

Impact of Breakfast Consumption on Student Focus and Distraction Levels

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I. INTRODUCTION

Understanding the impact of breakfast consumption on students' academic performance and overall well-being is crucial. Breakfast is often touted as the most important meal of the day, yet many students skip it due to various reasons such as time constraints, lack of appetite, or socio-economic factors.

Previous studies have shown that nutrition can significantly influence cognitive functions, energy levels, and mood. However, there is a need for more specific research focusing on how breakfast consumption correlates with students' focus and distraction levels during school hours.

This study aims to fill this gap by examining whether regular breakfast consumption among school students enhances their ability to stay focused and reduces their levels of distraction compared to students who skip breakfast.

II. LITERATURE REVIEW

Breakfast is frequently hailed as the most important meal of the day, and a substantial body of literature supports this assertion. Studies have shown that breakfast consumption is positively associated with a variety of health benefits, including improved nutrient intake, better weight management, and reduced risk of chronic diseases (Rampersaud et al., 2005). Nutrient-dense breakfasts have been linked to higher intakes of essential vitamins and minerals such as calcium, iron, and vitamin C (Deshmukh-Taskar et al., 2010). Several studies have explored the relationship between breakfast consumption and cognitive function, particularly in children and adolescents. Hoyland, Dye, and Lawton (2009) conducted a systematic review that highlighted the positive effects of breakfast on cognitive performance, particularly in tasks requiring attention, memory, and executive function. Benton and Parker (1998) found that children who consumed breakfast showed better memory recall

and attention compared to those who skipped breakfast. Furthermore, Wesnes et al. (2003) indicated that children who consumed a high-quality breakfast performed better on cognitive tests throughout the morning.

Impact on Academic Performance

The benefits of breakfast consumption extend to academic performance. Numerous studies have reported that students who regularly eat breakfast tend to have higher academic achievement than those who skip breakfast. Murphy et al. (1998) found that children who ate breakfast had higher math and reading scores. Similarly, Kleinman et al. (2002) observed that students who participated in school breakfast programs had improved standardized test scores and overall school performance. These findings suggest that breakfast consumption may contribute to better learning outcomes by enhancing cognitive function and concentration.

Breakfast Skipping and Its Consequences

Despite the benefits, breakfast skipping is prevalent among children and adolescents. Various studies have identified reasons for skipping breakfast, including lack of time, lack of appetite in the morning, and socio-economic factors (Mullan & Singh, 2010). Breakfast skipping has been associated with negative health outcomes, such as poorer diet quality, increased risk of obesity, and adverse metabolic effects (Timlin & Pereira, 2007). Additionally, skipping breakfast has been linked to lower cognitive performance and academic achievement. Taki et al. (2010) found that breakfast skipping was associated with lower academic performance and poorer behavioral outcomes in students.

Conceptual Framework and Guiding Theories

The conceptual framework for this study is based on the hypothesis that regular breakfast

consumption positively influences students' cognitive function and academic performance. This framework is supported by the Theory of Planned Behavior (Ajzen, 1991), posits that attitude toward the behavior, subjective norm, and perceived behavioral control influence behavioral intention. Furthermore, the self-regulation theory (Baumeister et al., 1994) posits that glucose from food intake, including breakfast, provides the energy necessary for cognitive tasks and self-control, which can affect focus and academic performance.

Operationalization of Dependent Variable

In this study, the dependent variable is the level of focus and distraction among students. Focus is operationalized through self-reported measures of students' ability to stay attentive during class, while distraction is measured by the frequency of off-task behaviors during homework and study sessions. The relationship between breakfast consumption and these variables is assessed using quantitative methods, including contingency table, chi-square test and ANOVA

Methods Used in Prior Research

Prior research on the effects of breakfast consumption has employed various quantitative methods. For example, Benton and Parker (1998) used controlled experiments to assess cognitive performance following breakfast consumption. Murphy et al. (1998) and Kleinman et al. (2002) utilized longitudinal data and multivariate analyses to examine the impact of school breakfast programs on academic performance. Additionally, Hoyland, Dye, and Lawton (2009) conducted a systematic review to summarize the effects of breakfast on cognitive function, while Rampersaud et al. (2005) employed cross-sectional surveys to investigate the association between breakfast habits and nutritional status.

