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RESEARCH PAPER

Gender Differences in Cognitive Learning Strategies in Pakistani Schools: Implications for Educational Practices

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ABSTRACT

This research analyzes gender equality in cognitive learning approaches among students in schools in Multan, Pakistan, and assesses their educational futures. The study seeks to evaluate how these variations affect students' educational prospects and suggests recommendations to cater this gap. The study examines gender differences in learning strategies influenced by access to resources, culture, and teaching styles by applying Vygotsky's sociocultural theory of cognitive development and learning strategies among male and female students. Structural data analysis tools such as standardized cognitive assessment tests, questionnaires, and interviews with urban and rural school students, teachers, and academic administrators are employed. These tools provide a comprehensive view of the cognitive approaches used by male and female students. The findings reveal that female students tend to engage more in cooperative learning and verbal communication, while male students demonstrate stronger inclination towards visual thinking. These gender-based cognitive differences highlight the need for gender-sensitive teaching models acclimating diverse cognitive patterns in educational access and cultural influences. The study suggests that effective interventions and policies in the Pakistani education system should address gender disparities in education and cognitive achievement.

KEYWORDS Cognitive Learning Strategies, Educational Practices, Gender Differences, Pakistani Schools, Sociocultural Impacts

Introduction

There is a significant agreement on the part of scholars that male and female learners use different learning strategies, and hence a lot of research has been dedicated to this issue. As a result, these differences occur due to the interaction of biological, psychological, and socio-cultural factors (Gurian & Stevens, 2005). It is significant to understand such gender-specific learning strategies to have better educational practices in Pakistani schools that are tailored according to the student's needs. For instance, various studies show that male students function better if presented with data and graphical images, and comprehend and solve problems faster than female students, especially in Mathematics and Science subjects (Halpern, 2012). Female students, on the other hand, are seen to be inclined toward the verbal-linguistic aspect where they perform fairly well on the test scores for reading and writing samples (Naglieri & Rojahn, 2001). These cognitive preferences are, therefore, not purely hard-wired, but rather they are partly accounted for by society's norms and expectations. Customary practices regarding child rearing

regarding the duties of boys and girls also enabled these cognitive inclinations in Pakistan (Ali et al., 2011).

This is because schools in Pakistan have always followed the traditional form of blind education where the male and female students are taught the same way without considering the differences. This lack of awareness is not conducive to achieving students' optimal learning and their achievement, especially that of students whose learning approach does not complement the instructional approaches dominant in the class (Aslam, 2009). Thus, some technologies that are used in Pakistani classrooms, such as the traditional lecture style, may not be beneficial for engaging female students who prefer collaborative and discussion activities (Hussain et al., 2011).

Eradicating these gender differences, entails having prior knowledge about how boys and girls handle information and learning from learning resources. To overcome the effects of these differences teachers and educators have to be prepared with coping methods that range from adopting a combination of visual, auditory, and kinesthetic teaching processes in the classroom (Pashler et al., 2008). Moreover, creating a gender-free learning environment aimed at non-traditional gender roles and students' variety of activity types can enhance equity for boys and girls students and lead to the growth of desirable outcomes (Meece et al., 2006).

The consequence of such analysis is profound in terms of educational policy and practice in Pakistan. Math education has become one of the most heated and critical issues of conversation in the United States of America and recognizing as well as manufacturing gender-specific cognitive learning strategies will assist in facilitating the improvement of transforming teaching and supporting the learning achievement of male as well as female students. The purpose of this research is to shed light on the above-mentioned gender differences and come up with feasible suggestions which will help in infusing gender-sensitive models in the Pakistani contexts of schooling.

Since education has seen vast improvements in research, a niche that remains underexplored in Pakistani schools is gender-specific cognitive learning strategies. Conventional teaching methods in Pakistan fail to address the diverse learning needs of male and female students, leading to hindered learning abilities and achievements for both genders. In practical reasoning, male students often outperform female students, particularly in visual-spatial learning and problem-solving skills. These differences arise from anatomical, neurological factors, and socio-cultural perceptions that shape academic settings and expectations.

