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GHANA TRANSITION-TO-ENGLISH PLUS (T2E+) IMPACT EVALUATION: BASELINE REPORT

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TABLE OF CONTENTS

CONTENTS 1
ACRONYMS 4
EXECUTIVE SUMMARY 6
- BACKGROUND 7
- PURPOSE 8

OVERVIEW OF TRANSITION-TO-ENGLISH PLUS 8
EVALUATION METHODS 10
- QUESTIONS 11
- DESIGN 11
- SAMPLES 12
- PROCEDURE 13
- MEASURES 14
- LIMITATIONS 15

FINDINGS 16
- CHILDREN'S BACKGROUND CHARACTERISTICS 16
- CHILDREN'S LANGUAGE AND READING OUTCOMES 20
- SUBGROUP ANALYSIS OF LANGUAGE AND READING OUTCOMES 31
  - BY PLACE OF RESIDENCE 31
  - BY GENDER 33
  - BY LANGUAGE MATCH 34
  - BY FAMILY SOCIO-ECONOMIC STATUS 35
  - BY HOME LITERACY ENVIRONMENT 36

CONCLUSION 38
REFERENCES 39
APPENDICES 41
- APPENDIX I: EVALUATION STATEMENT OF WORK 41
- APPENDIX II: EVALUATION METHODS 43
- APPENDIX III: STATISTICAL COMPARISON OF BACKGROUND CHARACTERISTICS 45
- APPENDIX IV: DATA COLLECTION INSTRUMENTS 49
- APPENDIX V: RESEARCH APPROVALS 66
- APPENDIX VI: ADDITIONAL ANALYSES 68

FIGURES

FIGURE 1. T2E+ THEORY OF CHANGE 9
FIGURE 2. SAMPLING PROCEDURE AND PLANNED SAMPLE SIZES AT BASELINE 12
FIGURE 3. A FRAMEWORK FOR COGNITIVE FOUNDATIONS OF LEARNING TO READ. ADAPTED FROM ADVANCING RESEARCH, IMPROVING EDUCATION. (2022). THE COGNITIVE FOUNDATIONS OF LEARNING TO READ: A FRAMEWORK. 15
FIGURE 4. PERCENTAGES OF LANGUAGE MATCH AND MISMATCH AT AND ACROSS THE LEARNER AND TEACHER LEVELS IN B1 18
FIGURE 5. PERCENTAGES OF LANGUAGE MATCH AND MISMATCH AT AND ACROSS THE LEARNER AND TEACHER LEVELS IN B2 18
FIGURE 6. PERCENTAGES OF CHILDREN REPORTING PARENTS, SIBLINGS AND OTHER MEMBERS IN THE FAMILY READ TO THEM IN B1 19
FIGURE 7. PERCENTAGES OF CHILDREN REPORTING PARENTS, SIBLINGS AND OTHER MEMBERS IN THE FAMILY READ TO THEM IN B2 19
FIGURE 8. PERCENTAGES OF CHILDREN WHO MISSED SCHOOL WITH DIFFERENT FREQUENCIES PER WEEK IN B1 AND B2 20
FIGURE 9. BASELINE EGRA AND ELM SCORES AND THE DIFFERENCE BETWEEN TREATMENT AND CONTROL GROUPS IN B1 21
FIGURE 10. BASELINE EGRA AND ELM SCORES & THE DIFFERENCE BETWEEN TREATMENT AND CONTROL GROUPS IN B2 22
FIGURE 11. PERCENTAGE OF CHILDREN WHO GAINED ZERO SCORES BY TREATMENT ARM IN B1 23
FIGURE 12. PERCENTAGE OF CHILDREN WHO GAINED ZERO SCORES BY TREATMENT ARM IN B2 24
FIGURE13. LOCAL LANGUAGE READING FLUENCY SCORE DISTRIBUTION BY TREATMENT ARM IN B1 25
FIGURE14. ENGLISH READING FLUENCY SCORE DISTRIBUTION BY TREATMENT ARM IN B1 25
FIGURE 15. LOCAL LANGUAGE READING FLUENCY SCORE DISTRIBUTION BY TREATMENT ARM IN B2 26
FIGURE 16. ENGLISH LANGUAGE READING FLUENCY SCORE DISTRIBUTION BY TREATMENT ARM IN B2 26
FIGURE 17. PERCENTAGE OF CHILDREN BY ADAPTED GHANA'S NATIONAL READING SCALE IN B1 27
FIGURE 18. PERCENTAGE OF CHILDREN BY ADAPTED GHANA'S NATIONAL READING SCALE IN B2 28
FIGURE 19. SCORE DISTRIBUTION AT THE ITEM LEVEL FOR ELM RECEPTIVE VOCABULARY B1 AND B2 29
FIGURE 20. SCORE DISTRIBUTION AT THE ITEM LEVEL FOR ELM EXPRESSIVE VOCABULARY B1 AND B2 29
FIGURE 21. PERCENTAGE OF CHILDREN ACROSS DIFFERENT SCORE POINTS FOR STORY RETELLING AND MEANING IN B1 30
FIGURE 22. PERCENTAGE OF CHILDREN ACROSS DIFFERENT SCORE POINTS FOR STORY RETELLING AND MEANING IN B2 31
FIGURE 23. EGRA AND ELM SCORE COMPARISON BETWEEN CHILDREN IN RURAL AND URBAN REGIONS IN B1 32

FIGURE 24. EGRA AND ELM SCORE COMPARISON BETWEEN CHILDREN IN RURAL AND URBAN REGIONS IN B2 32
FIGURE 25. EGRA AND ELM SCORE COMPARISON BETWEEN BOYS AND GIRLS IN B1 33
FIGURE 26. EGRA AND ELM SCORE COMPARISON BETWEEN BOYS AND GIRLS IN B2 33
FIGURE 27. EGRA AND ELM SCORE COMPARISON BETWEEN HOME-SCHOOL LANGUAGE MATCH AND MISMATCH IN B1 34
FIGURE 28. EGRA AND ELM SCORE COMPARISON BETWEEN HOME-SCHOOL LANGUAGE MATCH AND MISMATCH IN B2 34
FIGURE 29. EGRA AND ELM SCORE COMPARISON BETWEEN HIGH AND LOW FAMILY SOCIO- ECONOMIC STATUS IN B1 35
FIGURE 30. EGRA AND ELM SCORE COMPARISON BETWEEN HIGH AND LOW FAMILY SOCIO- ECONOMIC STATUS IN B2 36
FIGURE 31. EGRA AND ELM SCORE COMPARISON BETWEEN HIGH AND LOW HOME LITERACY ENVIRONMENT IN B1 37
FIGURE 32. EGRA AND ELM SCORE COMPARISON BETWEEN HIGH AND LOW HOME LITERACY ENVIRONMENT IN B1 37

TABLES

TABLE 1. SAMPLE SIZE BY TREATMENT STATUS IN B1 AND B2 AT BASELINE 13
TABLE 2. CHARACTERISTICS CHILDREN SAMPLED IN B1 AND B2 AND COMPARISONS OF TREATMENT AND CONTROL GROUPS 17

ACRONYMS

ASER	Annual Status of Education Report
B1, B2, etc.	Basic Grade 1, Basic Grade 2, etc.
EGR	Early Grade Reading
EGRA	Early Grade Reading Assessment
EGRP	Early Grade Reading Program
ELM	Expressive Language Module
GALOP	Ghana Accountability for Learning Outcomes Project
GES	Ghana Education Service
GLOI	Ghanaian Language of Instruction
HLE	Home Literacy Environment
IR	Intermediate Result
KG	Kindergarten
L1	First Language (Mother Tongue of child)
L2	Second Language (English)
MoE	Ministry of Education
NRRP	National Reading Radio Program
PLC	Professional Learning Circle
RAN	Resilient Africa Network
RCT	Randomized Controlled Trial
SES	Socio-economic Status
SHARE	Supporting Holistic and Actionable Research in Education

SISO	School Improvement Support Officer
T2E	Transition-to-English
T2E+	Transition-to-English Plus
UDS	University for Development Studies
UND	University of Notre Dame
USAID	U.S. Agency for International Development

EXECUTIVE SUMMARY

Strong reading skills are critical to success in school. However, reading performance among early grade learners in Ghana has been persistently weak. Improving reading outcomes has become a central policy and programmatic goal among the domestic government, donors, and other stakeholders in Ghana. The Transition-to-English Plus Program (T2E+), as studied in the present report, is one relevant programmatic effort. Since July 2021, T2E+ has been providing children in Kindergarten 2 to Basic 3 grade levels in 5,425 public primary schools across 16 regions in Ghana with a transitional bilingual education program. The program is designed to scaffold children's English reading skills development by first teaching them transferable language and reading skills in their mother-tongue.

In July 2021, a team of technical staff from the University of Notre Dame in the United States, the University of Developmental Studies in Ghana, and the Resilient Africa Network at Makerere University in Uganda embarked on a research project to evaluate the effectiveness, cost, and implementation conditions of T2E+, with support from the Ghana USAID Mission. For this evaluation, we use a randomized controlled trial study design with treatment and control groups in Basic 1 and Basic 2 (B1 and B2), respectively. In each grade, the two groups combined 199 primary schools selected randomly from the schools currently involved in T2E+. The schools selected were randomly assigned to a treatment or a control group. One hundred schools are in the treatment group and 99 schools are in the control group. Across all schools and grades, we have 4,352 learners (2,174 in B1: 2,178 in B2) and 392 teachers (196 in B1: and 296 in B2). The present report is part of a larger impact evaluation specifically aimed at examining the background characteristics, language, and reading outcomes among the children in our sample. Because children we sampled are from diverse social and family backgrounds, we examine how children with different backgrounds compare in reading in their mother-tongue and English at baseline. This will assist the Ghana Mission and other stakeholders as they examine which subgroups of children are most disadvantaged and thus require greater learning support for reading development.

The results show the average language and reading scores of the children surveyed are far below the grade appropriate performance standards set by the Ghana Ministry of Education. Across all learners, performance was particularly weak in higher-level reading skills such as reading fluency. This pattern persisted across the treatment and control groups in both B1 and B2. In nearly all background characteristics and key learning outcomes of interest, the treatment and control groups are not statistically different. A generally weak performance level across all groups and all grades demonstrates that T2E+ is responsive to the learning needs of early grade learners in many public primary schools in Ghana. At the same time, the similarity of learner characteristics and assessment scores between the treatment and the control groups shows these groups are comparable at the start, before the treatment group fully benefits from T2E+. All in all, these conditions allow us to attribute differences in children's learning outcomes at endline to the treatment. Finally, the subgroup comparisons show that children from more disadvantaged families, including those living in rural areas with lower socio-economic status and limited reading resources at home, are significantly underperforming compared to those from relatively more advantaged backgrounds. At endline in October 2022, we will explore, if feasible, how children with different backgrounds experience T2E+.

