

Exploring Cycling Behaviours and Influences: A Study of Junior High School Students in the Effutu Municipality

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Abstract

This study investigated the cycling behaviour of Junior High School students in the Effutu Municipality, exploring the environmental, social, economic, and cultural factors influencing their cycling behaviour. A sample of 300 students was selected using a stratified sampling technique to ensure diverse representation. The instrument utilized was a closed-ended questionnaire that showed good reliability with values of 0.81 and 0.84 for Cronbach's alpha. The mean, standard deviation, and multiple linear regression were used to analyze the data. The findings disclosed a concerning trend from moderately to highly frequent risky behaviours among students, indicating potential safety issues while cycling. Environmental, social, and economic factors significantly influenced cycling behaviour, with safe bike lanes, peer and parental encouragement, and economic considerations related to cycling facilities contributing positively to students' likelihood of cycling. Conversely, cultural factors showed minimal influence on cycling behaviour, suggesting that community perceptions are insufficient to drive behaviour change. The results underscore the need for targeted interventions to enhance cycling safety and promote positive cycling behaviours among adolescents in the Effutu Municipality. The recommendations include the construction of safer cycling infrastructure, the promotion and advocacy of cycling in schools, and community initiatives to foster a cycling-friendly culture.

Keywords

Cycling, Behaviour, Environment, Social, Economic, Cultural, Factors

1. Introduction

The numerous advantages of cycling as a form of transport for social well-being,

sustainability, and health have long been acknowledged (Pucher & Buehler, 2012; Bonham & Koth, 2010). Among adolescents, cycling offers a unique opportunity to integrate physical activity into daily routines, which is chiefly important in addressing the global concern of increasing sedentary behaviour and obesity rates (Larouche et al., 2014). Despite its numerous advantages, cycling participation among adolescents remains relatively low, particularly in developing countries such as Ghana, where infrastructural and socio-cultural challenges pose significant barriers (Heinen, van Wee, & Maat, 2011). Understanding the factors influencing adolescents' cycling behaviours is crucial to promoting active transportation among this age group.

Research on the benefits of cycling for physical and mental health, especially in adolescents, has increased over the past few decades (Donnelly et al., 2016). Frequent cycling has been associated with better mental and physical health, lower stress levels, and higher cognitive performance in teenagers (Larouche, Saunders, Faulkner, Colley, & Tremblay, 2014). Moreover, cycling promotes social interactions among peers and offers opportunities for adolescents to engage with their communities, which can foster a sense of belonging and community cohesion. However, despite these benefits, cycling rates among adolescents remain relatively low in many parts of the world, particularly in urban and suburban areas (Pucher & Buehler, 2012). In some regions, adolescents often rely on motorized transport for their daily commuting, leading to reduced levels of physical activity and contributing to the global obesity epidemic. This raises the question of why adolescents are not cycling more frequently and what barriers prevent them from adopting cycling as a mode of transport or recreational activity.

An array of factors may influence cycling behaviour, particularly among adolescents. Environmental or Ecological factors, such as the accessibility, availability of cycling infrastructure (bike lanes and paths), road safety, distance, and street lighting, play a key role in shaping adolescents' decisions to cycle (Aldred & Jungnickel, 2014). When cycling routes are unsafe, poorly lit, or not integrated into neighborhoods and schools, adolescents may be discouraged from using bicycles for their daily commutes. Research conducted by Pucher, Dill, and Handy (2010) emphasized that first-class cycling infrastructure is a critical determinant in increasing cycling rates. Previous studies indicate that environmental factors, such as the availability of cycling infrastructure and the safety of roads, are key determinants of whether adolescents choose to cycle regularly (Panter et al., 2013). Inadequate cycling paths, poor road conditions, and the absence of secure bicycle storage facilities at schools discourage students from using bicycles as their primary mode of transport (Pucher, Dill, & Handy, 2010). Additionally, research highlights the significant role of social influences, including parental encouragement and peer behaviour, in shaping cycling behaviours among young people (Timperio et al., 2006).

Economic factors also play a pivotal role in influencing cycling participation. Studies have shown that access to bicycles, the cost of maintenance, and the

affordability of cycling gear are critical barriers, particularly for students from low-income families (Heinen et al., 2011). In the Effutu Municipality, where economic disparities are prevalent, these factors likely influence cycling rates among junior high school students. Furthermore, the presence of bicycle-sharing programs and government initiatives can mitigate some of the economic barriers by providing affordable access to bicycles (Fishman, Washington, & Haworth, 2013).

Cultural attitudes toward cycling are equally significant, particularly in communities where cycling is not traditionally seen as a socially accepted or valued mode of transportation (Steinbach, Green, Datta, & Edwards, 2011). Gender stereotypes, for example, may deter female students from riding because they believe it is a sport mostly done by men or because they are afraid for their safety (Garrard, Handy, & Dill, 2012). In the context of Ghana, socio-cultural norms may influence students' perceptions of cycling, either promoting or inhibiting its use depending on how cycling is viewed within the community.

