]

Learning Strategies Survey. Learning strategies were measured with 40 items adapted from the Learning Style Survey (Cohen et al., 2002). The items form ten dimensions of four items each: (1) use of physical senses, (2) exposure to learning situations, (3) handling possibilities, (4) dealing with ambiguity and deadlines, (5) receiving information, (6) further processing information, (7) dealing with language rules, (8) dealing with multiple inputs, (9) dealing with response time, and (10) literalness of reality. Items were rated on a five-point frequency scale from 0 (*never*) to 4 (*always*).

3.4 Validity and Reliability

Both instruments were translated into Urdu by subject experts and checked for content validity to ensure students understood the items. [Insert Cronbach's alpha for the cognitive style scale, the learning strategies scale and each dimension, calculated from the SPSS data. Values of .70 or above are generally considered acceptable.]

3.5 Data Collection and Ethical Considerations

Permission was obtained from the department and school authorities before data collection. The researcher briefed students on the purpose of the study and explained the items before administration. Participation was voluntary, responses were anonymous, and students completed the questionnaires independently, without outside influence.

3.6 Data Analysis

Data were analysed using SPSS. Means and standard deviations described students' cognitive style and learning strategy scores. Pearson product-moment correlation tested the relationship between cognitive style and each learning strategy dimension, and between cognitive style and the total learning strategies score. Standard multiple regression was used to examine the combined and individual contributions of the ten strategy dimensions to cognitive style. The significance level was set at $\alpha = .05$ (two-tailed).

4. Results

4.1 Descriptive Statistics

Table 1 presents the means and standard deviations of cognitive style and the ten learning strategy dimensions.

Table 1: *Descriptive Statistics for Cognitive Style and Learning Strategy Dimensions (N = 152)*

Variable	Items	Item mean range	*M*	*SD*
Cognitive style (0–5)	15	3.28–3.75	3.52	0.25
Use of physical senses	4	3.49–3.59	3.54	0.43
Exposure to learning situations	4	3.42–3.70	3.60	0.40
Handling possibilities	4	3.70–3.83	3.77	0.36
Dealing with ambiguity and deadlines	4	3.51–3.77	3.67	0.41
Receiving information	4	3.49–3.78	3.63	0.42
Further processing information	4	3.61–3.92	3.79	0.25
Dealing with language rules	4	3.75–3.96	3.87	0.22
Dealing with multiple inputs	4	3.72–3.96	3.88	0.28
Dealing with response time	4	3.84–4.00	3.92	0.27
Literalness of reality	4	3.74–4.00	3.89	0.21

Note. *Learning strategy items were rated from 0 (never) to 4 (always).*

Students reported frequent use of all ten strategy dimensions, with means between 3.54 and 3.92 on the 0–4 scale. The most frequently reported strategies concerned response time ($M = 3.92$), literalness of reality ($M = 3.89$) and multiple inputs ($M = 3.88$). The least frequently reported concerned use of physical senses ($M = 3.54$) and exposure to learning situations ($M = 3.60$), although these were still high. Cognitive style scores were tightly clustered ($M = 3.52$, $SD = 0.25$), indicating little variation between students.

4.2 Relationship between Cognitive Style and Learning Strategies

Table 2 shows the Pearson correlations between cognitive style and each learning strategy dimension.

Table 2: *Pearson Correlations between Cognitive Style and Learning Strategy Dimensions (N = 152)*

Learning strategy dimension	*r*	*p*
Use of physical senses	−.166*	.041
Exposure to learning situations	.024	.771
Handling possibilities	.023	.775
Dealing with ambiguity and deadlines	.132	.104
Receiving information	−.035	.668
Further processing information	−.070	.393
Dealing with language rules	.040	.626
Dealing with multiple inputs	.177*	.029
Dealing with response time	−.141	.082
Literalness of reality	−.097	.234
Learning strategies (total)	**.025**	**.763**

Note. *$p < .05$ (two-tailed).*

The correlation between cognitive style and overall learning strategies was negligible and not significant ($r = .025$, $p = .763$). Therefore, $H_0 1$ was not rejected for the overall relationship. Of the ten dimensions, only two correlated significantly with cognitive style, and both correlations were weak. Use of physical senses was negatively correlated ($r = −.166$, $p = .041$), and dealing with multiple inputs was positively correlated ($r = .177$, $p = .029$). Each explained about 3% of the variance in cognitive style. The remaining eight correlations were small ($|r| \leq .141$) and not significant.

4.3 Learning Strategies as Predictors of Cognitive Style

Table 3 reports the standard multiple regression with the ten strategy dimensions entered together as predictors of cognitive style.

