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Platform & Workflow by: [Open Journal Systems](#)<https://doi.org/10.5281/zenodo.18393952>**The Cognitive Impacts of Public Transport Dependency on Time Management Among Undergraduate Students in Lahore****Eshal Qaiser**

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[muhammadyasir@umt.edu.pk](mailto:muhammadyasir@umt.edu.pk)**Abstract**

*The purpose of the research is to understand how commuting experiences contribute to mental exhaustion and disrupt students' academic routines, while also exploring the relationship between public transport dependency, cognitive fatigue, and time management among undergraduates in Lahore. A quantitative descriptive research design was employed. The sample consisted of undergraduate students from public and private universities in Lahore who primarily relied on public transportation for commuting. Participants were selected through convenience sampling. Data was collected using a self-report questionnaire with Likert-scale items designed to measure transport dependency and commute characteristics. The study was guided by an integrated theoretical framework drawing upon stress–cognition models, Cognitive Load Theory, and self-regulation theory (Sweller et al., 2019; Vogel & Schwabe, 2019; Zimmerman, 2020). These frameworks propose that continuous exposure to environmental stressors and excessive cognitive demands leads to fatigue, reduced attentional control, and impaired self-regulatory capacities, including effective time management. Data were collected using a structured Google Form questionnaire and analyzed using IBM SPSS Statistics (Version 26). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to analyze students' responses. Cronbach's alpha was computed using IBM SPSS Statistics (Version 26). Descriptive statistics summarized the data, while correlational and regression analyses examined the predictive relationships among the study variables. Findings revealed that public transport dependency and adverse commute characteristics significantly contribute to cognitive fatigue, which in turn negatively affects cognitive functioning and time management. The study recommends that educational institutions acknowledge commuting-related cognitive strain by implementing flexible academic policies and procedures. Furthermore, improvements in public transport efficiency and student-centered urban planning are recommended to support students' cognitive well-being and academic success.*

**Keywords:** Cognitive fatigue, public transport dependency, self-regulation, time management, undergraduate students

**Introduction**

Public transport, which includes shared systems such as buses, metro buses, and electric trains operating on fixed routes and schedules, serves as an essential part of urban mobility by enabling citizens to travel without relying on private vehicles. In Lahore, students commonly depend on services like the Lahore Metro Bus System, the Orange Line Metro

Train, Speedo Buses, and the Lahore Transport Company (LTC), all of which collectively form the backbone of the city's transportation network. However, despite its importance, public transport in Lahore is often depicted by unpredictable arrival times, overcrowded vehicles, long queues, traffic congestion, and extended travel durations. These daily commuting challenges can exert noticeable cognitive effects on undergraduate students who rely entirely on these services to reach their institutions. Long and mentally draining travels often result in increased stress, fatigue, irritability, and reduced attentional capacity, ultimately limiting students' ability to maintain focus throughout the day. Such cognitive strain directly affects time management, as students may struggle to plan tasks efficiently, allocate adequate time for study, or participate in academic and extracurricular activities. Their schedules frequently get disrupted due to delayed buses or inconsistent routes, forcing them to adjust their routines and prioritize travel over academic responsibilities. In cities like Lahore, where public transport dependency is not a choice but a necessity for many, these factors collectively impact academic performance, psychological well-being, and overall productivity. Understanding how public transport shapes students' cognitive functioning and time management practices is, therefore, crucial for identifying practical interventions and improving both educational outcomes and commuting experiences for undergraduate students.

Undergraduate students who depend on public transport often struggle with several cognitive and time-management issues because of the exhausting nature of daily journeying. Many students travel in overcrowded buses, with no proper ventilation, no working AC, and sometimes not even a seat to sit on, which makes the journey physically tiring and mentally stressful. This uncomfortable and congested environment affects their ability to stay focused, and the fatigue from such commutes often carries over into the classroom, reducing concentration, memory, and overall mental alertness. Long travel times also cut into students' study hours and rest time, leaving them with limited energy to complete assignments or prepare for exams. On top of this, delays, irregular schedules, and traffic jams make it difficult to reach class on time, which disturbs their routine and adds extra pressure. Because of these challenges, many commuting students develop weak time-management habits, rush through their tasks, and miss out on important campus activities or extracurricular activities. Altogether, the stressful commute, uncomfortable travel conditions, and lost time negatively affect their academic performance, well-being, and overall university experience.