INTRODUCTION

BACKGROUND

Over the past few decades, Ghana has made remarkable progress in expanding children's access to primary education. For example, the net enrollment rate increased from 61 to 91 percent between 1999 to 2015 (UNESCO Institute for Statistics, 2016). This achievement, however, has not coincided with improvements in children's learning outcomes. In 2015, the Ghana Education Service conducted a national Early Grade Reading Assessment (EGRA) among a random sample of 7,311 grade 2 learners in public schools across all ten regions of the country. The result showed many children struggled with foundational reading skills and could not read with comprehension–whether in their mother-tongue (henceforth L1[1]) or in English (Ghana Education Service et al., 2016). This situation has led the national government, donors, and non-governmental organizations to adopt improving children's literacy outcomes as a central policy and program focus. One relevant programmatic effort was the USAID-sponsored *Learning* Activity, which implemented a nationwide Early Grade Reading (EGR) program in public primary schools from 2017 to 2019. The EGR program sought to improve reading performance for learners in kindergarten and basic grades 1 and 2[2] (B1 - B2) through phonics-based transitional bilingual education (USAID Ghana, 2019).

Previous impact evaluations showed that the EGR program successfully improved children's reading both in L1 and in English (USAID et al., 2021; USAID Ghana, 2019). The effects of the program were notable. The standardized mean difference between children that did and did not receive EGR treatment was 0.5 score points for oral reading fluency and 1.2 score points for letter sound knowledge. To optimize the outcome of EGR, a 2019 impact evaluation reported areas for further improvement. First, despite positive outcomes, a large proportion of children supported by EGR could not read any words (USAID, 2019). After two years of intervention, reading scores of many learners still were below the national EGRA learning targets in Ghana. Additionally, the report documented various factors that enabled and hindered the impact of EGR (USAID, 2019). Enabling factors included availability of teaching and learning materials and strong teacher compliance with the EGR curriculum. Challenges included a mismatch between L1 and the instructional language at school and students' and teachers' absenteeism.

As we detail below, the Transition-to-English Plus (T2E+) program examined in the current report builds on EGR with an integration of a national reading radio program and a more robust mother-tongue language education, while also enhancing implementation conditions. In order to understand the effectiveness of T2E+, a team of researchers and technical staff from the University of Notre Dame (UND) in the United States, the University for Development Studies (UDS) in Ghana, and the Resilient Africa Network (RAN) out of Makerere University in Uganda embarked on an impact evaluation in summer 2021 via the Supporting Holistic and Actionable Research in Education Activity[3] (SHARE).

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[1] LI is the first language of the child. In Ghana there are 11 approved official Ghanaian Languages of instruction which are associated with the first language of the child in many schools.

[2] In Ghana, the equivalent of B1 and B2 is Grade 1 and Grade 2 respectively. The official entry age of children to B1 and B2 is 6 and 7 years respectively. However, there are some instances where overage and/or underage children are enrolled in B1 and B2.

[3] SHARE is a cooperative agreement between USAID and the University of Notre Dame, providing research to advance USAID's education sector learning priorities in the global education sector. For more information about SHARE, please visit at https://pulte.nd.edu/projects/supporting-holistic-and-actionable-research-in-education/

PURPOSE

The evaluation of T2E+ aims to examine the *effects*, *cost*, and *optimal implementation conditions* via an experimental research study. The information generated in the T2E+ impact evaluation will assist the Ghana Ministry of Education (MoE), the Ghana Education Service (GES), USAID/Ghana Mission, FHI360 (the T2E+ implementing organization), and other stakeholders as they seek to understand what is required to design and scale up an effective early grade reading program in public primary schools in Ghana. Ultimately, the T2E+ evaluation will help the Ghana Mission and other stakeholders with evidence-based policy and programming decision making for the improvement of early grade learners' reading performance in Ghana.

OVERVIEW OF TRANSITION-TO-ENGLISH PLUS

The USAID Partnership for Education: Learning activity (*Learning*) is a program aligned with USAID's global goal: "All children reading." The program supports the MoE, GES, and affiliated institutions to improve reading performance for early grade learners. The implementation of *Learning* has been led by FHI 360, a nonprofit human development organization. Since its inception in 2017, *Learning* has progressed through four programs (FHI360, 2021): the Early Grade Reading (EGR) Program, the Transition-to-English (T2E) Program, the National Reading Radio Program (NRRP), and the T2E Plus (T2E+) Program. The T2E+ Program is the subject of this impact evaluation. USAID/Ghana is supporting the Ghana MoE back to school agenda by extending *Learning's* original T2E programs through T2E+ to help learners successfully transition back to school after closures due to the COVID-19 pandemic.

The T2E+ Program - July 2021 to December 2022: T2E+ expands on the original T2E program and the NRRP by providing radio reading lessons nationwide; training, coaching and mentoring for B1-B3 teachers and education personnel; materials for pupils and caregivers; and a curriculum with scripted lessons, materials and related resources for teachers.

The T2E+ curriculum is founded on the understanding that reading comprehension is a combination of word recognition as well as language/listening comprehension. This program, its services, curriculum, and materials focus on word recognition and reading for meaning. Word Reading is the process in which students identify and blend the sounds of letters and includes foundational skills such as phonological awareness, phonics, fluency, writing, print concepts, and oral language. Reading for Meaning is the process by which students are able to understand the meaning of a given word, which involves vocabulary, fluency, comprehension, writing, print concepts, and oral language.

The goal of T2E+ is to improve the reading and comprehension skills of KG2 – B4 students in both L1 and in English. The L1 of students should ideally match the Ghanaian Language of Instruction (GLOI) used in the school, although this is something being examined in this evaluation. To achieve this goal, T2E+ focuses on three intermediate results (IR), as seen in the theory of change diagram in **Figure 1** below. The full scope of the project can be seen after examining the activities related to each IR.

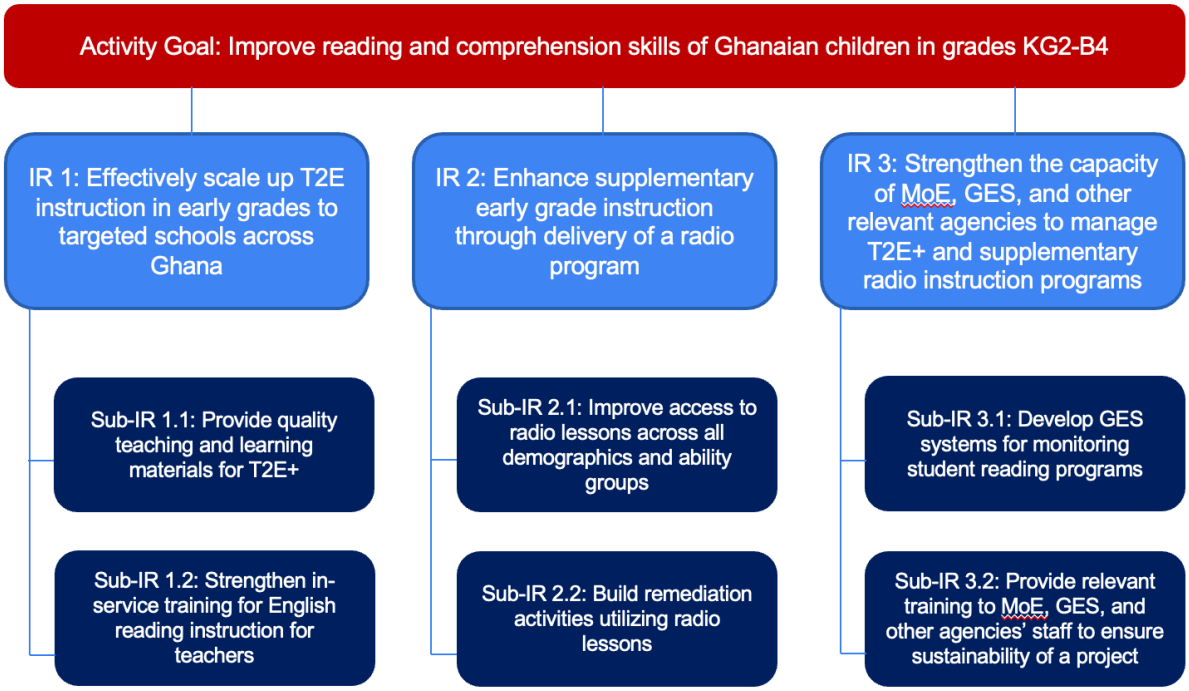


Figure 1. T2E+ Theory of Change

IR 1 – Effectively scale up T2E instruction in early grades to targeted schools across Ghana

The first IR focuses on effectively scaling up T2E instruction in early grades to targeted schools across Ghana. T2E+ now includes 5,425 schools in 257 districts across all 16 regions of Ghana, and reaches over 22,000 teachers and more than 800,000 learners in B1-3.

Under IR 1, teachers receive a three-day training series in GLOI teaching methods, focusing on both general concepts and the specific implementation of T2E+ materials. Teachers also go through a training series in English instruction. This foundational training prepares them to make use of the numerous and varied teaching and learning materials provided through T2E+. These include:

- A curriculum with scripted lesson plans and an instruction schedule
- Teacher guides in GLOI and English
- Textbooks and activity books for students in GLOI and English
- Supplementary readers for students' personal use
- USB pen drives with copies of the radio reading lessons

In addition to these materials, teachers also have access to supplementary materials designed to provide additional support to students. For example, teachers can receive training in how to engage and instruct learners with specific disabilities. The English materials are also available in braille. Teachers can utilize the results of the Annual Status of Education Report (ASER), a simple assessment tool for understanding a student's current reading level, to guide their use of targeted remediation activities.

In addition to training and materials, the teachers are also surrounded by a robust support network. At the school level, curriculum leads, head teachers, and/or assistant head teachers serve as coaches and provide a number of services. These coaches regularly observe teachers and provide feedback and guidance based on their observations. At the same time, teachers participate in a biweekly Professional Learning Circle (PLC) with coaches, during which they can discuss implementation and challenges related to T2E+. Further support is provided at the district and project level, which will be outlined under IR 3.

Classroom-level instruction for T2E+ commenced in mid-September 2021. The first three months of T2E+ instructions were focused on L1 reading skills including phonological awareness, fluency, writing, print concepts, oral language, and comprehension. English reading instructions were integrated in January 2022 alongside the GLOI instruction, with one hour of English lessons and 30 minutes of local language lessons each school day.