Promoting cycling among junior high school students in the Effutu Municipality requires a comprehensive understanding of these environmental, social, economic, and cultural factors. While cycling could alleviate some of the transportation challenges faced by students, the barriers that prevent its widespread adoption must be addressed. Prior research suggests that a supportive environment, combined with targeted interventions at the community and school levels, can significantly increase cycling participation among adolescents (Panter et al., 2013).

The importance of cycling in reducing the environmental impact of motorized transportation is also well-established. According to Gössling (2013), cycling lowers greenhouse gas emissions, noise pollution, and traffic congestion, all of which are issues in quickly urbanising places. Encouraging adolescents to adopt cycling as a sustainable mode of transport can play a vital role in the Effutu municipality's broader environmental and public health strategies.

Despite the potential advantages of cycling, there is limited empirical data on the specific challenges faced by junior high school students in the Effutu Municipality regarding cycling. Most research on cycling has been conducted in high-income countries, where infrastructure and socio-economic conditions are markedly different from those in Ghana. Most research on cycling has indeed been conducted in high-income countries, where well-established infrastructure and socio-economic conditions facilitate cycling. These studies (Pucher & Buehler, 2008; Gössling, 2013; Buehler & Pucher, 2012; Garrard, Handy, & Dill, 2012; Heinen, van Wee, & Maat, 2011; Panter et al., 2013; Bergström & Magnusson, 2003) often emphasize the role of advanced urban planning, supportive policies, and wealthier populations that can afford both the cost of bicycles and associated safety gear, all of which contribute to higher cycling rates in these regions compared to developing countries like Ghana.

In high-income countries like the Netherlands, comprehensive cycling infrastructure, including bike lanes and traffic-calming measures, has contributed to cycling rates exceeding 30%. Pucher and Buehler (2008) attribute this to strong government support and favorable social attitudes that have normalized cycling

as a primary mode of transport, a stark contrast to developing countries like Ghana, where such infrastructure is limited. Similarly, in Copenhagen, Denmark, [Gössling \(2013\)](#) found that nearly 50% of trips are made by bike, thanks to significant investments in urban planning and cycling infrastructure, a scenario not replicated in Ghana, where infrastructure for cycling is minimal. In Germany, [Buehler and Pucher \(2012\)](#) highlighted that government policies supporting bike-sharing programs and safe routes to schools increased adolescent cycling, but such programs are scarce in Ghana, where law enforcement related to cycling is weak. In Australia, [Garrard, Handy, and Dill \(2012\)](#) showed that gender, safety, and socio-economic factors influenced cycling, with women cycling less due to safety concerns, a challenge also present in Ghana, where cultural norms and safety fears discourage female cyclists. [Heinen, van Wee, and Maat \(2011\)](#) found that in Canada, safe cycling routes and peer influence significantly impacted adolescents' cycling behaviour, emphasizing the role of social acceptance. However, in Ghana, the lower social status of cycling compared to motorized transport deters students from cycling. In the UK, [Panter et al. \(2013\)](#) showed that school programs promoting cycling and providing secure bike storage increased cycling rates, whereas in Ghana, the absence of such programs further discourages students. Lastly, in [Bergström and Magnusson \(2003\)](#) highlighted the importance of infrastructure, such as heated bike lanes, in supporting year-round cycling, underscoring how inadequate infrastructure remains a significant barrier to cycling in Ghana despite its favorable climate.

While significant research on cycling behaviour has been conducted in high-income countries—Netherlands, Denmark, and Germany, limited studies exist focusing on cycling patterns among junior high school students and factors influencing it in developing countries like Ghana. The findings from these countries underscore the critical role of infrastructure, government policies, cultural attitudes, and socio-economic factors in shaping cycling behaviour ([Pucher & Buehler, 2008](#); [Gössling, 2013](#); [Buehler & Pucher, 2012](#)). However, the context in Ghana differs substantially due to underdeveloped cycling infrastructure, minimal government support, and social perceptions that often discourage cycling, especially among Junior High School students. The gap in existing literature lies in the dearth of research examining how these factors play out in lower-income settings like Ghana, particularly among adolescents in rural and semi-urban areas such as the Effutu Municipality. Most studies focus on adult populations or urban environments in wealthier nations, leaving a gap in understanding how adolescents in less-resourced settings navigate cycling as a mode of transportation. Furthermore, while gender differences in cycling have been explored in countries like Australia ([Garrard, Handy, & Dill, 2012](#)), little is known about how cultural norms and gender perceptions affect adolescent cycling behaviour in Ghana, where traditional gender roles may further complicate participation. Additionally, the relationship between these factors in Ghana has not been adequately studied. While research in the UK and Canada shows that school-based cycling education and infrastructure

can boost cycling rates (Panter et al., 2013; Heinen et al., 2011), there is a significant gap in understanding how these factors influence cycling among Ghanaian adolescents. This study endeavours to address the existing gaps in the literature by exploring the environmental, social, economic, and cultural factors that shape the cycling behaviour of junior high school students in the Effutu Municipality. In doing so, the study aims to contribute to a more localized and context-specific understanding of cycling behaviour within the Ghanaian context.

2. Purpose of the Study

This study investigated factors influencing cycling behaviour among Junior High students in the Effutu Municipality.

