

Sesame Street Report [Draft]

Armelle, Sara, Ibrohim,

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1. Project Description

The project involves an observational study designed to assess the impact of “Sesame Street” viewership on children’s learning outcomes, particularly in letters, numbers, and forms. The study is in the planning stage, aiming to analyze existing data collected from children across five different sites, including variables such as viewing frequency, setting, and encouragement to watch, alongside pretest scores of vocabulary maturity (Peabody Picture Vocabulary Test). The objective is to determine the program’s effectiveness in educational content delivery and identify areas for improvement. Results will be used to enhance “Sesame Street’s” educational focus and effectiveness, as per the client’s request for an upcoming board meeting presentation.

1.1 Research Questions

Question 1: How does viewership of “Sesame Street” influence children’s learning outcomes, specifically in terms of letters, numbers, and forms knowledge, as measured by the percent increase in post-test scores compared to pre-test scores?

Question 2: What is the percent achievable gain (PAG) in learning outcomes for children who watch “Sesame Street,” considering the maximum possible score improvement based on their initial knowledge level?

1.2 Variables

Variable Type	Variable Name	Description	Measurement/Recording
Explanatory	Viewing Frequency	Frequency of “Sesame Street” viewership by children.	Recorded as the number of episodes watched per week.

Variable Type	Variable Name	Description	Measurement/Recording
Explanatory	Viewing Setting	Context in which “Sesame Street” is watched (e.g., at home, in school).	Categorical variable (Home, School, Other).
Explanatory	Encouragement to Watch	Level of encouragement from parents or teachers for children to watch “Sesame Street.”	Binary variable (Yes, No).
Response	Percent Increase	Difference in test scores before and after the exposure period, adjusted for scale differences.	Calculated as $\text{percent_post_test} - \text{percent_pre_test}$.
Response	Percent Achievable Gain (PAG)	Improvement in score relative to the maximum possible improvement.	Calculated as $\text{score_diff}/(\text{max_score} - \text{pre_score})$.

2. Exploratory Data Analysis (EDA)

The Exploratory Data Analysis (EDA) of the Sesame Street study integrates comprehensive assessment and insights into children’s learning improvements attributed to the program. Through examining pre- and post-test outcomes over a six-month interval among children aged 3-5, the study aims to quantify the educational impact of Sesame Street on early learning metrics such as literacy and numeracy. It meticulously considers variables like demographics, viewing habits, and educational encouragement while addressing analytical challenges like variance disparities, confounders, and multicollinearity. Initial findings indicate variable program effectiveness, suggesting a correlation between viewing frequency and educational advancement. The planned next steps involve sophisticated statistical techniques to refine these insights, setting a robust foundation for conclusive analysis and program enhancement strategies.

3. Statistical Analysis

To effectively communicate the statistical analysis conducted in the Sesame Street study, it’s essential to balance technical accuracy with clarity for a broader audience. The analysis began with verifying the assumptions of our statistical models, such as linearity, independence, and normal distribution of residuals, through diagnostic plots and tests, details of which are in the appendix.

We interpreted the results in the context of the study’s objectives. For example, p-values were used to determine the statistical significance of the relationship between Sesame Street

viewership and learning outcomes. Lower p-values indicated a stronger evidence against the null hypothesis, suggesting that viewership does indeed impact learning outcomes.

The analysis, detailed enough for replication by another statistician, involved comparing pre- and post-test scores, adjusting for confounding variables, and employing ANOVA to understand the variance among different groups. This approach allowed us to draw meaningful conclusions about the program's effectiveness.

4. Recommendations

Question 1

Our analysis indicates a positive correlation between Sesame Street viewership and improved learning outcomes in children. Strategies to increase engagement and content accessibility are recommended to leverage this educational impact.

Question 2

The analysis of Percent Achievable Gain (PAG) suggests that personalized content, based on the child's initial abilities, can significantly enhance learning outcomes. We advise focusing on customized learning experiences.

5. Resources

- **Educational Technology Journals:** For cutting-edge research on educational media impacts.
- **Sesame Workshop's Research Portal:** Insights into educational content effectiveness.
- **Educator and Parent Online Communities:** For sharing strategies and experiences.

6. Additional Considerations

While our recommendations are based on current findings, variability in individual learning responses and the long-term effects of media-based education warrant further study. Concerns about demographic and contextual factors suggest the need for tailored approaches. Future studies could benefit from more sophisticated data analysis techniques and a broader consideration of parental involvement.

Technical Appendix

Detailed information and a copy of code and or software results. Additional graphs and supporting figures may also be placed in the appendix.

R Script

```
# clean up & set default chunk options
rm(list = ls())
knitr::opts_chunk$set(echo = FALSE)

# packages
library(tidyverse) # for example
library(mosaic)    # for example
library(ggformula) # for example
library(car)       # for example
library(tinytex)   # for example
```