IR 2 – Enhance supplementary early grade instruction through delivery of radio program

IR 2 is a continuation of the NRRP to provide further access to radio lessons across Ghana. These lessons provide opportunities for all learners across the country to encounter meaningful and pedagogically sound reading instruction. This includes remedial radio activities guided by the ASER assessment. The pen drives provided to teachers allow access to these materials in the classroom as well.

IR 3 – Strengthen the capacity of MoE, GES and other relevant agencies to manage T2E+ and supplementary radio programs

Under the third IR, a further series of support systems are provided to aid teachers as they implement T2E+. At the district level, School Improvement Support Officers (SISOs), National Core Trainers and District Teacher Support Teams work to monitor and improve implementation of T2E+ across all districts. They provide coaching and mentorship alongside school level coaches, as well as provide higher support. SISOs in particular support IR 3 through a monitoring plan to use data to track progress of implementation and address achievement gaps to improve pupil learning. These SISOs are trained in the use of T2E+ teaching and learning materials, coaching, and monitoring. They monitor the fidelity of T2E+ implementation through school visits, phone surveys, and community visits. The data they collect is sent to a GES server for rapid analysis and visualization. SISOs can then present the data to schools and districts so they can create action plans. At the national level, a working group for T2E+ also reviews the data to monitor overall progress of implementation and design interventions where necessary.

EVALUATION METHODS

QUESTIONS

To achieve the goals of the T2E+ impact evaluation, we SHARE is investigating the following questions:

- To what extent does the T2E+ Activity increase Basic 1 and 2 learners' oral language and reading skills in the official Ghanaian languages of instruction and in English?
- What are the costs of T2E+ by program sub-components (e.g., materials, teacher training, etc.)?
- What factors explain different levels of program effectiveness in different school settings?
- How is growth in Ghanaian language reading skills associated with growth in English reading skills?

The current baseline report is part of the larger impact evaluation described above and is designed to specifically examine how children involved in T2E+ were performing in their oral language and reading skills prior to completing the full cycle of the program. The T2E+ impact evaluation uses an experimental study design with one treatment and one control group. The treatment group refers to a sample of schools and learners that will receive T2E+ during the 2021-22 academic school year. The control group refers to a sample of schools and learners that are placed in a control wait-list while the impact evaluation is ongoing, but will benefit from some of the T2E+ support at a later time.

Given this evaluation design, it is critical to ensure that the treatment and control groups closely resemble each other as much as possible. In other words, the background characteristics and pre-intervention learning outcomes must be similar. If that holds true, then the only difference between the treatment and control groups is that one receives T2E+ and the other does not. This would allow SHARE by endline to attribute differences in children's learning outcomes to T2E+. Thus, the baseline analysis focuses on examining and comparing the background characteristics and pre-intervention learning outcomes of children sampled in the T2E+ evaluation in and between the treatment and control groups.

In addition, children sampled in this baseline report are from diverse social, cultural, and family backgrounds in terms of, for instance, place of residence, the language used most at home, L1, gender, family's socio-economic status, and access to printed reading materials at home. We take on this diversity and examine how children with different backgrounds compare in their language and reading outcomes at baseline. These comparisons will be useful for the USAID/Ghana Mission and other stakeholders to understand how children with different backgrounds perform and which subgroups are more disadvantaged, thus requiring greater support for reading development in the future.

DESIGN

SHARE is using a randomized controlled trial (RCT) design to address the four questions presented in the evaluation questions section above. We created treatment and control groups using a four-stage process. In Ghana, there are about 15,400 public primary schools nationwide. Among these schools, approximately 10,000 schools are currently implementing the Ghana Accountability for Learning Outcomes Project (GALOP) with support from the Government of Ghana and the World Bank (World Bank, 2019). The World Bank selected these 10,000 schools based on those demonstrating the poorest learning outcomes at the time of selection. The remaining 5,425 public primary schools have been implementing T2E+ since

July 2021. Some of the GALOP and the T2E+ schools received the *Learning*'s EGR programs or the pilot of the T2E program in the past.

To avoid logistical difficulties and a risk of treatment contamination, the research team and the USAID/Ghana Mission focused the T2E+ impact evaluation only among schools who received neither the GALOP, the former EGR, nor the T2E pilot programs. There were 3,127 schools who qualified under these conditions. These 3,127 schools consequently constituted the sampling frame of this study. From the 3,127 schools, SHARE in consultation with the Ghana MOE randomly selected 200 schools across the 16 regions of Ghana to participate in the T2E+ impact evaluation. The SHARE research team then randomly assigned 100 schools to treatment and another 100 schools to control.

Within each school selected, we planned to randomly select 12 learners in B1 and B2 respectively, for a total of 4,800 learners across all groups and grade levels. Because we were interested in assessing the effects of T2E+ by child gender, besides the overall effect, we tried to sample boys and girls at a 50:50 ratio. Also, to understand the school and classroom environments surrounding the children selected, we sought to survey their teachers and head teachers with a goal of 200 B1 teachers, 200 B2 teachers, and 200 head teachers in total (50% from the treatment group and 50% from the control group). **Figure 2** illustrates the sampling procedure and the planned sample sizes for the overall T2E+ impact evaluation.

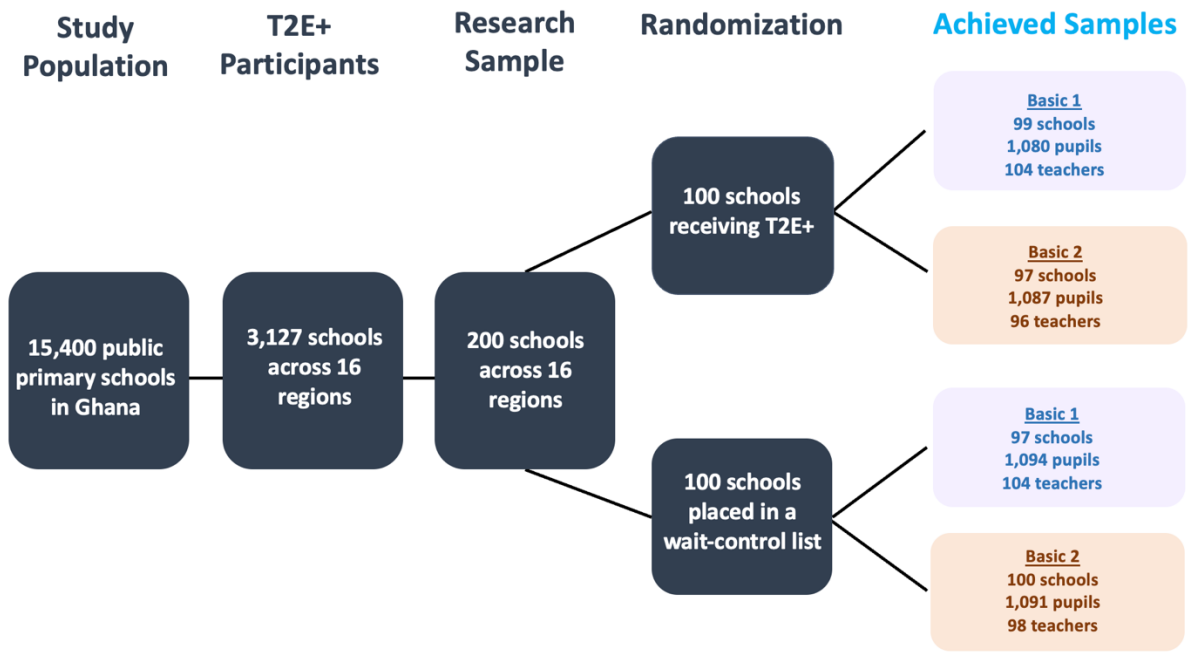


Figure 2. Sampling procedure and planned sample sizes at baseline

SAMPLES

Table 1 presents a summary of schools, teachers, and learners who were surveyed at baseline. Overall, the study included 4,352 learners and 394 teachers across 99 treatment schools and 100 control schools. The research team could not visit one of the planned treatment schools due to unsafe weather conditions

at the time. Also, two treatment schools had no B2 class, while one control school had no B1 class. In both grades, about 70% of the schools sampled were in rural regions and 30% were in urban regions.

We initially invited 200 teachers in each B1 and B2 whose classes were selected for learner assessments, of which 392 participated across all schools and all grade levels. In B1, 99 teachers were from the treatment schools and 97 were from the control schools. In B2, 100 teachers were from the treatment schools and 96 were from the control schools.

At the learner level, we interviewed 2,174 learners in B1 and 2,178 learners in B2 out of the planned 2,400 learners in each grade. In B1, 1,080 learners were from the treatment schools and 1,094 learners were from the control schools. In B2, 1,087 learners were from the treatment schools and 1,091 learners were from the control schools. In both grades, about 50% were boys and 50% were girls.

Table 1. Sample size by treatment status in B1 and B2 at baseline[4]

	Treatment	Control	Total
In Basic 1			
School	**99**	**99**	**198**
In urban	30	26	56
In rural	69	73	142
Teacher	**99**	**97**	**196**
Male	34	34	68
Female	65	63	128
Learner	**1,080**	**1,094**	**2,174**
Boy	539	554	1,093
Girl	541	540	1,081
In Basic 2			
School	**97**	**100**	**197**
In urban	30	26	56
In rural	67	74	141
Teacher	**100**	**96**	**196**
Male	40	44	84
Female	60	52	112
Learner	**1,087**	**1,091**	**2,178**
Boy	535	551	1,086
Girl	552	540	1,092

PROCEDURE

Baseline data collection was conducted from early November to late December 2021 across the 16 regions of Ghana. Prior to the field work, the UDS team in close collaboration with UND conducted a four-day assessor training among 62 assessors who had language proficiency in English, as well as in one

[4] The sizes of student samples in both grades allow this T2E+ impact evaluation to detect effect sizes from 0.23 to 0.33. This means that our study can detect small, fine-grained differences in learning outcomes between treatment and control groups when such differences do exist.

or more Ghanaian languages taught in the T2E+ program. All assessors showed strong consistency or agreement in how they rated correct and incorrect responses to the child assessments. On average, the agreement rate was 92%, implying excellency in the quality of baseline data collection.

MEASURES

At the teacher/classroom and head-teacher/school level: The teacher and head-teacher surveys gathered information on various aspects of classroom and school environments, including: the language teachers speak the most at home, the language of instruction mandated in each school, the presence of a school library, school size, and urban/rural locale of the school.