Gaps in the Literature

While the existing literature provides substantial evidence on the benefits of breakfast consumption, several gaps warrant further investigation. Most studies have focused on the general effects of breakfast on cognitive function and academic performance, with less emphasis on specific aspects such as focus and distraction levels during school hours. Additionally, there is a need for more research on the quality of breakfast and its impact on cognitive and academic outcomes. Studies have shown that not all breakfasts are equally beneficial; nutrient-dense breakfasts tend to have more positive effects compared to high-sugar, low-nutrient options (Rampersaud et al., 2005).

The literature overwhelmingly supports the importance of breakfast consumption for children and adolescents, highlighting its positive effects on nutrient intake, cognitive function, and academic performance. However, there are significant gaps that need to be addressed, particularly regarding the specific impact of breakfast on focus and distraction levels during school hours. This study aims to fill this gap by examining how breakfast consumption affects students' focus and distraction, providing insights that can inform educational and nutritional policies to enhance student well-being and academic success.

Research Question

How does breakfast consumption among school students affect their level of focus and distraction compared to students who skip breakfast?

Research Hypothesis

Regular breakfast consumption among students correlates positively with enhanced focus and reduced distraction levels compared to those who skip breakfast.

Methods

Data Source and Sample Method

The data for this study were obtained from a secondary data source, specifically a school survey conducted among students in grades 8 to 12. This 8 to 12 grades sample method approach helps to capture the diversity within the student population and allows for more generalizable findings. Also the sample represents a cross-section of the student population in a mid-sized urban school district.

Data Collection Methodology

The survey employed a structured questionnaire to collect data on students' breakfast habits, focus levels, and distraction levels. Additional variables such as sleep quality, physical activity, mood, academic performance, and screen time were also included to provide a comprehensive analysis.

Unit of Analysis

The unit of analysis for this study is the individual student. The dependent variables (focus and distraction levels) are measured at the individual level through self-reported data. Each student's responses regarding their breakfast habits, focus during class, and distractions while studying provide the primary data for analysis.

Description of Variables of Interest

Independent Variable:

Breakfast Consumption Frequency

Description: This variable measures how often students consume breakfast.

Levels of Measurement: Ordinal

Categories and Coding: Every day (coded as 1), Some days (coded as 2)

Rarely (coded as 3), Never (coded as 4)

Dependent Variables:

1) Focus Levels During Class

This variable measures students' self-reported ability to stay focused during class.

Levels of Measurement: Ordinal

Categories and Coding: Always focused (coded as 5), Often focused (coded as 4)

Sometimes focused (coded as 3), Rarely focused (coded as 2), Never focused (coded as 1)

2) Distraction Levels During Homework/Studying:

This variable measures how often students get distracted by other activities while doing homework or studying.

Levels of Measurement: Ordinal

Categories and Coding: Never distracted (coded as 1), Rarely distracted (coded as 2)

Sometimes distracted (coded as 3), Often distracted (coded as 4)

Always distracted (coded as 5)

Control Variables

Sleep Quality:

This variable measures how well students sleep on a typical night.

Levels of Measurement: Ordinal

Categories and Coding: Very well (coded as 5), Moderately well (coded as 4)

Not well (coded as 3), Poorly (coded as 2), Very poorly (coded as 1)

Physical Activity Frequency:

This variable measures how often students engage in physical activity or exercise during the week.

Levels of Measurement: Ordinal

Categories and Coding: Every day (coded as 5), Most days (coded as 4)

Some days (coded as 3), Rarely (coded as 2), Never (coded as 1)

Screen Time:

This variable measures the amount of time students spend on their mobile phones for non-academic purposes each day.