The current homogenous educational model in Pakistani classrooms inadequately addresses the needs of a heterogeneous group of learners, potentially widening gender disparities in achievement. This dys-synchronization may result in disenchantment, poor performance, and learning impairments among students whose learning approaches differ from established teaching methods. Additionally, the lack of gender-sensitive teaching methodologies perpetuates gender stereotypes and limits students' ability to develop diverse cognitive skills.

Exploring gender differences in cognitive learning strategies among students in Pakistani schools and understanding their implications for learning is essential. Addressing this issue is crucial for creating educational policies that encompass the cognitive potentials of both male and female students, enhancing their academic achievements and overall learning process. This research aims to fill the identified gap by

presenting findings on gender differences in cognitive learning approaches and providing policy and practical recommendations to improve the Pakistani education system.

Knowledge of cognitive learning styles between males and females is vital in modifying the practices in Pakistani schools to improve students' achievements. The findings of different scholars suggest that, within the context of cognitive preferences and learning approaches, male and female students differ. For instance, a visual-spatial and problem-solving specialty is established to be common among male students, whereas a verbal-linguistic specialty is prominent in female students (Halpern, 2012). These differences are related to the specific aspects of individuals' biology, psychology, and social environment (Gurian & Stevens, 2005). Thus, the study examines the Pakistani context as traditional gender roles and expectations continue to play a large role in students' educational experiences.

The education system of Pakistan particularly focusing on the female section of the country has a major drawback of a centralized teaching style mainly focusing on lectures and examinations as a part of their curriculum. This brings about disengagement, poor academic achievement, and delayed cognitive development, especially for students who use learning styles that are not in harmony with the main learning techniques being practiced (Aslam, 2009). Knowledge of these gender-specific cognitive strategies enables instructors to design an improved learning environment that positively affects the learning of their students, regardless of their gender.

It is believed that handling the nature of male and female learning and studying styles can help to minimize gender prejudices and gender discrimination in studying. Some children are encouraged to have more practice in various thinking skills than other children based on gender differences; thus, equal participation of boys and girls in school activities can promote equal development of the children's thinking abilities. This in turn may assist in narrowing the gender differences in achievement and promote the academic as well as the cognitive and emotional growth of all students (Meece et al., 2006).

Since education is a crucial determinant of future generations' success, proper educational practices must be guided by an accurate understanding of gender-differentiated learning. This study aims to fill this gap by exploring the cognitive learning styles of male and female students in Pakistani schools. The findings will be valuable for educators, policymakers, and curriculum developers to create a gender-friendly educational environment and implement necessary measures to support students' cognitive development, ultimately enhancing their educational performance and achievement.

By examining these gender differences, the study seeks to advance the discussion on educational equality and its efficiency in Pakistan. The findings hold significant importance as they can inform and inspire policy shifts that positively impact the learning environment for all students, regardless of gender, at their educational institutions.

Literature Review

As established in this research, cognitive learning strategies differ between male and female students. The literature review on cognitive learning strategies reveals something more significant: male and female students differ fundamentally in their approaches to learning. According to Halpern (2012), male students are characterized by their ability to perform better in tasks relating to visual-spatial skills and problem-solving part while female students are better endowed in verbal language skills. Thus, the

differences in cognitive skills are attributed to the root causes based on biology and conditioned behavior in a certain culture (Gurian & Stevens, 2005).

Research has also shown that culture and the roles assigned to learners determine their learning behaviors. In many societies, such as Pakistan, cultural norms encourage boys to be more aggressive and assertive, which enhances their performance in problem-solving skills. On the other hand, girls are conditioned to be communicative and cooperate hence developing the verbal and collaborative modes of learning (Cdesq, 2006). Such gender-specific preferences are seen in the contexts where male and female students come across content used in classrooms in different ways.

Education in Pakistan cannot meet students' cognitive needs, as it relies primarily on lecture-based pedagogy and examinations. Aslam (2009) opines that such an approach hinders learning and lowers performance and student engagement, especially for those who learn effectively using certain techniques. This is particularly important especially bearing in mind the socio-cultural setting of Pakistan whereby gender specific roles as well as expectations prevail over educational encounters.

The use of reflection above social norms in the process of learning was examined by Ali et al. (2011) in Pakistani schools. According to their rate, female students use more communication tactics and verbal methods than male students who prefer to use visual and an analytic approach. These results are comparable with other global studies; however, the stylized gender roles that the Pakistani culture enforces intensify these outcomes.