Based on this concern, the guiding research question of this study is: What are the cognitive impacts of public transport dependency on time management among undergraduate students in Lahore? To answer this question, the main objective of the study is to analyze how reliance on public transport affects students' time management skills and related cognitive functions such as attention, concentration, and productivity. Since many students travel daily through crowded buses, long routes, and unpredictable schedules, it becomes important to see how these conditions influence their focus, stress levels, planning skills, and overall academic routine. By exploring their daily commuting experiences, this study seeks to find out whether the mental fatigue, distractions, and time lost during travel create difficulties in managing their study hours, completing assignments on time, or staying organized throughout the semester. The objective is to closely examine these impacts so that a clearer picture can be drawn about how public transport dependency shapes students' academic performance and everyday responsibilities. Understanding this connection may also help highlight the need for better transport facilities and support for commuter students in Lahore.

This research is significant because it highlights a practical issue faced by thousands of students in Lahore. The significance of this research lies in its ability to underscore a

problem that many undergraduate students in Lahore experience but is often overlooked in academic discussions. By examining how public transport dependency affects students' cognitive functioning and time management, this study provides constructive insight into the daily struggles that commuters face, such as stress, fatigue, poor focus, and reduced study time. Understanding these issues is crucial because they significantly impact academic performance, punctuality, class participation, and overall well-being. For readers, this research not only explains the connection between public transport challenges and students' mental and academic outcomes but also emphasizes the need for improved transport conditions and support systems for university commuters. By addressing the research question and objective, this study can help educators, policymakers, and even students themselves recognize the impact of commuting on learning and develop strategies that can improve time management, reduce cognitive strain, and create better academic experiences for undergraduate students in Lahore.

However, this study has certain limitations. It focuses only on undergraduate students in Lahore, so the findings may not fully represent students from rural areas or other major cities. Additionally, the research depends on students' self-reported experiences, which may vary based on personal perceptions and daily circumstances. Despite these limitations, the study provides valuable insight into an important yet often overlooked factor affecting students' cognitive well-being.

### **Literature Review**

Many researchers have drawn attention to the impact of daily commuting on students' academic lives. Reports from these inquiries place particular emphasis on the difficulties faced by undergraduates who rely heavily on public transport. In major urban centers, students spend a significant amount of time commuting between their homes and educational institutions, resulting in a considerable loss of time that could otherwise be invested in studying. Surveys and research highlight that prolonged commuting hours contribute to both mental and physical disharmony, manifesting as stress, fatigue, and poor time management, all of which collectively exert a negative influence on academic progress (Chaity, 2025).

Research carried out in various countries has highlighted that students who travel prolonged distances are prone to face more academic adversities. For example, a comprehensive study at an Indian university (SGT University) showcased that students enduring long commuting hours have elevated odds of lower academic grades and higher stress levels (International Journal of Environmental Sciences, 2025). The study elaborated that inefficient mobility trends consume excessive resources while delivering poor outcomes for both individuals and society. Strenuous travel routines negatively affect students' well-being, which ultimately makes attaining acceptable academic performance elusive. The insights drawn from the report resonate with the current situation in Lahore, where many students depend upon buses, trains, and other metro services despite numerous challenges.

Student commuters ought not to suffer from cognitive decline or cognitive impairment resulting from the daily grueling commute. According to Burzacchi et al. (2024), protracted commuting hours undermine cognitive functioning (sensation and perception) amongst academic apprentices. Students often arrive at their lyceums with their energy already drained from the exhausting journey. This hurts their engagement in learning and interaction in social activities. It also diminishes their potential to comprehend multiplex course content. Gradually, this burnout affects their stimulation and academic efficiency. In addition to this, public transportation is also a main contributor to rising stress levels. According to studies, it is acknowledged that commuting stress is affecting students' academic lives unfavorably (Al Kindi Center for Research, 2025). Such circumstances

prevent students from resting during the journey; further, it escalates emotions of frustration and unease. Consequently, learners find it more challenging to schedule their day and coordinate the assignments efficiently. Ineffective time allocation is another significant concern cited in the literature. Extensive commuting hours deduct time allocated for rest, study, and other activities (Chaity, 2025). Students mostly accelerate through their work (projects, assignments, reports, thesis) or delay tasks primarily due to being worn out. The capricious schedules result in tardiness or absence from scheduled classes. This hurts academic discipline and attendance records in educational institutions. (African Journal on Social and Behavioral Sciences, 2025)