Levels of Measurement: Ordinal

Categories and Coding: Less than 1 hour (coded as 1), 1-2 hours (coded as 2)

2-3 hours (coded as 3), 3-4 hours (coded as 4), More than 4 hours (coded as 5)

Additional Variables

Mobile Phone Ownership:

This variable measures whether students own a mobile phone.

Levels of Measurement: Nominal

Categories and Coding: Yes (coded as 1), No (coded as 0)

By operationalizing these variables and using appropriate coding schemes, the study aims to comprehensively analyze the impact of breakfast consumption on students' focus and distraction levels, while controlling for potential confounding factors.

Research Design

The research design for this study is an independent groups means comparison. This design is chosen to compare the focus and distraction levels between different groups of students based on their breakfast consumption frequency. Specifically, the study divides students into four groups based on how often they consume breakfast: every day, some days, rarely, and never. This design allows us to examine the differences in focus and distraction levels between these distinct groups.

Analysis Procedure

The analysis procedure involves several statistical methods to test the research hypothesis and explore the relationships between variables. The primary methods used are descriptive statistics, contingency tables, chi-square tests, and ANOVA,

Descriptive Statistics

To summarize the data and provide an overview of the sample characteristics.

Measures: Mean, median, standard deviation, and frequency distributions for key variable breakfast consumption frequency.

Contingency Tables and Chi-Square Tests

To examine the relationships between breakfast consumption frequency and categorical variables such as focus and distraction levels. Contingency tables are created to display the frequency distribution of focus and distraction levels across different breakfast consumption groups. Chi-square tests are used to assess the statistical significance of the associations observed

in the contingency tables. Contingency tables and chi-square tests are useful for exploring relationships between categorical variables and determining whether the observed associations are statistically significant.

Analysis of Variance (ANOVA)

One-way analysis of variance is a technique to compare whether two sample’s means are significantly different. To compare the means of focus and distraction in our case.

Data Cleaning and Preparation

Checked for missing values and handled them appropriately (e.g., imputation or exclusion). Ensured all variables are correctly coded and categorized.

Software Used

I used jamovi software, a free and open-source computer program for data analysis and performing statistical tests.

III. RESULTS

The following statistical methods were used to analyze the data:

- 1) Descriptive statistics to summarize the data.
- 2) Contingency tables to examine the relationship between breakfast frequency and focus/distraction levels. chi-square tests to determine the significance of the associations.
- 3) ANOVA to compare the means of focus levels across different breakfast frequency groups.

Descriptive Statistics Results

The descriptive statistics for focus levels based on breakfast consumption frequency are as follows:

Descriptives											
		Breakfast Frequency	N	Mean	Median	Mode	SD	Minimum	Maximum		
Grade		Every day	73	10.1	10.0	9.00	1.13	8.00	12.0		
		Some days	29	10.4	11.0	11.00	1.12	9.00	12.0		
		Rarely	30	10.6	11.0	12.00	1.25	9.00	12.0		
		Never	12	10.5	11.0	11.00	1.17	9.00	12.0		

The descriptive statistics highlight the average tendencies in focus and distraction across different categories of breakfast consumption. Overall, the descriptive statistics suggest that there is not a straightforward relationship between breakfast consumption frequency and focus levels, as both students who rarely and never eat breakfast report higher mean focus levels than those who eat breakfast every day or some days. This highlights the need for further analysis to understand the underlying factors that contribute to these patterns

and to examine potential confounding variables that may influence students' focus levels.

Analysis Statistics Results

Contingency Tables

Contingency tables were created to explore the relationship between breakfast frequency and two categorical outcomes: focus levels (categorized as High, Not High -Low Focus) and distraction levels (categorized as High and Not High - Low distracted).