Gender differences have an important bearing on the educational practices that are discussed below. Pashler et al. (2008) stated that their findings support another idea that teaching should be done with variety as students employ different thinking methods. For example, combining such activities as graphics and visual perception with sounds and body movements can be useful for male and female students learning. This is very much the situation in Pakistan where the education system is deemed insufficient to respond to the needs of the learners because it does not fully factor in these differences (Hussain et al., 2011).

However, such an environment has to be built by transforming the existing practices involved in teaching and learning which perpetuate the negative gender stereotype. Meece et al (2006) stress on the need to maintain a classroom atmosphere that will entice every learner to engage in a range of cognitive processes.

Material and Methods

The objective of this research is to explore the effects of gender on learning styles among school-going students in Pakistan. Participants included boys and girls from both district and urban schools in Multan, spanning primary, secondary, and higher secondary levels. The stratified random sampling technique was employed to ensure the inclusion of students from various socioeconomic backgrounds across different regions. The sample consisted of approximately 500 students selected to participate in the study. Self-report questionnaires, such as the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich & De Groot (1990), were used to measure learning strategy inventories, focusing on the cognitive learning strategies utilized by the students. The surveys included commonly asked questions regarding gender, age, socioeconomic status, and level of education. Administration tests were conducted to assess specific cognitive capacities, including spatial, verbal, and problem-solving skills.

Theoretical Framework

This research leverages Vygotsky's socio-cultural theory to explore how sociocultural and environmental factors influence cognitive learning strategies. Vygotsky (1978) posited that cognitive development is a social process, driven by interactions with more knowledgeable individuals and situated within a cultural context. This perspective underscores the importance of understanding how the sociocultural context of Pakistan impacts gender-based learning processes. The study will investigate issues related to the use of cultural tools, language, and social interactions in learning, with a focus on comparing learning approaches between male and female students.

Mcleod, (2020) writes in an article that the Zone of Proximal Development (ZPD), and culture-specific tools are among the ideas included in Lev Vygotsky's (1934, 1978) theory. The ZPD, Vygotsky's second key idea, is connected to the idea of the more informed other. This crucial idea has to do with the distinction between what a child can accomplish on their own and what they can accomplish with the help and support of an experienced partner. As a result, Vygotsky places a lot greater emphasis on social interaction as a learning aid, contending that children will develop on their own, but not to their full potential. The zone of proximal development (ZPD), as he calls the difference between actual and prospective learning, can only be closed by working with adults and other students, he contends. One who possesses more skill or knowledge than the learner about a certain work, procedure, or idea is known as the more knowledgeable other (MKO). To help a child acquire abilities within their zone of proximal development—the space between what they can accomplish on their own and what they can accomplish with assistance—the MKO can be a teacher, parent, coach, or even a peer.

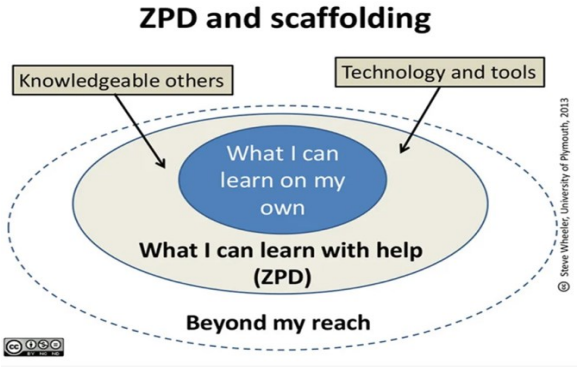

Figure.1 (McLeod, S. (2020)

Results and Discussion

The data analysis section for this study utilizes a systematic approach to evaluate and interpret both quantitative and qualitative data collected from the participants. The goal is to identify and understand gender differences in cognitive learning strategies among students in Pakistani schools and their implications for educational practices.

