Examination the Relationship between Personal Need for Structure and Need for Cognitive Closure with Students' Learning style

Hesam'aldin Mahfouzi

Department of Educational Science and Psychology at University of Mohaghegh Ardabili, Ardabil, Iran, E-mail: mahfouzi.hesamaldin@gmail.com

Abstract— This research investigated the relationship between Personal Need for Structure (PNS), the Opinions about Learning and Studying (OLS)—which captures classroom-related need for closure—and the Learning Style Inventory (LSI) in a sample of high school students. The primary aim of this study was to shed light on the roles of need for structure and need for cognition in shaping learning styles. Results indicated that PNS, particularly the component "desire for structure" (PNS-F1), showed a positive relationship with scores on Abstract Conceptualization minus Concrete Experience (AC-CE). Additionally, the OLS component "Preference for Structure" was positively associated with AC-CE. A simple linear regression was conducted to predict participants' AC-CE scores based on their PNS-F1 scores, and a significant regression equation was found. These findings suggest that students with a higher Need for Structure are more likely to rely on systematic planning and to develop theories and ideas based on observation rather than engaging actively in new experiences. While this research provides useful insights into the connections between cognitive-epistemic needs and learning styles, further investigations are warranted in this area.

Keywords: Personal Need for Structure, Need for Cognitive Closure, Learning Style Inventory, Students

1. Introduction

Theories of learning and knowledge formation vary widely in their emphasis on different aspects of learning. Most explanations include considerations of motivation, cognition, and underlying individual differences. Some of these theories do not attempt to distinguish clearly between these aspects but instead view them as part of a complex system of interactions (e.g., see [1],[2],[3],[4],[5]). Such approaches recognize that learning is influenced by a dynamic interplay of factors that reflect both individual traits and situational demands.

Lay Epistemic Theory [6] takes a similar approach to the knowledge formation process, applying social-cognitive psychology to address motivational aspects of learning. Within this theory, the term 'Need for Closure (NFC)' refers to an individual's tendency to seek certainty and structure and to avoid ambiguity. While the need for closure can vary depending on the situation, it is also considered a measurable dimension of individual differences in Lay Epistemic Theory [7]

Another closely related motivational factor is Personal Need for Structure (PNS), conceptualized by Neuberg and Newsom, which describes an individual's tendency to avoid complexity in information processing and to seek simple, predictable structures. NFC and PNS share several similarities, as both assume that information processing can be challenging and cognitively taxing, prompting individuals to adopt strategies that reduce the discomfort of complex situations. They also emphasize the situational and social context within which these motivations operate, and both include individual-differences measures that support their theoretical constructs [8],[7].

However, despite their theoretical similarities, studies comparing NFC and PNS have reported a low correlation between their scales, suggesting that they are distinct phenomena [9]; (see also [10]&[11]).

Another relevant concept in this context is learning style, which reflects stable, enduring patterns through which individuals process their environment. Learning styles essentially capture preferences in how people engage in the act of learning [12]. David Kolb developed the Learning Style Inventory (LSI) to examine learners' preferences and to categorize them into four primary approaches. He proposed that people generally tend to favor one of four modes: Concrete Experience, Reflective Observation, Abstract Conceptualization, or Active Experimentation [13].

The present investigation examines the hypothesis that a learner's preference for simple structures (PNS) and cognitive closure (NFC) might be related to, and perhaps predictive of, their preferred learning style.

2 .Method

2.1. Participants

Participants in this study were 248 high school students from Ardabil, Iran (153 females, 91 males, and 4 unspecified/other), studying in the fields of humanities, science, and mathematics during the 2023/2024 academic year. Schools were selected based on availability, and classrooms were used randomly to select participants.

2.2 .Learning Style Inventory (LSI)

The Learning Style Inventory, an educational and research tool developed by Kolb and revised multiple times, is widely used for self-assessment. As Kolb noted, "the LSI usually provides a valuable self-examination and discussion that recognizes the uniqueness, complexity, and variability in individual approaches to learning. The danger lies in the reification of learning styles into fixed traits, such that learning styles become stereotypes used to pigeonhole individuals and their behavior" [13](pp. 290-291).

The Inventory categorizes four learning modes based on individual preferences: Concrete Experience (CE), Reflective Observation (RO), Active Experimentation (AE), and Abstract Conceptualization (AC). The AE-RO score is calculated as AE minus RO, and the AC-CE score as AC minus CE. Zull's research [14] linked these modes to different brain areas, noting that "concrete experiences come through the sensory cortex, reflective observation involves the integrative cortex at the back, creating new abstract concepts occurs in the frontal integrative cortex, and active testing involves the motor brain."

Both the early and newer versions of the LSI have been shown to be reliable and valid across various languages and contexts. This study used the Farsi version of the LSI. Factor analysis and concurrent validity testing showed this adaptation to be reliable, with Cronbach's alpha coefficients ranging between 0.64 and 0.74 for all subdimensions, and Spearman-Brown coefficients ranging between 0.62 and 0.68 for all subdimensions [15].