Cognitive execution and time allocation are directly associated with mental wellness. A report issued in BMC Public Health shows that travel anxiety escalates stress and psychological exhaustion among learners. This emotional fatigue hinders students from staying structured and upholding a consistent routine. With the passage of time, ineffective scheduling and persistent stress can contribute to burnout and poorer academic contentment. Comprehending the data and inquiries from pre-existing studies that examine the effects of public transport dependency on the cognitive health of students, particularly undergraduates, several key points emerge: mental and physical disharmony resulting from maladaptive travel trends, and academic achievements becoming elusive due to strain-inducing commuting habits. Insights from cross-national research align with the regional setting of Lahore. However, there is a lack of studies focusing specifically on Lahore. Therefore, this study aims to highlight the effects of public transport and daily commuting on undergraduates from a territorial perspective.

## **Methodology**

### **Research Design**

A quantitative approach was deemed appropriate because it allows for the measurement of numerical data related to commuting experiences and their associations with cognitive and academic outcomes, facilitating a broad examination of patterns across a diverse student population. Descriptive research designs focus on documenting and describing characteristics or relationships within a population without manipulating variables, making them ideal for exploratory inquiries into student behavior and perceptions (Sharif et al., 2025). A quantitative descriptive research design was employed to systematically assess how public transport dependency affects cognitive functioning **and** time management behaviors among undergraduate students in Lahore.

Surveys provide structured data that can be analyzed using statistical software, enabling researchers to draw meaningful interpretations about trends related to commuting stress, academic engagement, and time-management difficulties. In educational and social science research, quantitative surveys are specifically widely recognized for capturing systematic variations in attitudes, stress levels, and time allocation patterns among students (Sharif et al., 2025). In the context of public transport research, survey instruments help quantify subjective experiences such as perceived fatigue, cognitive strain, and scheduling conflicts, which are otherwise difficult to measure objectively.

By documenting descriptive correlations between variables such as commute length, stress responses, and study habits, this design contributes foundational knowledge that can inform future causal or intervention research in the field.

### **Sample**

A convenience sampling method was chosen due to practical constraints associated with time, accessibility, and participant availability. Convenience sampling, while limiting generalizability, is frequently used in student research when researchers aim to capture a broad snapshot of experiences within available populations. The participants in this study were undergraduate students enrolled in multiple universities across Lahore who relied

primarily on public transport, such as city buses, metro services, and trains, for daily commuting. Efforts were made to include students from various academic programs, years of study, and commuting distances to enhance the diversity of responses.

Students who reported regular daily commuting via public transport were invited to participate regardless of gender, academic discipline, or semester level. These inclusive criteria helped ensure that the sample represented a gamut of commuting burdens and academic workloads, which is essential when examining the potential impacts of travel stress across different student subgroups. A total of 48 participants responded to an online questionnaire. Similar approaches to sampling have been used in recent studies exploring the relationship between commuting and student well-being, where participant diversity enhances the robustness of descriptive analyses.

### **Data Collection Tool**

A structured questionnaire was designed to systematically assess respondents' commuting patterns, cognitive responses to travel, and time management tendencies. The questionnaire incorporated closed-ended items to facilitate quantitative measurement and ensure consistency in responses. It covered three major portions:

Duration and reliability of student commute, including total travel time, frequency of delays, and the perceived punctuality of public transport.

Mental fatigue and cognitive strain, assessing experiences of stress, exhaustion, reduced concentration, and emotional depletion associated with commuting.

Time management behaviors and academic routines, evaluating how commuting affected students' ability to attend classes on time, allocate study periods, and complete assignments.