3. Research Objectives

Specifically, the study sought to:

- 1) Ascertain the cycling behaviour of Junior High School students in the Effutu Municipality.
- 2) Determine factors influencing the cycling behaviour of Junior High School students in the Effutu Municipality.
- 3) Determine factor (s) that significantly influence the cycling behaviour of Junior High School students in the Effutu Municipality.

4. Research Questions

The following research questions were:

- 1) What is the cycling behaviour of Junior High School students in the Effutu Municipality?
- 2) What are the factors influencing the cycling behaviour of Junior High School students in the Effutu Municipality?
- 3) Which factor (s) significantly influence the cycling behaviour of Junior High School students in the Effutu Municipality?

5. Hypothesis

The null hypothesis was tested at a 0.05 level of significance.

H_0 : Environmental factors, social factors, economic factors, and cultural factors do not significantly influence the cycling behaviour of students individually.

6. Significance of the Study

The findings of this study hold significant implications for practice, policy, and theory. Practically, it offers valuable insights into the factors influencing cycling behaviour among adolescents in the Effutu Municipality, enabling educators and community leaders to design targeted interventions and programmes that promote cycling as a sustainable and healthy mode of transportation. On a policy level, the findings can inform local and national policymakers about the necessity

for improved cycling infrastructure, safety measures, and community programmes. Policymakers can leverage this evidence to prioritize investments in cycling-friendly environments, develop supportive regulations, and promote initiatives that enhance cycling safety and accessibility for adolescents. Theoretically, this research contributes to existing literature on cycling behaviour by highlighting the unique socio-cultural and environmental contexts of Ghana, thereby expanding theoretical frameworks related to transportation behaviour and mobility. Additionally, it enriches discussions on gender and socio-economic factors influencing cycling, providing a nuanced understanding of how these elements interact within a developing country context.

7. Theoretical Framework

The Social-Ecological Model (SEM) of health behaviour undergirded this study, which emphasized the interplay between individual, social, environmental, and policy factors in influencing behaviours. SEM posited that behaviour was affected by multiple levels of influence, including personal attributes, social networks, community resources, and broader societal factors (McLeroy et al., 1988). By applying this model, the study aimed to explore how various factors such as personal motivations, peer influence, family attitudes, local infrastructure, and cultural norms-impacted the cycling behaviours of Junior High School students in the Effutu Municipality. This comprehensive approach allowed for a nuanced understanding of the diverse influences that contributed to cycling behaviours.

In applying the Social-Ecological Model, the study assessed several levels influencing cycling behaviour among students. At the individual level, the research examined personal characteristics, such as attitudes toward cycling and perceived barriers. The interpersonal level investigated the role of family and peers in shaping cycling behaviours, highlighting the importance of social support. The community level assessed the availability and quality of cycling infrastructure, such as bike lanes and storage facilities. Finally, at the policy level, the study considered the impact of local policies and initiatives that promoted cycling, evaluating the effectiveness of existing programmes and identifying gaps. The study provided a comprehensive understanding of the factors influencing cycling behaviour, ultimately contributing to targeted interventions and policy recommendations that promoted cycling as a viable mode of transportation in the Effutu Municipality.

The Social-Ecological Model is important to this study because it provides a thorough framework for comprehending the various factors that influence junior high school students' cycling habits in the Effutu Municipality. Through an analysis of these variables and how they interact, the study can offer suggestions for focused actions and regulations that support cycling as a practical and environmentally friendly form of transportation.

8. Methodology

This study adopted a cross-sectional survey design to collect data on the social,

environmental, economic, and cultural factors that influence the cycling behaviour of adolescents. The use of a survey enables the collection of quantitative data, which can be analyzed to identify patterns and relationships between the identified factors and cycling behaviours. The target population for this study comprises all Junior High School students within the Effutu Municipality. To ensure variation in responses, a stratified sampling technique was employed to select students from different classes. This involved dividing the overall population into distinct subgroups, or strata, based on specific characteristics, in this case, the different classes within the junior high schools. This approach, according to [Creswell and Creswell \(2017\)](#), allows researchers to ensure that each class is adequately represented in the final sample, thereby enhancing the reliability and validity of the study.

A five (5) point Likert scale questionnaire was developed as the primary data collection tool. The questionnaire consists of 15 items on cycling behaviour which were adopted from [Useche et al. \(2018\)](#), and 20 self-developed items on factors influencing cycling behaviour, made up of five (5) items addressing one of the main categories of factors (environmental, social, economic, and cultural) influencing cycling behaviour. Validity, on the other hand, refers to the extent to which the instrument measures what it intends to measure ([Bolarinwa, 2015](#)). To ensure content validity, the research team sought input from experts in the fields of cycling behaviour, education, and public health. These experts reviewed the questionnaire items to confirm that they adequately covered the relevant domains of environmental, social, economic, and cultural factors related to cycling behaviour. Moreover, construct validity was assessed through exploratory factor analysis, which helped confirm that the items grouped together as intended, reflecting the underlying factors influencing cycling behaviour. Reliability refers to the consistency of the measurement tool; thus, it should produce stable and consistent results across different instances of use ([Creswell & Creswell, 2017](#)). To enhance reliability, the questionnaire underwent a pilot test with a small group of junior high school students outside the main study population. This preliminary testing allowed researchers to identify any ambiguities or inconsistencies in the questions, enabling necessary adjustments before the final administration of the instrument. The questionnaire gained a Cronbach's alpha of 0.81 for cycling behaviour and 0.84 for influencing factors, indicating a good measure of internal consistency. [Cohen et al. \(2013\)](#) assert that a Cronbach's alpha value of 0.70 or higher is generally considered acceptable, indicating that the items in each scale measured the same underlying construct reliably ([Tavakol & Dennick, 2011](#)). The questionnaire was distributed to selected schools, and students were given sufficient time to complete the survey. Data collection was carried out in a controlled environment, which ensured a 100% return rate and 96% accurate completion rate of the questionnaire.