Focus Levels by Breakfast Frequency

Breakfast Frequency	High	Not High	Total
Every day	2 (9.09%)	10 (45.45%)	12 (54.55%)
Not Every day	0 (0.0%)	10 (45.45%)	10 (45.45%)
Total	2 (9.09%)	20 (90.91%)	22 (100.0%)

χ^2 Tests							
		Value		df		p	
χ^2		4.08		9		0.906	
N		22					

The chi-square test for independence between breakfast frequency and focus levels showed no statistically significant association. This

suggests that the frequency of breakfast consumption is not significantly related to how often students report being focused.

Distraction Levels by Breakfast Frequency

Breakfast Frequency	High	Not High	Total
Every day	1 (4.55%)	11 (50.0%)	12 (54.55%)
Not Every day	1 (4.55%)	9 (40.91%)	10 (45.45%)
Total	2 (9.09%)	20 (90.91%)	22 (100.0%)

χ^2 Tests							
		Value		df		p	
χ^2		8.31		12		0.761	
N		22					

Similarly, the chi-square test for the relationship between breakfast frequency and distraction levels also indicated no significant association. This implies that breakfast

consumption does not significantly impact how often students feel distracted during homework or studying.

Anova

One way ANOVA on Focus and Distraction

One-Way ANOVA (Welch's)									
		F		df1		df2		p	
Focus		0.0596		3		4.20		0.979	
Distraction		1.2357		3		4.08		0.405	

One-way Analysis of Variance (ANOVA) was conducted to compare the means of focus and distraction with breakfast as the grouping variable. There were no statistically significant differences in focus (p value 0.979) or distraction (p value 0.405) levels between respondents based on their frequency of breakfast eating. This suggests that, in this dataset, how frequently people eat breakfast has no significant effect on their reported focus or distraction levels in the investigated scenarios.

Findings

The analysis of this dataset does not reveal any statistically significant effects of breakfast consumption frequency on either focus or distraction levels among students. These findings suggest that other factors might play more critical roles in affecting students' academic engagement and should be investigated in future research. I plan to repeat this study with a larger population of students (n=300). Further elaboration on these results and their implications will be discussed in the discussion section of the study.

IV. DISCUSSION

The analysis of the relationship between breakfast consumption frequency and students' focus and distraction levels yielded several important insights. The study's primary aim was to determine whether regular breakfast consumption is associated with enhanced focus and reduced distraction among school students. However, the results indicate that there are no statistically significant differences in focus and distraction levels across different breakfast consumption frequency groups.

While promoting regular breakfast consumption is important for overall health and nutrition, it may not be sufficient to improve students' focus and reduce distractions. Schools and policymakers should adopt a holistic approach that considers other factors such as sleep quality, physical activity, mental health, and the learning environment.

Future interventions should focus not only on the frequency of breakfast consumption but also on the nutritional quality of the meals. Ensuring that students have access to nutrient-dense breakfasts could have a more significant impact on cognitive functions and academic performance. Addressing various aspects of student well-being, including stress management, social-emotional learning, and creating a positive school climate, may be more effective in enhancing focus and reducing distractions than focusing solely on breakfast consumption.

V. LIMITATIONS AND FUTURE RESEARCH

This study has several limitations that should be acknowledged: The small sample size (N = 22) may limit the generalizability of the findings. Larger, more diverse samples are needed to validate these results and draw more robust conclusions. The reliance on self-reported measures of focus and distraction may introduce bias. Future studies should consider using objective measures of cognitive performance and classroom behavior. The study did not account for other potentially influential factors such as socio-economic status, parental involvement, and school resources. Future research should include these variables to provide a more comprehensive understanding of the determinants of student focus and distraction.

VI. CONCLUSION

The study found no significant differences in focus and distraction levels across different breakfast consumption frequency groups among school students. These findings suggest that other factors may play a more critical role in influencing students' cognitive engagement and academic performance. Future research with larger samples and more comprehensive data is needed to further explore these relationships and inform effective interventions. By focusing on a more integrated approach to student health and learning, educators and policymakers can better support students in achieving their full academic potential.

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