Table 3: *Standard Multiple Regression of Cognitive Style on Learning Strategy Dimensions (N = 152)*

Predictor	*B*	*SE B*	β	*t*	*p*
Use of physical senses	−0.09	0.053	−.166	−1.85	.066
Exposure to learning situations	0.04	0.053	.063	0.75	.454
Handling possibilities	0.09	0.065	.132	1.41	.161
Dealing with ambiguity and deadlines	0.07	0.054	.123	1.41	.161
Receiving information	−0.06	0.054	−.108	−1.22	.225
Further processing information	−0.10	0.084	−.101	−1.20	.232
Dealing with language rules	0.02	0.104	.024	0.26	.795
Dealing with multiple inputs	0.18	0.083	.205*	2.23	.027
Dealing with response time	−0.14	0.093	−.156	−1.57	.119
Literalness of reality	−0.13	0.126	−.113	−1.04	.300

Note. *R^2 = .13, adjusted R^2 = .07, $F(10, 141) = 2.09$, $p = .029$. *$p < .05$.*

The ten strategy dimensions together explained 13% of the variance in cognitive style (adjusted R^2 = .07), and the model was statistically significant, $F(10, 141) = 2.09$, $p = .029$. H_o2 was therefore rejected. However, the effect was small. Dealing with multiple inputs was the only significant individual predictor (β = .205, $p = .027$). Use of physical senses had a negative coefficient that approached but did not reach significance (β = −.166, $p = .066$).

5. Discussion

The main finding of this study is that cognitive style and learning strategy use were largely unrelated among secondary school students in Lahore. The overall correlation was close to zero, and only two of ten strategy dimensions showed weak significant links with cognitive style. Even with all ten dimensions combined, strategies explained only 13% of the variance in cognitive style, and 7% after adjustment for the number of predictors.

This result differs from studies that reported strong and widespread relationships, such as Shi (2011) and Li and Qin (2006). Several explanations are possible. First, those studies involved

university English majors, whose strategy use may be more developed and more personally chosen. Secondary students in Pakistan learn within a structured, examination-oriented system in which teachers and textbooks largely determine study methods. As a result, students may use similar strategies regardless of their underlying style. Second, cognitive style scores in this sample varied very little (SD = 0.25). Restricted variation in a variable reduces the size of any correlation it can show. Third, students reported very high strategy use across all dimensions, with several items approaching the scale maximum. This ceiling effect may reflect socially desirable responding and also limits the ability to detect relationships.

The findings are, however, consistent with research questioning the strength of the style–strategy link. Husmann and O'Loughlin (2019) found that most students did not use strategies matching their learning style, and Pashler et al. (2008) found little evidence that style-matched instruction improves learning. Li and Qin (2006) also noted that successful learners use strategies flexibly beyond their preferred style. In Pakistan, Amin et al. (2024) found that differentiated teaching helped students of all learning styles, rather than only those whose style it matched.

The two significant dimensions deserve attention. The positive link with dealing with multiple inputs suggests that students with a particular style may be better at filtering relevant information and monitoring grammar, meaning and formality at the same time. This is consistent with the field-independent learner's ability to separate details from context (Witkin et al., 1977). The negative link with use of physical senses suggests that students at the other end of the style dimension rely more on visual, auditory and written cues. Both relationships were weak, so they should be treated as tentative.

Taken together, these results suggest that, at secondary level, learning strategies may be shaped more by instruction and context than by stable cognitive traits. This supports Chamot's (2005) view that strategies are teachable and that explicit strategy instruction can benefit all learners.

6. Conclusion and Recommendations

This study examined the relationship between cognitive style and learning strategies among 152 secondary school students in Lahore. Students reported frequent use of a wide range of learning strategies. However, their strategy use was largely independent of their cognitive style. Only two strategy dimensions, use of physical senses and dealing with multiple inputs, showed weak relationships with cognitive style, and the strategies together accounted for a small share of its variance. The assumption that secondary students' strategies simply follow from their cognitive style was therefore not supported in this context.

Based on these findings, the following recommendations are made:

1. Teachers should teach a broad range of learning strategies explicitly to all students, rather than limiting strategy advice to a student's presumed style.
2. Teacher-training programmes in Punjab should present learning-style matching with caution and give greater emphasis to evidence-based strategy instruction.
3. Schools should help students develop flexibility in using strategies across different subjects and tasks, since flexible strategy use is associated with successful learning.
4. Curriculum developers should build strategy training, such as summarising, organising notes and filtering relevant information, into secondary textbooks and classroom activities.

6.1 Limitations and Future Research

The study has several limitations. The sample was drawn from one district and was relatively small, so the findings may not generalise to rural areas or other provinces. Both instruments relied on self-report and showed ceiling effects, with some items answered identically by nearly all students. The cross-sectional correlational design cannot establish cause and effect. In addition, the study did not examine differences by gender, school type or academic achievement.

Future research should use larger samples from urban and rural schools across Pakistan, validated cognitive style measures such as the Group Embedded Figures Test, and instruments with wider response ranges. Studies should also compare public and private school students, include academic achievement as an outcome, and test whether explicit strategy instruction improves learning for students with different cognitive styles.

Conflict of interest

The authors declare no conflict of interest.

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Ethical approval

The study was conducted with permission from the Department of Education, Leadership and Management, Superior University, Lahore, and the participating schools. Participation was voluntary and anonymous.

Data availability

The data supporting the findings of this study are available from the corresponding author on reasonable request.

Author contributions

N.Y. conceived the study, collected and analysed the data, and wrote the manuscript. T.M.C. supervised the research and reviewed the manuscript.

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