Table 1
Major Themes and its Interpretation

Major Themes	Description	Interpretation
Visual-spatial learning strategies	Male students exhibit a preference for visual-spatial tasks and problem-solving.	This aligns with findings that boys tend to excel in tasks requiring spatial awareness and problem-solving skills, suggesting a

		need for visual aids and hands-on activities in teaching.
Verbal-linguistic learning strategies	Female students show strengths in verbal-linguistic activities and collaborative learning.	Girls are often socialized to develop strong communication skills, indicating the importance of discussion-based and collaborative learning environments.
Socio-cultural influences on learning	Gender roles and societal expectations shape cognitive learning strategies.	Traditional gender roles in Pakistan influence how boys and girls approach learning, highlighting the need to challenge stereotypes and promote a balanced skill set for all students.
Classroom dynamics and teacher practices	Different teaching methods affect the engagement of male and female students.	The prevalent one-size-fits-all teaching approach may not cater to the diverse cognitive needs of students, indicating a need for differentiated instruction strategies.
Student engagement and academic performance	Engagement levels and performance vary based on the alignment of teaching methods with cognitive strategies.	When teaching methods align with students' cognitive strategies, both engagement and academic performance improve, suggesting tailored instructional practices are beneficial.
Parental and community expectations	Parental expectations influence students' learning strategies and academic choices.	Parents' attitudes towards education and gender roles impact students' learning behaviors and career aspirations, indicating a need for parental involvement in educational reforms.
Barriers to effective learning	Gender-specific barriers such as lack of resources and support for preferred learning strategies.	Identifying and addressing barriers like insufficient resources for visual or verbal learning can help create a more supportive learning environment for both genders.
Implications for educational policy	Recommendations for incorporating gender-sensitive practices in education.	Policies need to incorporate training for teachers on gender-sensitive teaching methods and curricula that address the diverse cognitive strategies of students.

Interpretation of Themes

- Male students preferred *Visual-Spatial Tasks* disclose the necessity for educators to incorporate drawings, diagrams, and overall opportunities for hands-on manipulations into the activity. This may in turn assist in optimizing of their strengths and utilize it in enhancing the learning experience they get. The precise structures and processes that individuals reveal can be linked to their interactions with others, indicating that mental functioning is not solely generated from social contact. Vygotsky, 1979, p. 30, cited in Wertsch & Bivens, 1992 about the use of cultural tools—like diagrams—in cognitive development that is consistent with visual-spatial tasks. With the use of these tools, students can build knowledge through social interactions and mediation of learning.

- Female students' strengths in the zone of *Verbal-Linguistic* should imply that discussion-based learning, group work, and verbal instructions should be the norms in the classrooms so as to provide for the flow of information as the girls capture the strengths of the whole body. Vygotsky's (1978) theory of socio-cultural reflects that language-based social interactions are particularly important for the formation of cognition. Learning through discussion offers a forum for interpersonal communication and mental growth.

- Hence, there is an indication that learning strategies are not equally affected by *Socio-Cultural Norms* and educational tasks and activities ought to challenge stereotypes.

Activities that keep the boys engaged in tasks, and teach knowledge and abilities that are presumed to be for girls and vice versa can go a long way in eradicating these barriers to equality. According to Vygotsky, learning is culturally contingent, with people from various cultures having varying learning styles. According to this view, culture plays a major role, and educators must take into account how it affects the learning environment

As education is ingrained in cultural contexts, dispelling prejudices necessitates altering the cultural narratives around gender and education, prompted by socio-culturalism. (MCW, 2022).

- The study implies that the current practices of training the learners are not sufficient to meet the complex learning needs of learners. Preparing teachers so that they can deliver instruction that is characterized by *differentiation* and help to support both the visual and the verbal learning domains. Vygotsky (1978) advocates a Zone of Proximal Development (ZPD), (referred to in Figure 1) which teaches according to the requirements and capabilities of each learner, is compatible with the concept of differentiated instruction. The learning needs vary from proximity to proximity.

- There is significant correspondence between the teaching modes employed and students' tendencies to engage in *Appropriate Cognitive Processes* which in turn boosts observation and better performance. It shows why there is a need for differentiated instructions that can be used to attend differently to the various students. Vygotsky's concept of scaffolding projects that effective teaching strategies should scaffold students' learning experiences, supporting their cognitive development (Cherry K. 2022). This emphasizes how crucial individualized instruction is in meeting students' varied requirements and promoting their growth within their Zone of Proximal Development (ZPD).