At the learner level: We used a survey questionnaire to gather information on children's background characteristics, including: gender, age, the language they speak the most at home, and reading interactions within the family. To assess children's language and reading competencies, we used EGRA and USAID's Expressive Language Module (ELM). EGRA is a standardized assessment that measures children's foundational reading skills. We assessed three skills: (1) letter-sound identification—the ability to accurately read letters and letter names, (2) non-word reading—the ability to accurately decode invented or made-up words, and (3) oral reading fluency—the ability to read words with speed and accuracy. Each child was assessed on EGRA in English and in one of the GES-approved local languages.

ELM is a performance-based language assessment that measures how well children speak and understand a specific language that is being assessed in EGRA, in this case English. We assessed four language skills: (1) receptive vocabulary—the ability to understand a set of words and choose a corresponding image for each word, (2) expressive vocabulary—the ability to describe an image in a proper English word, (3) story re-telling—the ability to understand a short or relatively longer story read aloud and repeat the story in one's own words, and (4) story inference—the ability to draw conclusions or inferences about a short or relatively longer story read aloud. The inclusion of ELM recognizes that children's oral language ability (as measured by the four skills in our evaluation) is a critical building block of reading comprehension (Dickinson & Porche, 2011; Resnick & Snow, 2009). As such, the four language skills measured in ELM in conjunction with the three decoding-focused reading skills measured in EGRA can jointly paint a more holistic picture of how children in the T2E+ program learn to read. In **Figure 3**, we visually illustrated how oral language skills and decoding skills are the two fundamentals of reading comprehension. Appendices IV and VI provide more details on EGRA, ELM, and the resulting data.

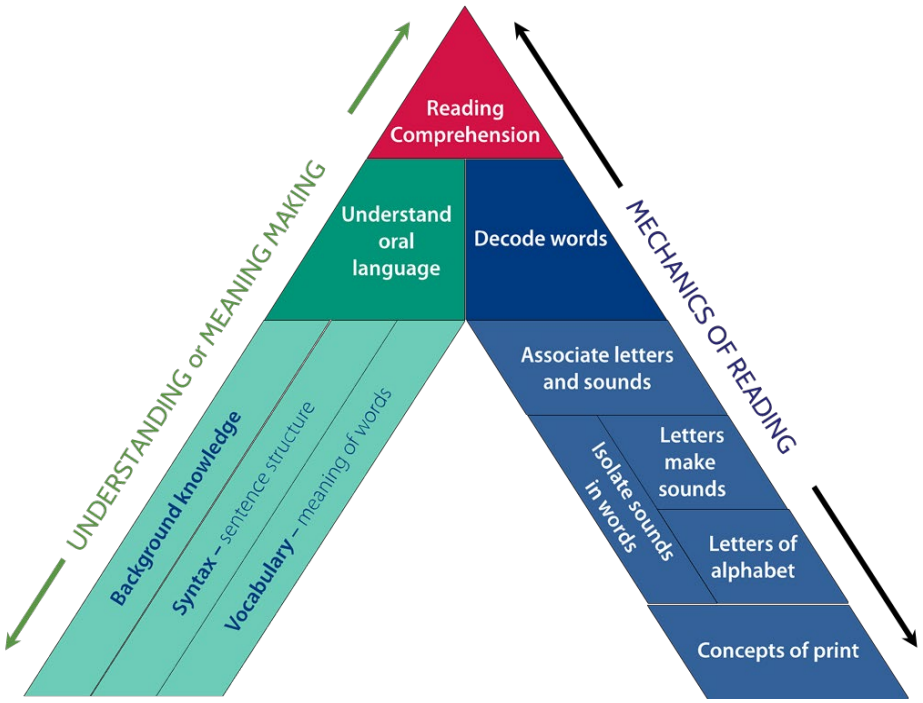


Figure 3. A framework for cognitive foundations of learning to read. The figure is adapted from Advancing Research, Improving Education. (2022). The Cognitive Foundations of Learning to Read: A Framework. https://sedl.org/reading/framework/

LIMITATIONS

There are a few potential risks to this T2E+ impact evaluation to acknowledge. Typically, in an impact evaluation, the baseline analysis would assess the outcomes of interest *prior to* the start of the program. However, the T2E+ baseline assessment commenced in November 2021, about three months after the start of the program in schools in September 2021. The early phase of the T2E+ curriculum offers intensive local language instructions. The treatment group might have gained some learning in this area as a result. If this was true, the effects of T2E+ may be underestimated at endline, meaning a true growth of the treatment group may have been estimated larger had the baseline assessment occurred earlier. Another risk, which is common to most evaluations, is the possibility of contamination across treatment and control groups. For T2E+, contamination may occur when instructional materials and ideas are shared with the control schools via teacher or learner transfer. It may also occur when the control schools receive a reading intervention. Because we use a cluster randomized trial in which we allocate schools to different treatment conditions and the sampled schools are not physically too close to one another, this design is robust enough to avoid or minimize contamination compared to other designs that allocate individual learners within the same school to different treatment conditions (Torgerson, 2001). Thus, we do not anticipate contamination would have a vast impact on the T2E+ impact evaluation. Still, if it exists, we plan to detect and account for contamination during endline data collection in October 2022 by gathering relevant information via surveys. It is also important to note that our initial evaluation questions did not plan to measure T2E+ effects by different subgroups, other than the child's gender. As a result, the sample sizes of each subgroup were not always equal, except that they have a 50:50 ratio of boys and girls. Finally, the findings of the T2E+ impact evaluation, including those from the current baseline report, are

generalizable only to the 3,127 schools in our sampling frame. It is worth noting that the World Bank's GALOP supports 10,000 of the most poorly performing public primary schools (World Bank, 2019). Thus, the 3,127 T2E+ schools may be more advantaged than the GALOP schools, though we do not have data to empirically test this assumption.

FINDINGS

CHILDREN'S BACKGROUND CHARACTERISTICS

AN OVERVIEW

Table 2 shows the overall characteristics of children we assessed in B1 and B2 including age, school attendance, and gender, as well as language and reading interactions between children, their family members, and teachers at home and in school. Within each grade, we also show how children in the treatment and control groups are comparable. (Please see Appendix III for more detailed statistical information on these characteristics and treatment-control group comparisons).

In B1, the average child was 8.1 years old, which is about 2 years above the official Ghanaian entry age to B1. They reported being absent at school about 1.6 days in the past week and having about two reading materials at home. Among all the 2,174 learners in B1, 50% were girls. 65% spoke the same language at home and in school. 26% reported their parents read to them at home. 80% stated that their teachers speak with them in English outside the lesson hours at school. 7% of children attended school with a library. When disaggregated by treatment status, i.e., whether receiving T2E+ or not, by and large the figures were the same or so similar that none of these numeric differences was statistically meaningful, meaning these differences are likely to be by chance.

In B2, the average child was 9.2 years old, about 2 years older than the official Ghanaian entry age to B2. Besides age, on average B2 learners showed similar background characteristics to B1 learners. When disaggregated by treatment status, the sample pattern repeated. No numeric difference was statistically meaningful, meaning the pattern is likely due to chance and may not represent the population.

Table 2. Characteristics of children sampled in B1 and B2 and comparisons of treatment and control groups

Description		Basic 1			Basic 2		
		All children	Treatment	Control	All children	Treatment	Control
Age in years		8.1	8.0	8.2	9.2	9.2	9.3
Number of days absent at school in the past week		0.6	0.6	0.6	0.7	0.7	0.8
Number of reading resources at home		1.8	1.8	1.8	2.0	2.0	2.0
% of girls		50.1	49.4	50.1	50.1	50.8	49.5
% of children whose home- and school-language match		65.4	66.6	64.4	66.7	67.1	66.5
% of children reporting parents read to them		26.3	26.1	26.5	25.2	23.0	27.7
% of children reporting teachers use English outside class		79.4	77.1	81.7	79.5	75.4	83.4
% of schools with a school library		6.8	9.1	4.4	6.5	8.6	4.4

LANGUAGE MAPPING

A core premise of T2E+ is that teachers and learners teach and learn at school in a language that children are familiar with as a school subject and the language of instruction as a transitional pathway to reading skills development in English. It is important to know the extent to which this premise holds true in practice. In this report, *language match* means that the child's home language is the same with the official Ghanaian Language of Instruction (GLOI)[5] of the school. *Language mismatch* means the child's home language is different from the GLOI. The same definition is applied to define language match or mismatch among teachers.

In **Figures 4 and 5**, we visually presented the percentages of language match and mismatch at the child and teacher levels in B1 and B2, respectively. Each figure has three pie charts: (a) the percentage of language match and mismatch among children, (b) the percentage of language match and mismatch among teachers, and (c) the percentage of match and mismatch across learners and teachers defined as a three-way match and mismatch.

In B1, about 66% of children and 75% of teachers showed a language match. Combining children and teachers, only 55.7% communicate, learn and teach in the same language at home and in school. This

[5] In Ghana public primary schools are assigned to one of the 11 approved Ghana Languages of instruction used for teaching the lower primary level. These GLOI include: Akuapem Twi, Asante Twi, Ewe, Nzima, Kasim, Dagaare, Dagbani, Fanti, Ga, Dangme, and Gonja

means that half of the children in our sample learn at school in a language other than the official language of instruction. Among these children, 1% spoke English as the main language of communication at home.

Similar to B1, 67% of children and 73% of teachers in B2 showed a language match. Combining children and teachers, the percentage of language match was as low as 53%, meaning half of the children in our sample learn at school in a language other than the designated language of instruction of the school or in a language they do not use in their day-to-day life at home. Among these children, 1% spoke English as the main language of communication at home.