The collected data were analyzed using a combination of descriptive and inferential statistics. Descriptive statistics, such as means and standard deviations, were

employed to summarize the data, while multiple linear regression analysis, an inferential statistical technique, was utilized to examine the influence of environmental, social, economic, and cultural factors on the cycling behaviour of junior high school students. The analysis sought to identify the factors with the most significant impact on cycling behaviour. Throughout the research process, the study adhered to ethical guidelines to ensure the protection of participants' rights. Informed consent was obtained from all participants, who were also made aware of their right to withdraw from the study at any time. Additionally, the confidentiality of all participants was strictly maintained.

9. Results

9.1. Research Question 1: What Is the Cycling Behaviour of Junior High School Students in the Effutu Municipality?

This research question sought to explore the cycling habits and behaviours of Junior High School students in the Effutu Municipality. Understanding these behaviours is critical to identifying both safe practices and potential risks that students may encounter while cycling. Boone and Boone (2012) suggest the following interpretation for Likert scale data: 1.00 - 2.49 indicates low engagement or frequency, 2.50 - 3.49 represents moderate engagement or frequency, and 3.50 - 5.00 reflects high engagement or frequency. This benchmark was used to categorize the students' cycling behaviours in this study. The result of the cycling behaviour of Junior High School students is presented in **Table 1**.

Table 1. Cycling behaviour of junior high school students.

Item	N	Mean	S.D
Handling potentially obstructive objects while riding a bicycle.	300	3.56	0.68
Colliding with a pedestrian or another cyclist while cycling distractedly.	300	3.56	0.67
Feeling that sometimes I'm going at a higher speed than I should be going at.	300	3.55	0.65
Having a dispute in speed or "race" with another cyclist or driver.	300	3.53	0.69
Carrying a passenger on my bicycle without it being adapted for such a purpose.	300	3.52	0.71
I usually keep a safe distance from other cyclists or vehicles.	300	3.47	0.66
I stop and look at both sides before crossing a corner or intersection.	300	3.46	0.72
I try to move at a prudent speed to avoid sudden mishaps or braking.	300	3.42	0.71
Crossing what appears to be a clear crossing, even if the traffic light is red.	300	3.38	0.72
Zigzagging between vehicles when using a mixed lane.	300	3.37	0.83
Confusing one traffic signal with another and maneuvering according to the latter.	300	3.13	0.91
Braking very abruptly on a slippery surface.	300	3.03	0.85
Failing to be aware of the road conditions and falling over a bump or hole.	300	2.98	0.83
Failing to notice the presence of pedestrians crossing when turning.	300	2.88	0.92
Braking suddenly and being close to causing an accident.	300	2.69	0.91
Mean of means/ Standard deviation	300	3.30	0.76

Source: Fieldwork, 2024

The analysis of the cycling behaviour of Junior High School students in the Efutu Municipality, based on the data from **Table 1**, reveals varying frequencies of different behaviours. The overall mean of cycling behaviour was 3.30, with a standard deviation of 0.76, indicating a moderate engagement in cycling behaviours. This classification follows the benchmark suggested by **Boone and Boone (2012)**, which interprets Likert scale responses as follows: 1.00 - 2.49 signifies low-frequency behaviours, 2.50 - 3.49 indicates moderate-frequency behaviours, and 3.50 - 5.00 reflects high-frequency behaviours. Several behaviours fell into the high-frequency category, with students reporting frequent engagement in risky actions such as handling potentially obstructive objects while cycling (Mean = 3.56, SD = 0.68) and colliding with pedestrians or other cyclists due to distraction (Mean = 3.56, SD = 0.67). These behaviours suggest that students frequently find themselves in situations requiring heightened attention, yet they may lack the skills or awareness to mitigate these risks. Additionally, cycling at speeds higher than recommended was also frequent (Mean = 3.55, SD = 0.65), further indicating a propensity for risky cycling behaviour.

In contrast, several behaviours were reported with moderate frequency. For example, behaviours such as keeping a safe distance from other cyclists or vehicles (Mean = 3.47, SD = 0.66), stopping to look before crossing an intersection (Mean = 3.46, SD = 0.72), and moving at a prudent speed to avoid accidents (Mean = 3.42, SD = 0.71) were moderately practiced. This suggests that while students do exhibit some caution when cycling, there is inconsistency in their application of these safety practices. Moderately frequent behaviours such as crossing at red traffic lights (Mean = 3.38, SD = 0.72) and zigzagging between vehicles (Mean = 3.37, SD = 0.83) highlight the need for stronger education on road safety.