2.3 .Personal Need for Structure Scale (PNS)

The Personal Need for Structure (PNS) refers to an individual's desire for well-organized and predictable environments, as well as their response to a lack of environmental structure. Thus, individuals who perceive themselves as competent in handling novelty and uncertainty are likely to report lower levels of need for structure and reduced sensitivity to unstructured environments. The original PNS Scale [16] is a 12-item measure designed to assess individual differences in the preference for simple knowledge structures. Following extensive research, Neuberg and Newson [8] introduced a revised 11-item version of the scale. The present study utilizes the Farsi adaptation of this scale [17].

2.4 .Opinions about Learning and Studying Questionnaire (OLS)

The NFC is a 42-item scale developed by Kruglanski and colleagues [18]. Roets and Van Hiel [19] investigated the dimensional structure of the scale and published a revised 41-item version of the NFCS, as well as an abridged 15-item version of this revision [20]. The NFC expresses itself in five facet scales: preference for order, preference for predictability, need for decisiveness, discomfort with ambiguity, and closed-mindedness. The NFCS has been validated multiple times, adapted into various languages and applied across a variety of topics.

The original NFC was not designed for classroom situations, and the content of some items was entirely work-related. Accordingly, DeBacker and Crowson [21] designed a version of the NFC suitable for educational psychology research. Since the participants in the current research are students, and the study examines their learning styles, we used DeBacker and Crowson's version of the NFC, which was adapted into Farsi by Zare and colleagues [22]. This scale is also known as the "Opinions about Learning and Studying (OLS)" and captures two dimensions of classroom need for closure: preference for structure and preference for certainty [21]

3 .Results

Pearson Correlation examined the relationship between Learning styles (includes AC-CE & AE-RO), PNS and OLS. The results revealed statistically significant positive correlation between variables: AC-CE and PNS, $r = .293$, $n = 248$, $p < .020$; AC-CE and PNS-F1, $r = .375$, $n = 248$, $p < .002$; AC-CE. PNS-F1 had the highest correlation between variables. The results indicates there is no statistically significant correlation between AE-RO score and PNS or OLS (or their components). Although OLS was not significantly correlated with AC-CE, one of its two components, OLS-F1 had a positive correlation with AC-CE, OLS-F1, $r = .294$, $n = 248$, $p < .020$

Table 1. Descriptive Statistic and Correlations Results.

	PNS	PNS-F1	OLS-F1	M	SD
AC-CE	.293*	.375**	.294*	6.90	8.04
M	34.20	14.87	33.38	-	-
SD	7.23	3.65	6.60	-	-

Note: mean and standard deviation for AC-CE presented in horizonal rows, and means and standard deviation for PNS, PNS-F1, OLS-F1, represented in vertical columns. AC-CE = Abstract Conceptualization – Concrete Experience, PNS = Personal Need for Structure, PNS-F1 = PNS factor "Desire for the Structure", OLS-F1 = Opinion about Learning and Studying factor "Preference for Structure".

Also a simple linear regression was calculated to predict participant's AC-CE score based on their PNS-F1 score. A significant regression equation was found ($F_{(1,61)} = 9.97$, $p < .002$) with an R2 of . 0.141. Participants predicted AC-CE score is equal to -5.385 + 0.826 (PNS-F1) score. Participant's AC-CE increased 0.834 for each score of PNS-F1.

4. Discussion

Epistemic needs—the fundamental drives that push individuals to seek understanding, knowledge, and shaping how we think, learn, and make decisions. In the context of student learning, these needs influence not only what learners focus on but also how they approach new information and educational tasks. When students have high epistemic needs, particularly the Need for Structure, they often develop distinct strategies that align with their desire for predictability and control in their learning environments. This study sheds light on the intricate relationship between epistemic needs and students' preferred learning styles, adding depth to our understanding of these psychological factors in educational settings.

Our findings suggest that students with a higher Need for Structure are more inclined toward systematic, organized approaches to learning. These students often rely heavily on structured planning, focusing on developing coherent theories and explanations derived from careful observations. Instead of immersing themselves in novel or ambiguous experiences, they prefer to work within established frameworks that allow them to process information predictably and thoroughly. Such learning preferences may reflect their need for cognitive closure, as they are more comfortable with clear, well-defined tasks and outcomes. This insight highlights a crucial area for educators and psychologists: by recognizing the ways epistemic needs shape learning preferences, they can design curricula and interventions that balance structured and experiential learning, providing support for students who may struggle in less structured environments while encouraging them to step outside their comfort zones.

5. Conclusion

In conclusion, the current study underscores the significant role of epistemic needs - especially the Need for Structure - in shaping students' learning preferences and behaviors. By examining how these cognitive motivations align with various learning styles, this research opens a pathway for educators to better understand and support their students. Ultimately, we hope that these findings will capture the attention of researchers, prompting further exploration into this field. Continued investigation could not only broaden the theoretical framework around epistemic needs and learning styles but also enhance practical approaches in education, fostering more adaptive and inclusive learning environments for students across diverse backgrounds.

6. Conflict of Interest

The authors declare no conflict of interest regarding the publication of this article. The research was conducted independently, and no financial, professional, or personal relationships influenced the findings or interpretations presented in this study. All data collection, analysis, and conclusions were based solely on academic principles and were free from any potential bias.

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