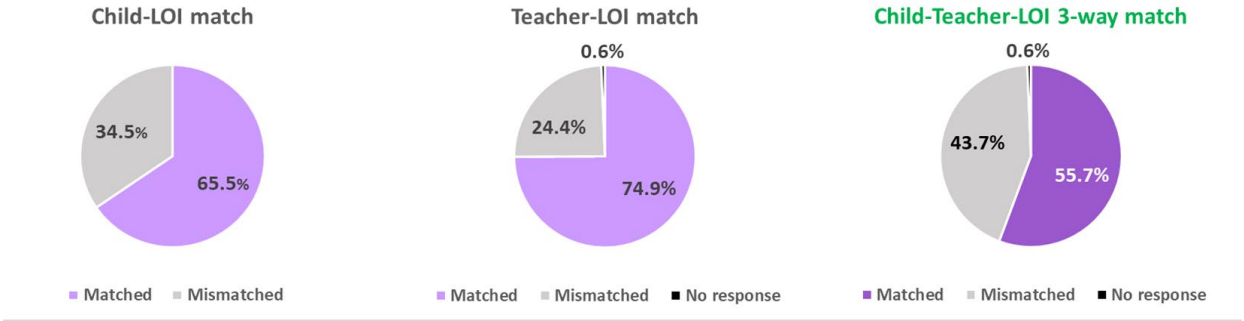


Figure 4. Percentages of language match and mismatch at and across the learner and teacher levels in B1

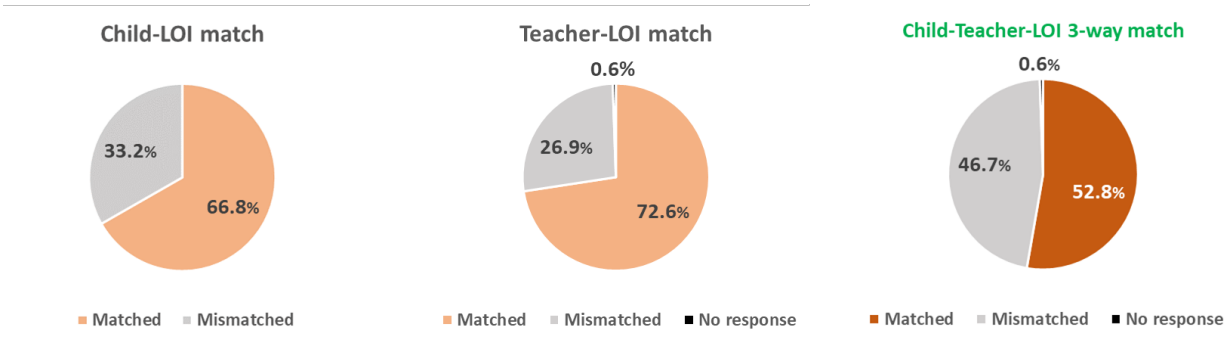


Figure 5. Percentages of language match and mismatch at and across the learner and teacher levels in B2

READING INTERACTIONS AT HOME

Learning to read does not stop at the school gate. How children engage with reading at home, besides school instructions, also positively predicts reading development (Friedlander, 2013; Zuilkowski et al., 2019). In **Figures 6 and 7**, we visually presented the patterns of child-family reading interactions, as measured in the percentages of children who reported that someone in their family reads to them in B1 and B2, respectively. Each figure has three pie charts: (a) the percentage of children reporting parents or caregivers read to them at least once in the previous week, (b) the percentage of children reporting siblings read to them at least once in the previous week, and (c) the percentage of children reporting someone else in their family, for instance an uncle, aunt or other adults, read to them at least once in the previous week. Overall, in both grades, less than 50% of children in our sample had someone in their

family read to them in the week preceding the survey. Despite generally low levels of within-home reading interactions, it appears that children with siblings had more reading engagement at home.

Looking closely in B1, 27% of the sampled children reported their parents read to them, 45% reported their siblings read to them, and 20% reported that other family members read to them. The similar pattern repeated in B2, though the percentages were marginally lower than those observed in B1.

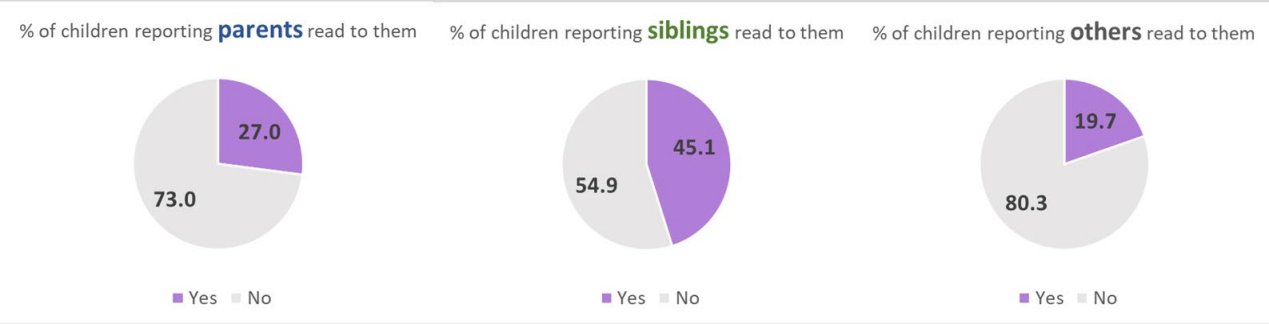


Figure 6. Percentages of children reporting parents, siblings and other members in the family read to them in B1

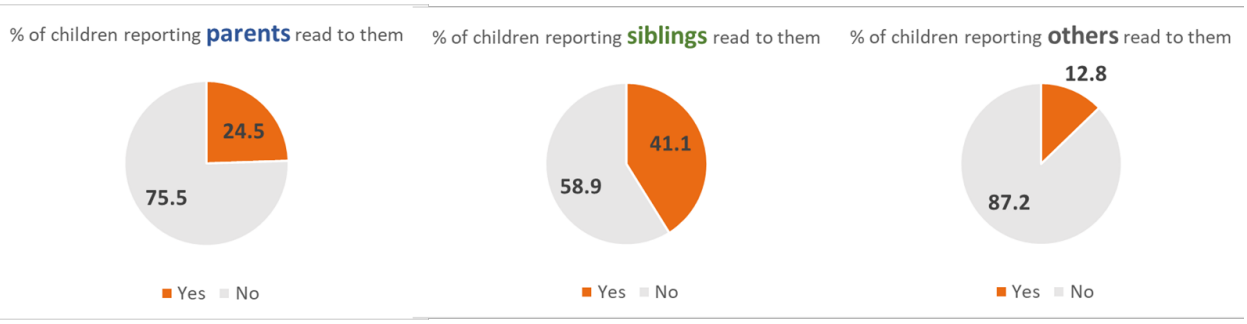


Figure 7. Percentages of children reporting parents, siblings and other members in the family read to them in B2

SCHOOL ABSENTEEISM

In Ghana, similar to other countries in Africa, children's school absenteeism is a persistent barrier to school achievements (Kodzi et al., 2014; Ramchander, 2017). High absenteeism can compromise an accurate assessment of the effectiveness of T2E+ because it means children receive a lower dosage of T2E+ instructions than they were intended to. Moreover, child absenteeism can compromise the impact evaluation of T2E+ as it lowers the amount of learning support children receive and the effects of T2E+ could appear smaller than they actually are. Given this baseline analysis was conducted not long after a years-long school closure due to the COVID-19 pandemic, understanding children's school attendance or absenteeism bears importance. In **Figure 8**, we visually present the patterns of school absenteeism among children in our sample at baseline in B1 and B2, respectively.

When surveyed how many days children missed school in the past week, the average days of absence was just about 1 day in both grades. These figures were similar to what was reported in studies conducted in Ghana prior to the pandemic, which ranged from 0.7 to 0.9 days per week (Social Impact, 2018; Wolf et al., 2016). When looking at the distributions of the days of absence, 60% of children in both B1 and B2 attended all five days without missing any school. 17% in B1 and 20% in B2 were absent for one day. The remaining 17-20% of children missed from two to five days. Overall, the figures we observed in this baseline appear to be reflective of the attendance pattern in typical school settings or years in the country, though school actors and other stakeholders in Ghana's primary education system could support and encourage more learner's school attendance.

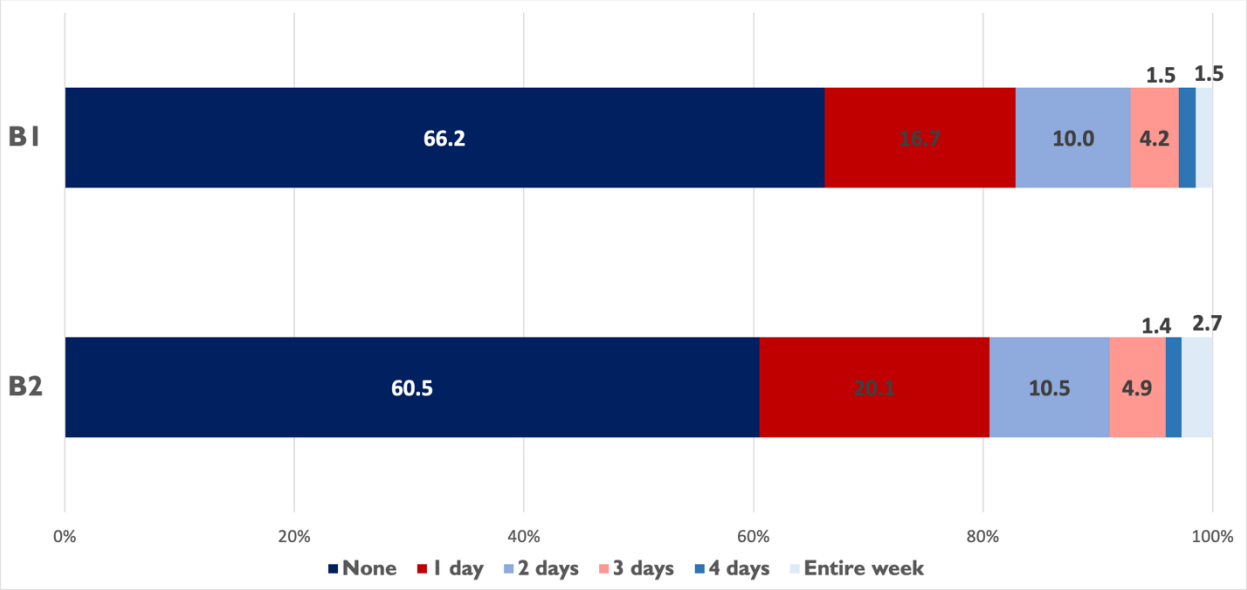


Figure 8. Percentages of children who missed school with different frequencies per week in B1 and B2

CHILDREN'S LANGUAGE AND READING OUTCOMES

AN OVERVIEW

This section is dedicated to the overall summaries of baseline learning outcomes and the comparability of treatment and control groups. **Figures 9 and 10** show these outcomes in B1 and B2. To better interpret each score, we incorporated Ghana's national benchmarks for EGRA. According to these benchmarks, children who read 40 correct letter sounds per minute, 25 correct invented words per minute, and 40 correct words per minute for reading fluency are considered a grade-level appropriate reader in the local language. For English, these benchmark scores are 35, 20 and 45 respectively. There are no existing benchmarks for ELM. Instead, we included the highest score children obtain in each subtest, which is 10 points for receptive vocabulary, 20 points for expressive vocabulary, 3 points for short and long story retelling, and 1 for short and long story meaning. In this section, ELM scores are re-scaled to range from

0-100 to avoid misleading visuals when presented together with EGRA scores. The original scores, using the original ELM and EGRA scales, can be found in Appendix III.