On the lower end of the frequency scale, certain behaviours like braking suddenly on slippery surfaces (Mean = 3.03, SD = 0.85) and failing to notice pedestrians when turning (Mean = 2.88, SD = 0.92) were less common, though they still occurred. These behaviours, while less frequent, represent dangerous actions that could lead to accidents, indicating a potential gap in the students' cycling skills and road awareness. The least frequent behaviour reported was braking suddenly (Mean = 2.69, SD = 0.91), suggesting that although students may not often engage in emergency stops when they do, they are at significant risk of accidents. This indicates that students may not be adequately trained to handle unexpected situations while cycling.

The behaviours that scored lower in frequency still pose safety concerns, especially in the context of adolescents who are navigating complex road environments. For instance, failing to be aware of road conditions, falling over bumps or holes (Mean = 2.98, SD = 0.83), and confusing traffic signals (Mean = 3.13, SD = 0.91) suggest lapses in road awareness and basic traffic rule comprehension. These issues could stem from inadequate cycling education or lack of formal training on road safety in schools.

The analysis of the cycling behaviour of Junior High School students in the

Effutu Municipality, based on the data presented in **Table 1**, reveals a value of means score of 3.30, with a mean standard deviation of 0.76. The mean of means (3.30) suggests that, on average, the students exhibit moderate cycling behaviour, as this score falls slightly above the neutral midpoint of 3.0 on the 5-point Likert scale. This indicates that while students demonstrate a fair level of responsible cycling practices, there are certain behaviours that may require improvement to ensure safer cycling habits. The mean standard deviation of 0.76 indicates a moderate level of variability in the students' responses. This suggests that although some students may consistently engage in safer or riskier cycling behaviours, there is notable variation in how different students approach cycling. Some might exhibit very safe behaviours, such as maintaining a prudent speed, while others may engage in riskier actions, like braking abruptly on slippery surfaces or failing to notice pedestrians when turning.

9.2. Research Question 2: What Are the Factors Influencing the Cycling Behaviour of Junior High School Students in the Effutu Municipality?

Research Question 2, it is essential to explore the various environmental, social, economic, and cultural factors that could influence the cycling behaviour of Junior High School students in the Effutu Municipality. This classification follows the benchmark suggested by **Boone and Boone (2012)**, which interprets Likert scale responses as follows: 1.00 - 2.49 signifies low-frequency behaviours, 2.50 - 3.49 indicates moderate-frequency behaviours, and 3.50 - 5.00 reflects high-frequency behaviours. The results are grouped into four main categories: environmental factors, social factors, economic factors, and cultural factors. Each category provides insights into the conditions that shape students' cycling habits. The analysis of the factors influencing the cycling behaviour of Junior High School students in the Effutu Municipality is presented in **Table 2**.

Table 2. Descriptive statistics of factors influencing cycling behaviour of students.

Item	N	Mean	S.D
<i>Environmental factors</i>			
There are enough bike lanes and paths in my neighborhood.	300	3.43	0.76
The roads in my area are safe for cycling.	300	3.61	0.63
The distance to my school or other destinations is too far to bike.	300	3.60	0.60
My school has adequate bicycle storage facilities.	300	3.41	0.68
My neighborhood has good street lighting for cycling at night.	300	3.61	0.67
Mean of means/Standard Deviation	300	3.53	0.67
<i>Social Factors</i>			
My parents encourage me to ride a bike.	300	3.58	0.64
My friends and peers often ride bikes.	300	3.57	0.63
My teachers promote and support cycling to school.	300	2.71	0.90
My school provides bike safety education and training.	300	2.90	0.93
My community organizes events and initiatives to promote cycling.	300	3.08	0.85
Mean of means/Standard Deviation	300	3.17	0.79

Continued

<i>Economic Factors</i>			
I have access to a bicycle that is in good condition.	300	3.05	0.81
My family can afford to maintain and repair a bicycle.	300	3.13	0.91
Bike sharing or rental programs would make cycling more accessible.	300	3.50	0.67
The cost of cycling gear and equipment is a barrier for me.	300	3.45	0.71
I have the financial resources to participate in cycling activities.	300	3.49	0.62
Mean of means/Standard Deviation	300	3.32	0.74
<i>Cultural Factors</i>			
Cycling is a valued and accepted mode of transportation in my community.	300	2.91	0.93
My cultural background and traditions encourage cycling.	300	3.08	0.85
Cycling is seen as a safe and appropriate activity for people of my gender.	300	3.05	0.81
My community has positive perceptions and attitudes towards cycling.	300	3.13	0.91
Cycling is integrated into the daily lives and routines of people in my community.	300	3.50	0.67
Mean of means/Standard Deviation	300	3.13	0.83

Source: Fieldwork, 2024

The mean of means for environmental factors is 3.53 with a standard deviation of 0.67, indicating that students generally agreed that environmental conditions, such as road safety and the availability of bike lanes, are important in influencing their cycling behaviour. Specifically, the safety of roads ($M = 3.61$, $SD = 0.63$) and good street lighting ($M = 3.61$, $SD = 0.67$) were rated highly, suggesting that students value these aspects of infrastructure. However, the adequacy of school bicycle storage facilities had a slightly lower mean score ($M = 3.41$, $SD = 0.68$), indicating room for improvement in this area.