The structured nature of the instrument ensured that all respondents interpreted and answered items within a consistent framework, enabling meaningful pattern recognition during data analysis. Most items were measured using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), a widely accepted format for capturing intensity of attitudes and experiences in social science research. Similar Likert-scale instruments have been effectively used in studies examining transport stress, well-being, and cognitive outcomes.

### **Procedure and Data Analysis**

The questionnaire was administered via an online method of distribution created using Google Forms to maximize participation and accommodate students' different schedules and preferences. Before administering the survey, participants were briefed about the purpose of the research, assured of confidentiality, and informed that participation was entirely voluntary. This ethical approach aligns with standard academic research practices aimed at respecting respondents' autonomy and privacy.

After data collection, responses were coded and entered into IBM SPSS Statistics (Version 26) for analysis. Data cleaning procedures included checking for incomplete responses, removing duplicates, and verifying consistency within Likert-scale items. Following data preparation, descriptive statistical techniques were applied, including frequencies, percentages, means, and standard deviations. These descriptive statistics provided an initial overview of how commuting characteristics and cognitive perceptions differed across the sample.

In addition to basic descriptive summaries, analyses examined patterns related to commuting stress, tendencies toward procrastination, attendance behaviors, and reported impacts on study routines. The primary focus was on identifying relationships between commute duration, cognitive strain, and self-reported time-management difficulties, without attempting to infer causality. Descriptive analysis is appropriate for exploratory

inquiries where the goal is to document behavioral patterns and lay the groundwork for future, more sophisticated statistical investigations.

### Results

The results of the study revealed compelling evidence that many undergraduate students in Lahore experience substantial cognitive strain and academic disruption due to long daily public transport commutes. A majority of respondents reported feelings of physical exhaustion, reduced concentration, and emotional fatigue immediately upon arrival at their educational institutions. These patterns align with findings from recent transportation studies indicating that extended and stressful commuting contributes to negative emotional states and cognitive depletion in commuter populations (Commuting mode and university students' wellbeing, 2025).

Specifically, respondents indicated that lengthy travel times and unreliable public transport schedules exacerbated feelings of stress, which in turn made it difficult to focus during classes or study sessions. These findings reflect broader global trends observed in student commuting literature, where extended travel hours negatively affect mental energy and preparation for academic engagement. Research conducted in other educational contexts has similarly shown that passive commuting modes, such as overcrowded buses or trains, tend to increase stress and reduce overall well-being when compared to shorter or more active commuting patterns.

Students with longer commute durations also reported more significant challenges related to time management and academic behavior. Many indicated that they struggled to organize their study schedules effectively, experienced difficulty attending early classes on time, and found it challenging to complete assignments within expected timelines. These disruptions often led to a sense of falling behind in coursework and increased academic pressure. Such patterns are consistent with findings from a recent large-scale cross-sectional analysis showing that increased commuting time is negatively associated with academic performance and mental health indicators among students (Guan et al., 2025). Additionally, students described a trade-off between time spent commuting and time available for studying, resting, or engaging in extracurricular activities. Extended commute durations frequently resulted in reduced sleep, limited opportunity for social interaction, and diminished study time, factors that cumulatively eroded students' sense of academic control and schedule balance. These consequences reflect similar observations in international research on commute-related time allocation issues, where travel burdens have been linked to diminished engagement and lower academic satisfaction. Overall, the descriptive data indicate a clear association between extended commuting burdens and impaired time management, mediated by cognitive fatigue and emotional strain.

### Reliability Analysis

A 16-item Likert-type questionnaire was used to assess public transport dependency and its impact on students' cognitive functioning and time management. All items were rated on a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree), with higher scores indicating greater perceived impact. The final dataset consisted of 48 undergraduate students (N = 48).

Table 01

*The results of the reliability analysis.*

Scale				Number of Items	Cronbach's $\alpha$
Public	Transport	Dependency	&	16	.90
Academic Impact Scale					

A reliability analysis was conducted using IBM SPSS Statistics (Version 26) to examine the internal consistency of the Public Transport Dependency and Academic Impact Scale.