In B1, when looking across all children in our sample, the average EGRA scores were well below the national benchmarks whether in the local language or in English. The average local language EGRA scores were 16.8 points for letter sound identification, 2.3 points for non-words (invented words) reading, and 2.1 points for reading fluency when the national benchmarks are 40, 25, and 40 respectively. The average English EGRA scores were slightly higher than those for the local language EGRA, which were 21 points for letter sound identification, 2.9 points for non-word reading, and 4.9 points for reading fluency. When comparing the treatment and control groups, the scores were similar except for the local language letter sound identification where the treatment group gained 3.7 score points higher than the control group. In all other EGRA subtests, none of the numeric differences in the average scores were statistically meaningful, implying that these differences could be due to chance. For English ELM, across all children, we observed that children scored relatively better in the receptive and expressive vocabulary subtests compared to story retelling or inference making subtests. These average scores were 86 points for receptive vocabulary (out of 100), 77 points for expressive vocabulary (out of 100), 1 point for short story retelling (out of 3), 0.6 points for short story inference (out of 3), 0.9 points for long story retelling (out of 3), and finally 0.3 points for long story inference (out of 3). When comparing the treatment and control groups, all scores were nearly identical. There was no numerically or statistically meaningful difference between the two groups.

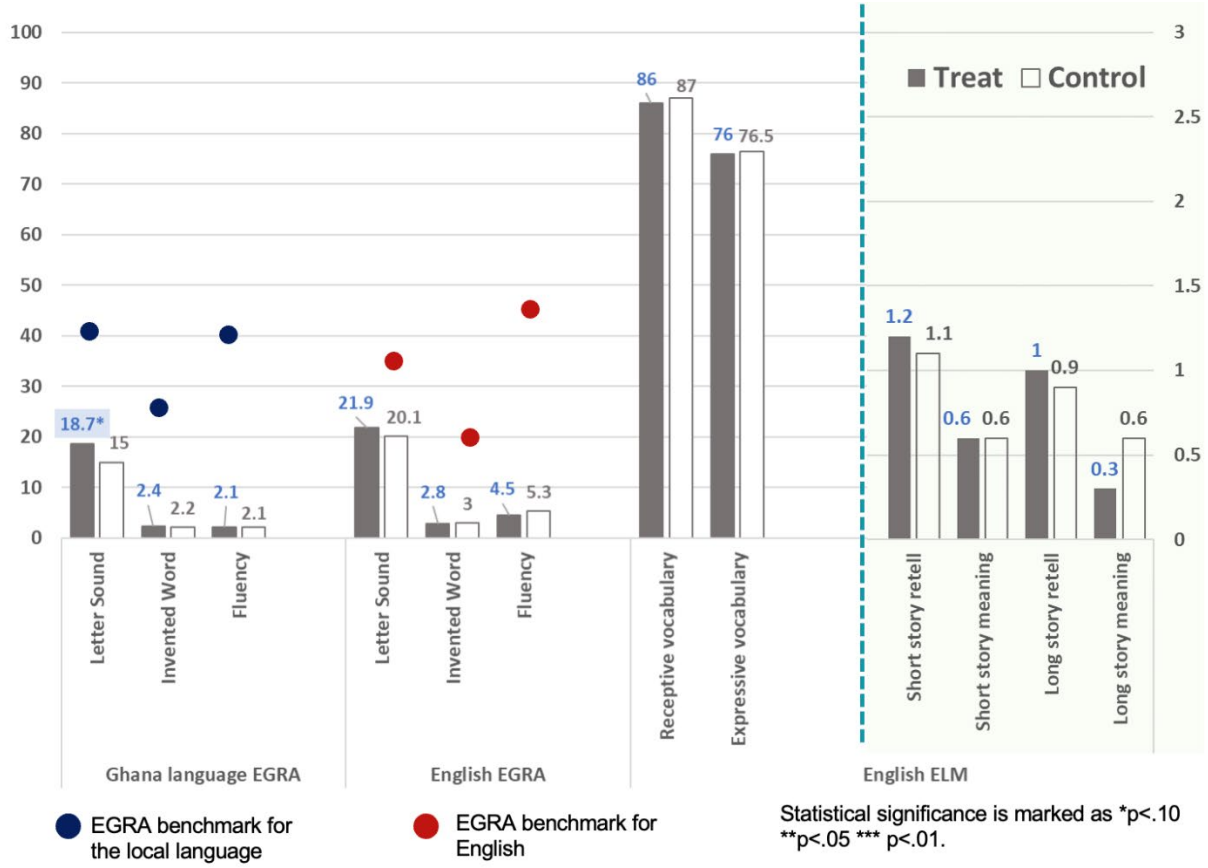


Figure 9. Baseline EGRA and ELM scores and the difference between treatment and control groups in B1

In B2, the average scores were higher compared to those in B1. Yet, on the whole the trend was similar. For EGRA, across all children, the average local language EGRA scores were 22.4 points for letter sound knowledge, 4.4 points for non-words reading, and 4.6 points for reading fluency. The average English EGRA scores were 28, 5.8, and 9.5 points respectively. When comparing the treatment and control groups, the scores were similar except for the local language letter sound identification and non-word reading and the English letter sound identification where the treatment group gained 6, 1.3, and 3.4 score points higher than the control group respectively. In all other EGRA subtests, none of the numeric differences were statistically meaningful. For English ELM, across all children, we noticed that children scored relatively better in the receptive and expressive vocabulary subtests compared to other subtests. These average scores were 91 points for receptive vocabulary (out of 100), 82 points for expressive vocabulary (out of 100), 1.3 points for short story retelling (out of 3), 0.9 points for short story inference (out of 3), 1 point for long story retelling (out of 3), and 0.6 points for long story inference (out of 3). When comparing the treatment and control groups, all scores were nearly identical. There was no numerically or statistically meaningful difference.

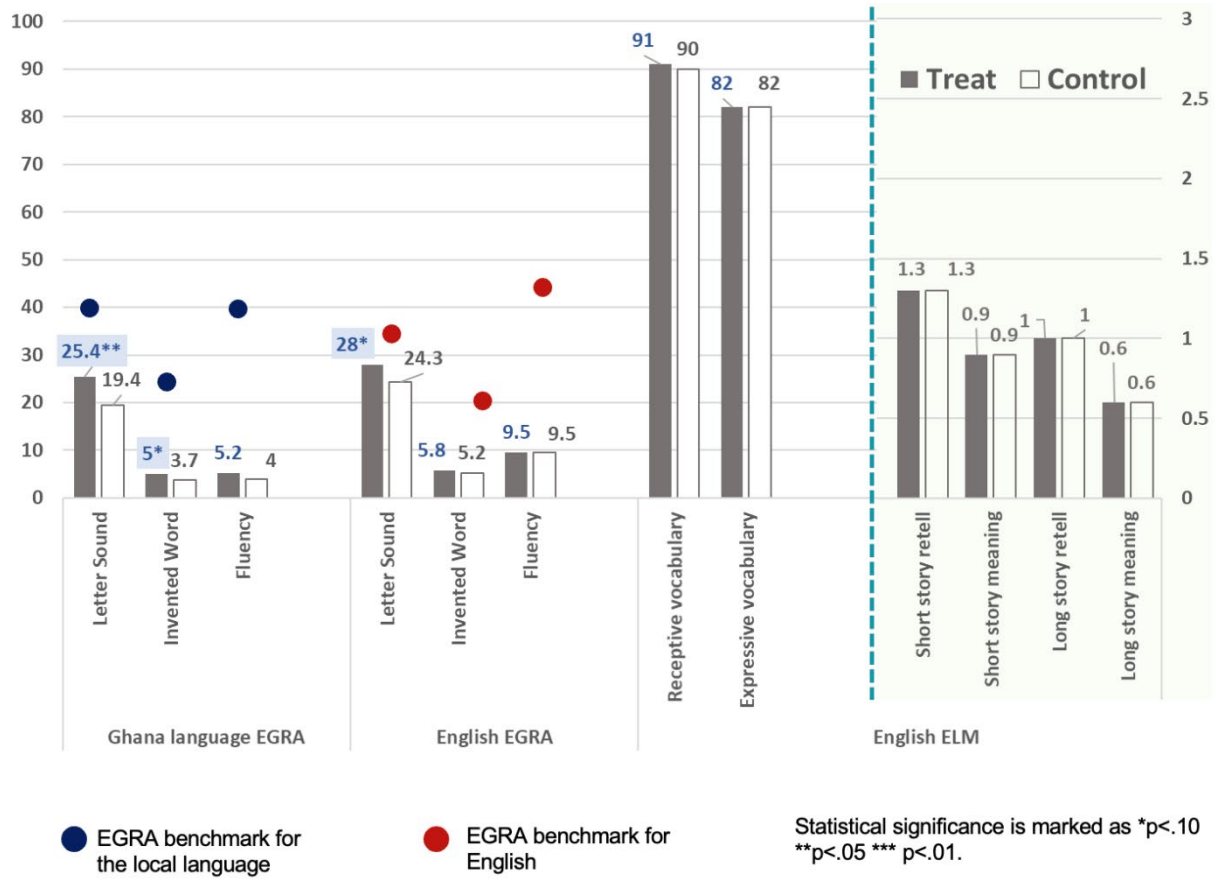


Figure 10. Baseline EGRA and ELM scores & the difference between treatment and control groups in B2

It is worth noting that across all grades, English EGRA scores were consistently higher than local language EGRA scores, which are hypothesized to be the mediating or transitional skills of the former. At this stage we do not have sufficient data that can help adequately explain why this pattern exists. To unpack this issue to the extent possible, we will collect interview and additional survey data from educators, parents and other system-level actors who could provide contextual explanations.

CHILDREN WITH ZERO SCORES

This section is dedicated to exploring areas in which children tend to have the most difficulty by looking at the percentages of children who scored zero in different EGRA and ELM subtests in B1 and B2. Essentially, **these children are those who are not able to read, comprehend or communicate a single letter or word in a given language.** As such, higher percentages indicate areas where children tend to struggle the most, and lower percentages indicate areas children tend to have less trouble with. In **Figures 11 and 12**, we visually presented this information in B1 and B2.