- *Parental Expectations* are very influential in determining the practical behaviors of students in their learning process. Parental involvement in educational reforms as well as increasing awareness about the necessity of supporting numerous approaches to thinking can improve learners' effectiveness. The sociocultural aspect of Vygotsky's theory emphasizes that parents are the pivotal part of the student's social context that shapes their cultural interactions (McLeod, S. (2020).

- Sub-areas like; some of the *Barriers to Learning* including lack of resources to support proactively for the *Particular Learning Style* can be of great help in the development of kinds of interferences. Therefore, it emphasizes the provision of teaching supports and appropriate cultural tools; visual-tactile aids, and verbal cues, which help to minimize the barrier of learning space for effective learning. Further Vygotsky stances that access to resources enables students to let observational learning happen (McLeod, S. (2020).

- The research brings out the importance of *Educational Policies* that include components of the gender policies that must include gender sensitivity to tailor the diverse cognitive needs. Policies should guarantee that educational methods promote equity in learning chances by supporting each student's sociocultural background. Vygotsky talks about the need to train teachers to adopt gender-

sensitive methods of teaching, overhaul the curriculum to embrace a range of cognitive schemes, and ensure all students' comfort for the gender they identify with is cherished (MCW, 2022).

Discussion

It also established that male studentss are more inclined towards visual-spatial learning styles, this way they proved themselves best in everything that deals with space and problem-solving. This finding also supports previous studies stating that boys are quantitatively more perceptive toward a visually savvy task than girls (Halpern, 2012).

In this regard, the preference for demonstration in the Pakistani educational context shows the necessity of integrating graphic aspects, graphics, and manipulations in the studied material. Male students may become demotivated by the existing lecture-based teaching approaches, which may not fully utilize all of their cognitive strengths. In light of this, teachers should employ more visual aids and real-world examples in their lesson plans since this may raise male students' engagement and academic achievement.

The data showed that female students performed well when using their verbal-linguistics possessing learning styles leaning towards the cooperative techniques and such general information processing tasks. Socialization practices in explaining the use of verbal-linguistic strategies among female students are due to the kinder girls' impulse to make their communication skills sound strong (Meece et al., 2006). Thus, this study underlines the significance for educational practices that include discussion, group work, and verbal instructions. However, based on the VARK analysis (Visual, Aural, Read/write, and Kinesthetic) – sensory modalities that are used for learning information (Fleming and Mills (1992), educators can improve the girls' environments and, as a result, their academic success by utilizing verbal-linguistic skills. Further, the modification of the classroom activities that engage them in more verbal and collaborative work may benefit both genders.

Socio-cultural factors such as culture, gender, and the practice that exists between the genders greatly affect learning strategies. Thus, sociocultural perspectives that are considered by Gurian and Stevens (2005) are important to understanding the students' cognitive processes and effects of their education.

In the given cultural context of Pakistan, there might exist certain learning patterns that reflect its gender-related prevailing stereotype and girls' subdued role. For instance, cultural norms and practices may dissuade girls from doing well in arenas with strong VSP (visual support practices; Rutherford, 2015) elements or confine the boy's learning styles to a limited focus on group study. To tackle those sociocultural factors, one has to alter gender-sensitive norms that are prevalent in societies and alter the impartation of education to a model that ensures all learners develop a rich repertoire of thinking skills. Existing strategies of training and teaching students do not allow for individual differences in the cognition process since the teaching techniques in use at the moment are quite standard and based on lectures. Currently, most Pakistani schools may use a single technique of teaching that does not address the individual learning capacity of the male child as compared to the female child.

In light of this study's result, the educational practices have to be more differentiated the practices, as well as outlined more inclusively. Introducing technical methods including differentiated instructions and usage of instruction learning methods are also suitable for making referrals in training teachers to address their learner's

preferred mode of thinking. It was evident that whenever the teaching strategies matched the students' intuitive patterns then there was enhanced response and achievement. Taking these findings into consideration, the analysis underlines the significance of matched teaching behavior and students' achievement and the necessity to take into account students' cognitive affiliations in their choice of instructional practices. Thus, this study underlines the significance of the educators' efforts to integrate the diverse methods of learning-teaching that focus on the approaches that correspond to the VL and VSL learning styles. As such, educators can establish a learning environment that targets set learners' strategies to increase gender variants of learning hence enhancing success rates.