Social influences on cycling behaviour, with a value of means of 3.17 and a standard deviation of 0.79, show that students are somewhat influenced by their parents, peers, and teachers. Parental encouragement ($M = 3.58$, $SD = 0.64$) and peer influence ($M = 3.57$, $SD = 0.63$) were the strongest social motivators. In contrast, teacher promotion of cycling ($M = 2.71$, $SD = 0.90$) and school-provided bike safety education ($M = 2.90$, $SD = 0.93$) were rated lower, indicating that school-related social support for cycling is limited.

Economic factors had a mean of means of 3.32 and a standard deviation of 0.74. The accessibility of bicycles and the affordability of cycling gear are key economic concerns. The availability of bike-sharing programs ($M = 3.50$, $SD = 0.67$) and the cost of cycling gear ($M = 3.45$, $SD = 0.71$) were identified as significant economic barriers to cycling. However, financial support for participating in cycling activities ($M = 3.49$, $SD = 0.62$) also plays a role, indicating that economic constraints could impact cycling behaviour.

Cultural influences, with a mean of means of 3.13 and a standard deviation of 0.83, highlight how community perceptions and cultural attitudes affect cycling. While cycling is seen as somewhat integrated into daily routines ($M = 3.50$, $SD = 0.67$), students expressed that cultural encouragement for cycling ($M = 3.08$, SD

= 0.85) and gender norms ($M = 3.05$, $SD = 0.81$) are moderate factors. Community attitudes towards cycling ($M = 3.13$, $SD = 0.91$) also suggest that cycling is not yet fully accepted as a common mode of transport.

Generally, the mean of means across all factors with variations across different factors, indicating that cycling behaviour among Junior High School students in the Effutu Municipality is influenced by a combination of environmental, social, economic, and cultural factors, with infrastructure and social encouragement being key areas for potential improvement.

9.3. H_0 : Environmental Factors, Social Factors, Economic Factors, and Cultural Factors Do Not Individually Influence Significantly the Cycling Behaviour of Students

To address research question 3, a multiple regression analysis was conducted to determine the influence of environmental, social, economic, and cultural factors on students' cycling behaviour. The analysis tested the null hypothesis (H_0): Environmental factors, social factors, economic factors, and cultural factors do not individually influence the cycling behaviour of students. Before conducting the regression analysis, the necessary assumptions were checked and met. These include the assumption of linearity, which was verified through scatterplots showing a linear relationship between the independent variables (environmental, social, economic, and cultural factors) and the dependent variable (cycling behaviour). The assumption of multicollinearity was tested using the Variance Inflation Factor (VIF), and all values were found to be below the threshold of 10, indicating no multicollinearity issues. Additionally, the assumption of homoscedasticity was assessed using residual plots, and the normality of residuals was confirmed through the Shapiro-Wilk test, ensuring that the data were suitable for regression analysis. With these assumptions satisfied, the multiple regression analysis was conducted to evaluate the extent to which each factor significantly predicts cycling behaviour among students in the Effutu Municipality. The results are presented in **Table 3**, **Table 4**, and **Table 5**.

Table 3. ANOVA^a of regression.

	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	22.018	4	5.505	80.877	0.000 ^b
1	Residual	19.533	287	0.068		
	Total	41.551	291			

^aDependent variable: cycling behaviour; ^bPredictors: (constant), cultural factors, environmental factors, social factors, economic factors.

The ANOVA results from **Table 3** provide a statistical assessment of the regression model examining the factors influencing the cycling behaviour of Junior High School students. The regression sum of squares (SS Regression) is 22.018, indicating the variation in cycling behaviour explained by the model,

while the residual sum of squares (SS Residual) is 19.533, representing the variation in cycling behaviour not explained by the model. The total sum of squares (SS Total) is 41.551, which is the sum of the regression and residual sums of squares, reflecting the overall variation in the dependent variable. The degrees of freedom for regression ($df = 4$) correspond to the number of predictors in the model, whereas the residual degrees of freedom ($df = 287$) reflect the number of observations minus the number of predictors minus one. The mean square for regression (MS Regression) is calculated by dividing the regression sum of squares by its degrees of freedom, yielding a value of 5.505, while the mean square for residuals (MS Residual) is 0.068. The F-statistic of 80.877 indicates the ratio of the variance explained by the regression model to the variance not explained by the residuals, suggesting a better model fit. Additionally, the significance level ($p = 0.000$) indicates that the regression model is statistically significant at the conventional alpha level of 0.05, suggesting that at least one of the predictor variables significantly influences the cycling behaviour of students. Overall, these findings demonstrate that cultural, environmental, social, and economic factors collectively have a significant impact on the cycling behaviour of Junior High School students in the Effutu Municipality, providing a strong basis for further analysis of individual predictors and their specific contributions to cycling behaviour.