In B1, children both in the treatment and control groups had difficulty in skills with increased linguistic complexity such as EGRA reading fluency as well as ELM short and long story meaning interpretation. In these subtests, 54.3% (English reading fluency in the control group) to 87.4% (English long story meaning in the treatment group) scored zero points. In contrast, children seem to have less trouble with EGRA letter sound identification and ELM expressive and receptive vocabulary as the percentages of zero-score learners were much lower in these areas. In B2, the same pattern repeated although the percentages were generally lower than those in B1 as children in B2 are likely to have had more extended schooling.

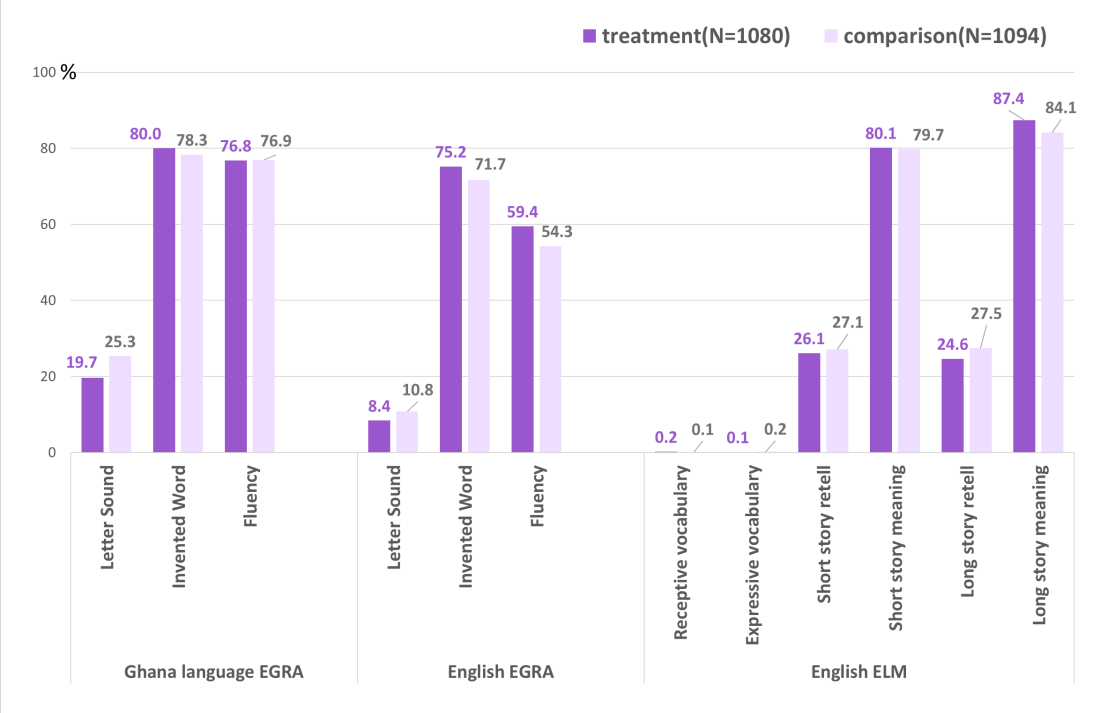


Figure 11. Percentage of children who gained zero scores by treatment arm in B1

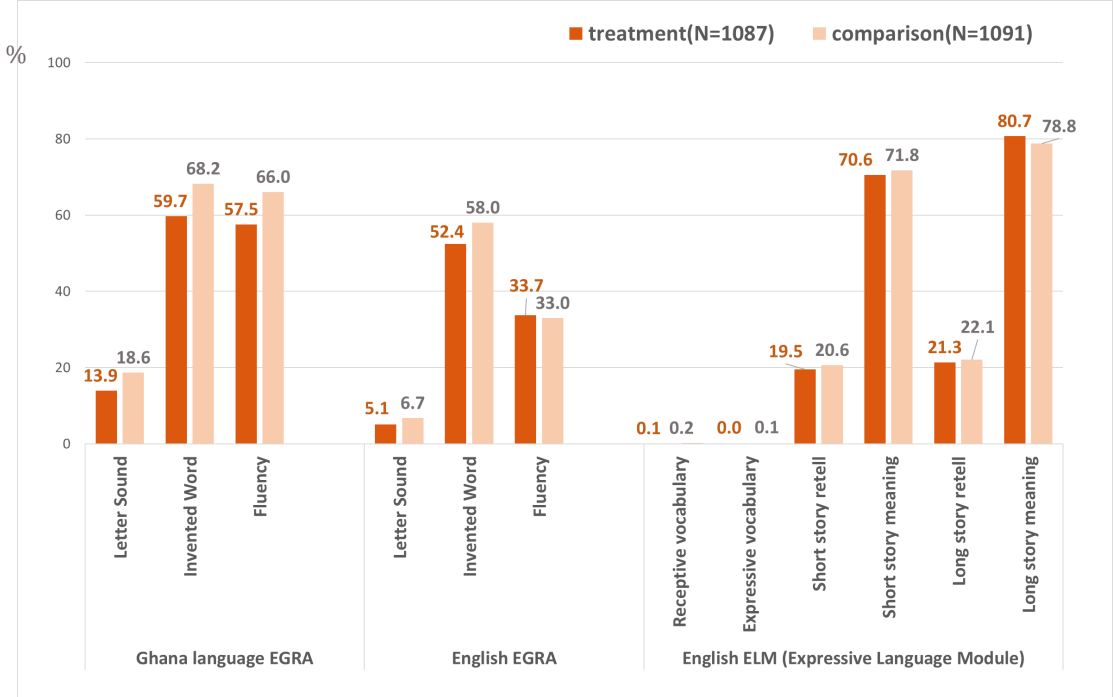


Figure 12. Percentage of children who gained zero scores by treatment arm in B2

SCORE DISTRIBUTION

This section is dedicated to examining how children's oral reading fluency scores are distributed by treatment arm in B1 and B2. Oral reading fluency—the ability to read connected text quickly and accurately—has been repeatedly identified as one of the most reliable and efficient predictors of children's reading comprehension (Reschly et al., 2009). To build on this evidence base and provide a fuller picture of the average reading fluency shown in **Figures 9 and 10** we visually presented how children's raw scores of reading fluency are spread across different score points in **Figures 13 and 14**.

In B1, **Figure 13** shows the score distribution for the local language fluency scores. In both the treatment and control groups, just about 75% of children were clustered at zero. The remaining 20% of children's scores are distributed across the spectrum with the highest score reading about 45 and 51 score points in the control and treatment, respectively. **Figure 14** shows English reading fluency, with about 57% of children clustered at zero and the rest distributed across the spectrum with the highest score reading about 70 and 72 score points in the control and treatment, respectively.

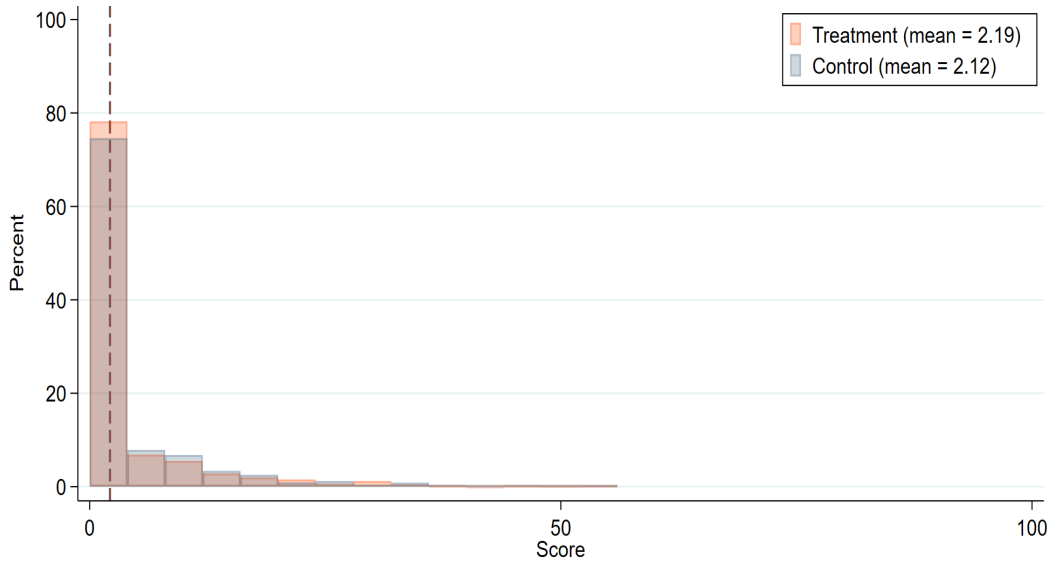


Figure 13. Local language reading fluency score distribution by treatment arm in B1

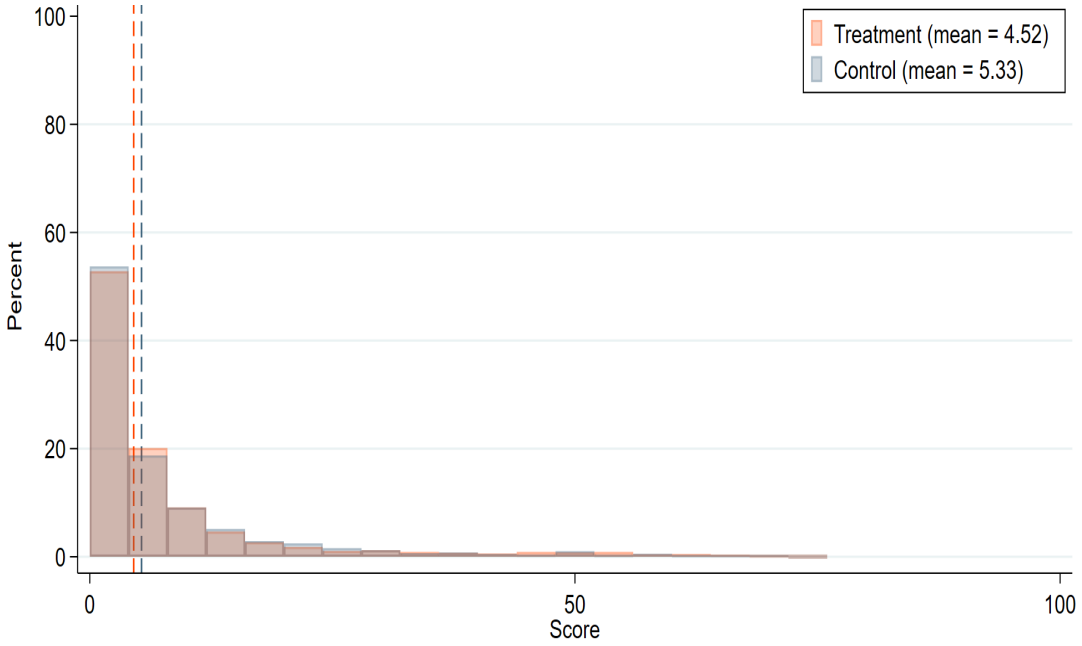


Figure 14. English reading fluency score distribution by treatment arm in B1

In B2, **Figures 15 and 16** show the distributions of raw scores were almost identical with those observed in B1 with a majority of children being clustered at zero both in the local language and English fluency scores. These patterns were the same between the treatment and control groups.