Parents' expectations and societal attitudes play a crucial role in shaping students' learning behaviors and cognitive development. The influence of parents, combined with community pressure to prioritize learning strategies, highlights the need for educational reforms that involve families and communities. Furthermore, parents' educational attitudes and their perceptions of gender roles significantly impact students' cognitive frameworks and academic goals. Promoting diverse forms of thinking and challenging traditional gender roles can enhance the learning environment. Schools should actively involve communities in combating inequality and ensuring the proper cognitive development of all learners, thereby creating a more inclusive and supportive educational experience.

Issues such as limited resources and the encouragement of preferred learning styles affect education in a gender-specific manner. Identifying facilitators and inhibitors to learning is crucial for eliminating barriers in the education field. For example, the lack of adequate resources for visual or auditory learning can hinder students' ability to engage in coursework. Student characteristics, including intellectual styles like analytical thinking, can create barriers to effective learning. However, these barriers can be addressed by providing students with subject-related support materials that align with their cognitive preferences. To ensure academic success for all children, teachers and policymakers must collaborate to provide the necessary resources tailored to each student's needs.

This highlights the need for gender-sensitive policies in the education system to enhance the learning and cognitive development of all students. The findings suggest that educational policies should focus on addressing gender disparities in learning approaches. Teachers should be equipped with strategies for implementing gender-sensitive approaches in classrooms and academic programs should be adjusted to better support the learning processes of both boys and girls. Additionally, efforts should be made to change the gender-biased structures within education. Implementing these changes can help create an effective educational system that fosters cognitive development for all children, regardless of gender.

Conclusion

The present research on gender differences in students' learning strategies in Pakistani schools is significant for stakeholders and educators, as it provides insights into the distinct approaches of male and female learners and their impact on the learning process. These findings are crucial for planning and implementing effective educational interventions. Vygotsky's sociocultural theory focuses on cognitive development is profoundly inspired by social collaborations and the cultural environment where learning happens. These results accentuate the significance of producing educational intrusions that not only cater to the divergent learning styles of male and female students but also encourage collective and socially-mediated learning environments. The study uncovers that male students tend to excel in using pictorial and visual materials, as well as hands-

on problem-solving skills. Therefore, educational practices that incorporate diagrams, models, and manipulatives could better address the needs of boys. Conversely, female students perform better in verbal-linguistic learning styles, which involve collaboration and communication. This suggests a need for more discourse-based and collaborative learning formats that align with girls' strengths in graphical and logical reasoning.

The conclusions drawn from the research on boys' and girls' cognitive learning styles for school in Pakistan have numerous important implications for educational processes. Such implications related to the improvement of approaches to teaching, catering to all learning-encompassing disabilities, and fairness for students:

- Any curricula and instructional methods should take into account the cognitive learners' learning styles. Since Carpenter and Moser's study highlights male students' ability to perform well in the visual-spatial tasks as compared to female students' ability to do well in the verbal-linguistic tasks; therefore, the teaching aids and techniques should also be diverse.
- Classroom teaching should include the use of assistive visual material and graphics, the use of diagrams and models, and manipulatives during Teaching Learning activities. This may assist in grabbing the attention of male students and also in explaining difficult lessons.
- A detailed example is that one should ensure that there are more discussion-based, collaborative, and verbal lessons for the VL learners. This may improve female students' interest and afford them the ability to capitalize on the existing advantages.
- Use methods, which follow the groups and subgroups differentiation in students' cognitive abilities. It entails lesson planning incorporating all three learning modalities namely the visual, the auditory, and the kinesthetic.
- It is thus essential that Teachers and Educators undergo training to enable them to be gender sensitive in their teaching. Sex difference patterns should become one of the objectives for professional development to further effective instructional practices.

The research also highlights that traditional gender differentiation influences students' thinking patterns and learning in the classroom. Vygotsky's theory recommends that these influences are a result of socially constructed roles and norms that can be tested and remodeled through purposeful educational practices. These influences underscore the necessity of challenging stereotypes that are easily perpetuated within the school environment. Additionally, it's possible that the varied cognitive learning styles of pupils are not well supported by the secondary education system's existing pedagogical approaches, which frequently rely on uniform teaching techniques. Teaching strategies that take into account various learning styles—such as verbal-linguistic and visual-spatial—can greatly improve student achievement and the learning process as a whole.

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