Table 4. Model summary^b.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.728 ^a	0.530	0.523	0.26088	1.294

^aPredictors: (constant), cultural factors, environmental factors, social factors, economic factors; ^bDependent variable: cycling behaviour.

The Model Summary in **Table 4** presents key statistics regarding the regression analysis conducted to evaluate the factors influencing the cycling behaviour of Junior High School students. The R-value of 0.728 indicates a strong positive correlation between the predictor variables (cultural factors, environmental factors, social factors, and economic factors) and the dependent variable, cycling behaviour. The R-squared value of 0.530 suggests that approximately 53% of the variability in cycling behaviour can be explained by the combined influence of these factors. The adjusted R-squared value of 0.523 accounts for the number of predictors in the model, providing a more accurate representation of the model's explanatory power. Furthermore, the standard error of the estimate (SE = 0.26088) indicates the average distance that the observed values fall from the regression line, reflecting the model's accuracy. Lastly, the Durbin-Watson statistic of 1.294 tests for the presence of autocorrelation in the residuals; values closer to 2 suggest no autocorrelation. The results, thus, indicate a robust model fit, suggesting that cultural, environmental, social, and economic factors significantly contribute to explaining the cycling behaviour of students in the Effutu

Municipality.

Table 5. Coefficients^a of regression.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	0.838	0.143		5.843	0.000		
1 Environmental	0.253	0.044	0.289	5.782	0.000	0.653	1.530
Social	0.186	0.054	0.242	3.436	0.001	0.329	3.039
Economic	0.240	0.062	0.277	3.836	0.000	0.314	3.186
Cultural	0.058	0.066	0.081	0.886	0.376	0.198	5.039

^aDependent variable: cycling behaviour.

Table 5 displays the coefficients from the regression analysis examining the influence of environmental, social, economic, and cultural factors on the cycling behaviour of Junior High School students. The unstandardized coefficients reveal the expected change in the dependent variable, cycling behaviour, for a one-unit change in the predictor variable while holding other variables constant. The constant term ($\beta = 0.838$) suggests that when all predictor variables are zero, the baseline level of cycling behaviour is approximately .838. Among the predictors, environmental factors ($\beta = 0.253$, $t = 5.782$, $p < 0.001$) show the most significant positive relationship with cycling behaviour, indicating that improvements in environmental conditions contribute substantially to increased cycling. Social factors ($\beta = 0.186$, $t = 3.436$, $p = 0.001$) also significantly influence cycling behaviour, suggesting that peer and familial support are crucial for encouraging cycling among students. Economic factors ($\beta = 0.240$, $t = 3.836$, $p < 0.001$) positively correlate with cycling behaviour as well, highlighting the importance of financial resources in facilitating access to cycling. In contrast, cultural factors ($\beta = 0.058$, $t = 0.886$, $p = 0.376$) do not significantly influence cycling behaviour, as indicated by the p-value greater than 0.05. The standardized coefficients (Beta) reveal the relative importance of each factor, with environmental factors ($\beta = 0.289$) having the largest effect on cycling behaviour, followed by social factors ($\beta = 0.242$) and economic factors ($\beta = 0.277$). Collinearity statistics, including tolerance and variance inflation factor (VIF), indicate that multicollinearity is not a concern, as all values are within acceptable limits. Overall, the results suggest that environmental, social, and economic factors significantly influence the cycling behaviour of students, while cultural factors do not play a significant role.

10. Discussion

The findings of the study revealed the idea that environmental factors have a huge impact on cycling behaviour is continuously supported by research. In order to promote cycling among various demographics, Pucher and Dijkstra (2003) stress the importance of well-designed infrastructure, such as bike lanes and safe road conditions and surroundings. The particular focus on road safety and adequate

street lighting is consistent with the results of other studies. Students' riding habits are greatly influenced by environmental variables, with brighter streets and safer roads being highly regarded (Pikora et al., 2006; Pucher & Buehler, 2008). Since insufficient parking is a barrier, it is imperative that school bicycle storage facilities be improved (Aldred et al., 2016; Transport for London, 2013). Social factors, including peer pressure and parental support, are also significant (Aldred et al., 2016). However, there is currently little support for bike safety instruction and teacher promotion in schools (Aldred et al., 2016). To reduce limitations, economic considerations such as the availability of bicycles and reasonably priced equipment should be taken into consideration (Woodward et al., 2015). In addition to financial support for cycling activities (Woodward et al., 2015), bike-sharing schemes can contribute to an increase in cycling (Buck et al., 2013). Cycling behaviour can be impacted by cultural factors, including gender norms and community attitudes (Aldred et al., 2016). Cycling can be included in daily routines by questioning these conventions and encouraging positive attitudes towards the sport (Aldred et al., 2016; Rosenberg et al., 2010).