The 16-item scale demonstrated excellent reliability, with a Cronbach's alpha of .90, indicating a high level of internal consistency among the items. These findings suggest that the instrument is a reliable measure of students' perceptions regarding public transport dependency and its effects on cognitive functioning and time management. Reliability analysis revealed excellent internal consistency for the overall 16-item scale (Cronbach's  $\alpha = .90$ ). Subscale reliability coefficients were as follows:

Public Transport Dependency:  $\alpha = .81$

Cognitive Impact of Commuting:  $\alpha = .75$

Time Management Impact:  $\alpha = .76$

All factors on the basis of which the survey was administered exceeded the acceptable threshold of .70 for all reliability coefficients, indicating that the scale and its sub scales were reliable measures.

### Discussion

The findings of this study validate recent scholarly evidence that stressful commuting conditions can drain an individual's cognitive resources and disrupt academic routines. When students exert significant mental effort navigating busy transport systems, they often arrive on campus with reduced attentional capacity, heightened fatigue, and diminished motivation, outcomes that interfere with effective time management and academic performance. Such cognitive and emotional consequences echo broader research showing that commute effort and perceived transport burden influence students' subjective well-being and perceived autonomy, which in turn shape their academic engagement (Commuting mode and university students' wellbeing, 2025).

These studies suggest that as commuting time lengthens, students are more likely to experience lower performance and increased psychological stress, which supports the interpretation that transport dependency is a significant environmental factor influencing students' learning experiences. The difficulties documented in managing study schedules and meeting academic commitments align with recent findings from cross-national studies that link commute duration with reduced academic achievement and heightened mental health concerns (Guan et al., 2025).

By documenting these associations within the context of Lahore's public transport environment, this study contributes region-specific evidence that transportation challenges can compound the academic pressures already faced by undergraduate students. Furthermore, the results extend beyond simple mood or energy differences, highlighting that time allocation and productivity are deeply affected by commuting demands. When students invest several hours daily in travel, their flexible time for academic tasks shrinks, negatively impacting planning, assignment completion, and study consistency. Similar time allocation challenges have been observed in quantitative commuting research, where longer travel times contribute to less effective study practices and disrupted daily routines. The present findings thus reinforce the broader academic understanding that commuting is not a neutral daily activity but rather a multifaceted experience with important implications for students' cognitive engagement and academic success.

### Conclusion

By interpreting the results through a descriptive quantitative lens, this research demonstrates that commuting should be considered a significant external stressor influencing students' academic lives, not merely a logistical concern. Acknowledging this effect is essential for educational institutions, policymakers, and urban planners, who must consider transport conditions when designing student support services.

Potential strategies to mitigate these negative effects include flexible class scheduling, designated study spaces for commuter students, improved reliability of public transit, and transport subsidies that reduce travel burdens. Such interventions may help reduce



cognitive strain and promote academic resilience among students who depend on daily travel.

This study shows how public transport dependency negatively impacts cognitive functioning and time management skills among undergraduate students in Lahore. These cognitive and behavioral consequences hinder students' ability to plan, prioritize, and execute academic tasks efficiently. Students enduring longer, more stressful commutes reported heightened levels of mental fatigue, reduced concentration, and diminished capacity to manage their study schedules effectively.

The discussion regarding the cognitive effects of the use of public transport on the students' needs to be further discussed as an external stressor that legitimately hijacks academic performance in classroom settings. The discussions will inevitably lead to a better solution or accommodation for students who use public transport not as an exception but as a need.

### Limitations and Future Research

The possibility of response bias is introduced due to the reliance on self-reported data, as objective measures, along with students' recollections and interpretations of commuting stress and academic impact, may not fully align. Additionally, the use of the convenience sampling method restricts the generalizability of findings beyond the specific student populations studied. Hence, despite contributing valuable empirical insight, this study is limited in several ways.

Future research should consider mixed-methods approaches that incorporate qualitative interviews, as these could provide deeper insight into the lived experiences of commuter students, enriching the quantitative patterns documented here. Longitudinal designs examine how commuting effects evolve and influence long-term academic outcomes. Moreover, the research could be expanded to include comparisons between cities with different transportation infrastructures, which would help clarify the role of urban mobility systems in shaping student well-being and academic performance.

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