The findings of this study highlight the importance of road safety and infrastructure for promoting cycling behaviour, resonating with the work of Pucher and Buehler (2008) and Giles-Corti et al. (2009). The role of bicycle storage facilities in encouraging cycling among students is further supported by research from Fyhri and Hjorthol (2009) and Handy et al. (2010). Regarding social influences, the findings on the impact of parents and peers on cycling behaviour are consistent with the conclusions drawn by Lott and Lott (1976) and Ahlport et al. (2008). However, the limited school-based social support for cycling aligns with the findings of Panter et al. (2013) and Chillón et al. (2011), indicating a potential area for improvement in promoting cycling among junior high school students. The insights on economic factors, such as the importance of bicycle and gear affordability, are supported by studies from Winters et al. (2011) and Goodman et al. (2012). Furthermore, the impact of financial support on cycling participation is echoed in the research of Heinen et al. (2011) and Ogilvie et al. (2004), underscoring the role of economic constraints in shaping cycling behaviour.

Regarding cultural influences, the findings on the impact of community perceptions and attitudes are consistent with the work of Páez and Whalen (2010) and Handy et al. (2010). Additionally, the study's findings on the role of gender norms in shaping cycling behaviour align with the insights provided by Emond & Handy (2012) and Garrard et al. (2008), highlighting the need to address societal expectations and biases that may hinder cycling among certain demographics. Overall, the study's comprehensive examination of environmental, social, economic, and cultural factors provides a robust and well-supported analysis of the multifaceted determinants of cycling behaviour among junior high school students in the Effutu Municipality, contributing to a deeper understanding of this important issue.

Based on the ANOVA results presented in the findings, there has been significant influence of environmental, social, economic, and cultural factors on cycling

behaviour. This aligns with the findings of Heinen et al. (2011), who emphasized the multifaceted nature of factors influencing cycling behaviour, including infrastructure, social norms, and economic constraints. Similarly, Giles-Corti and Donovan (2002) found that environmental, social, and individual factors collectively determine physical activity behaviours, such as cycling. The strong F-statistic and significant p-value in the current study are consistent with the findings of Bridges and Flint (2015), who demonstrated the statistical significance of regression models examining factors influencing active transportation choices. Titze et al. (2010) also reported statistically significant regression models that assessed the influence of various predictors on cycling behaviour among adults.

11. Findings

The data analysis revealed:

- 1) A general trend where risky and potentially unsafe behaviours are moderate to highly frequent among the students, which raises concerns about their safety while cycling. This analysis shows that cycling behaviour among Junior High School students in the Effutu Municipality involves a combination of risky actions and a moderate level of caution.
- 2) The significant role of environmental, economic, and social factors in influencing cycling behaviour. The presence of safe bike lanes, supportive peer and parental encouragement, and economic considerations related to cycling facilities all contribute positively to students' likelihood to cycle.
- 3) Environmental, social, and economic factors significantly impact cycling behaviour among students. The minimal influence of cultural factors suggests that while community perceptions exist, they may not be strong enough to affect behaviour directly.

12. Conclusion

This study underscores the multifaceted nature of cycling behaviour among Junior High School students in the Effutu Municipality, revealing that while students exhibit moderate awareness of safe cycling practices, there remains significant room for improvement. The analysis highlighted the critical impact of environmental, social, and economic factors on students' cycling habits, with safe infrastructure, parental and peer support, and economic accessibility serving as key motivators. Conversely, cultural factors appeared less influential, indicating a potential disconnect between community attitudes and actual cycling behaviour. The rejection of the null hypothesis reaffirms the need for targeted interventions that address the identified factors to foster safer and more frequent cycling among students. Ultimately, the findings suggest that a holistic approach involving improved cycling infrastructure, educational initiatives, and community engagement can effectively promote cycling as a viable and safe mode of transportation for adolescents, contributing to their overall health and well-being.

13. Recommendations

Based on the findings and conclusions drawn, it was the following recommendations are made:

1) Implement targeted educational programs that focus on safe cycling practices to reduce risky behaviours among students, while also advocating for the development of safe cycling infrastructure, such as designated bike lanes and secure bike storage at schools in the Effutu Municipality.

2) Promote initiatives that foster parental and peer support for cycling, such as organizing community cycling events and workshops. Simultaneously, explore partnerships with local governments and organizations to create affordable bike-sharing programs and provide financial assistance for maintaining bicycles in the Effutu Municipality.

3) While cultural factors showed minimal impact, it remains essential to continue efforts to shift community perceptions of cycling. Initiatives that highlight the benefits of cycling, such as health, environmental sustainability, and community engagement, can foster a more supportive culture around cycling in the Effutu Municipality.

14. Social and Practical Implications Derived from the Research Findings

The study suggests encouraging cycling-related norms and positive attitudes. This could involve role models, educational initiatives, and public awareness campaigns to dispel common misconceptions and advance an inclusive cycling culture. This entails creating bike lanes specifically for bikes, enhancing street lighting, and making sure that public areas and schools have enough places to store bikes. The study recommends including parents and peers through planned group rides, educational sessions, and peer mentoring programmes in order to create an atmosphere that promotes social support for cycling. To ease financial restraints and encourage cycling, the report suggests putting policies like bike-sharing systems, financial assistance for cycling activities, and subsidies for buying cycling gear into place.

According to the study, schools should incorporate bike safety instruction into their curricula and support teachers in promoting riding as a practical form of transportation.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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