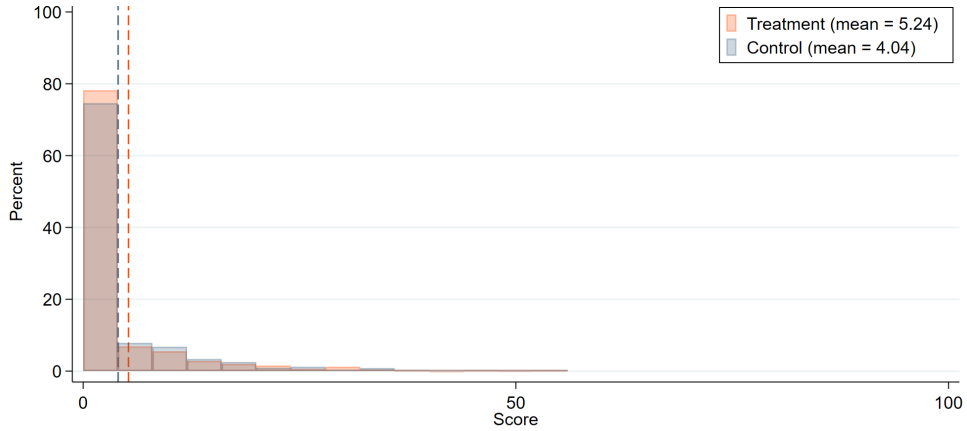


Figure 15. Local language reading fluency score distribution by treatment arm in B2

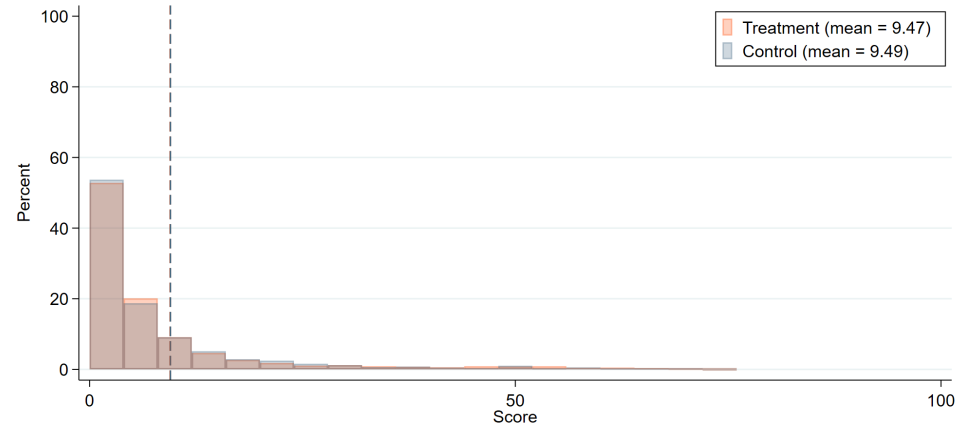


Figure 16. English language reading fluency score distribution by treatment arm in B2

PERFORMANCE BY GHANA'S NATIONAL READING SCALE

In this section, we classify children's EGRA scores by adapting Ghana's national reading scale proposed by the MoE (USAID Ghana, 2019). There are five levels. The highest level is '*Read fluently with comprehension*'. To qualify, children should score 80 percent or better on reading compression. The next highest level is '*Read with some understanding*.' Children at this level should score between 60 to 80 percent on comprehension. The third level is '*Read most words with minimal understanding*.' Children at this level score 20 or more points on fluency but less than 60 percent on comprehension. The next level is '*Read some words, but not understand*.' Children at this level score less than 20 correct words per minute on fluency.

The lowest level is '*Cannot Read*.' These children score zero on both fluency and comprehension. In **Figures 17 and 18**, we present this information visually.

In B1, for local language EGRA, over 76% of children were in the lowest category. For English EGRA, over 50% of children were in the same category, meaning a large number of children in B1 could not understand what they read whether in the local language or in English. This was the case for both the treatment and control groups. In B2, we observed a similar pattern, though the percentages of the lowest level were slightly lower than those in B1 and a small portion of children were spread across higher levels.

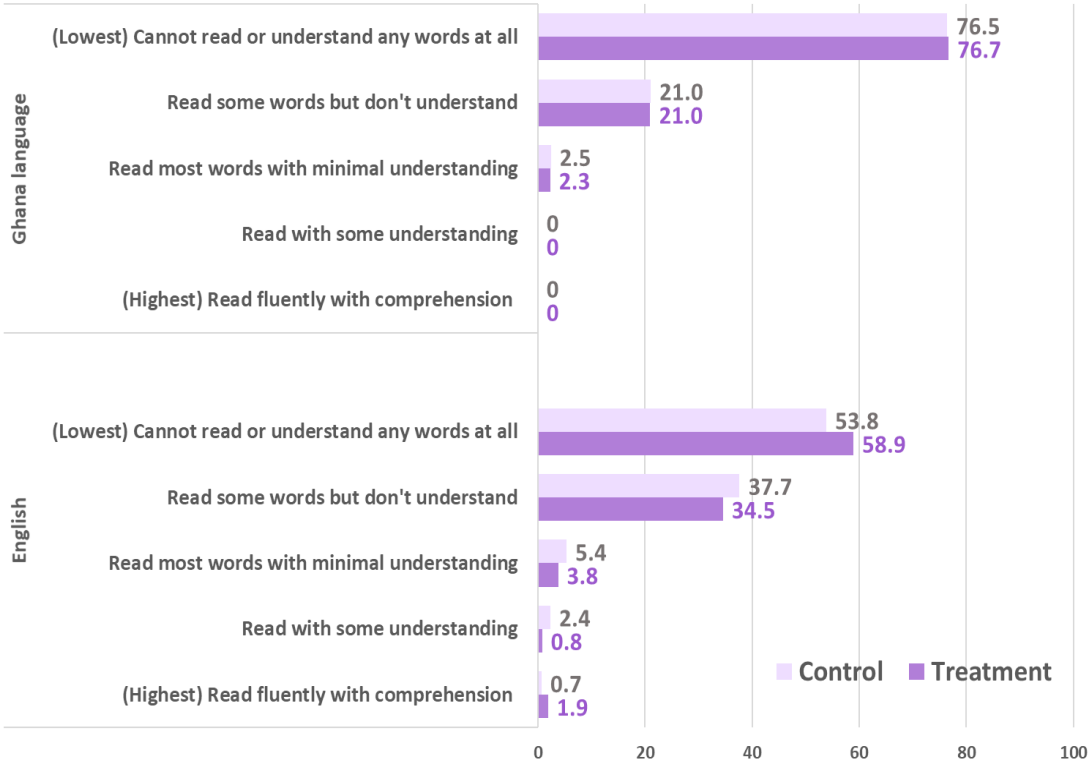


Figure 17. Percentage of children by Adapted Ghana's National Reading Scale in B1

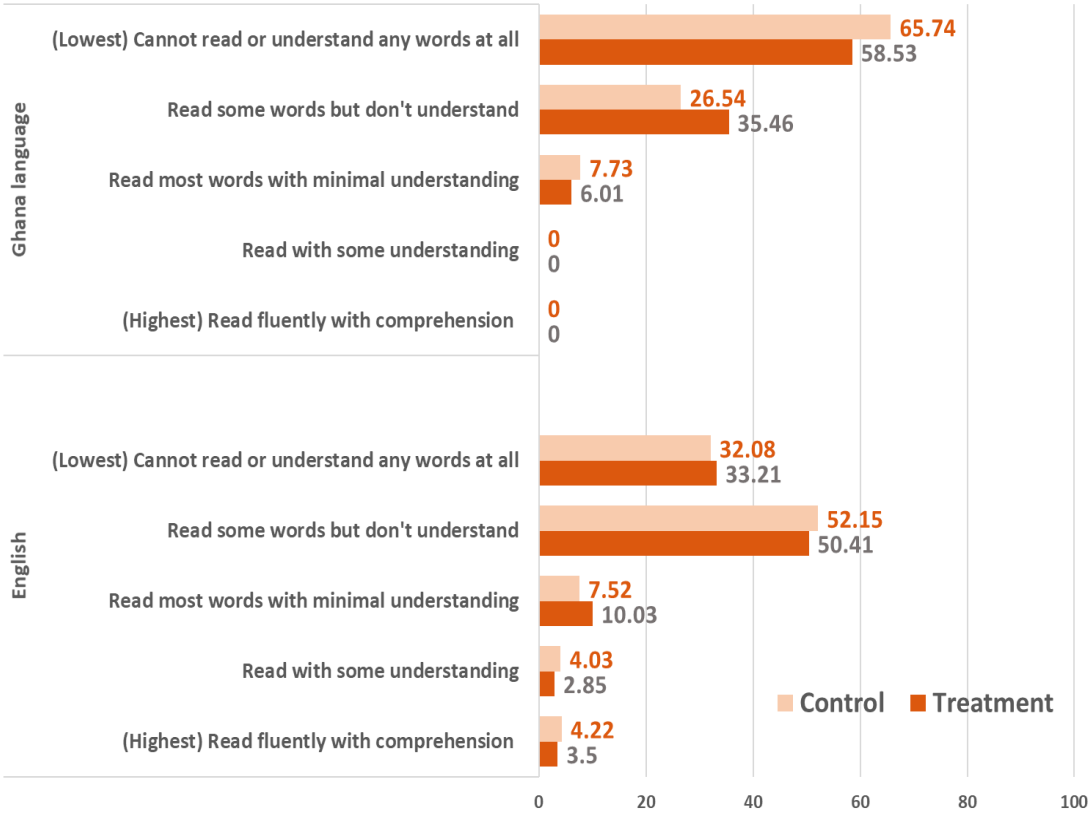


Figure 18. Percentage of children by Adapted Ghana's National Reading Scale in B2

RECEPTIVE AND EXPRESSIVE VOCABULARY

In this section, we examine ELM receptive and expressive vocabulary at the individual item level. Because the ELM scores were nearly the same between the treatment and control groups in both grades, here we show cross-group trends. In receptive vocabulary, there are 10 items. All items are binary—1 (correct) or 0 (incorrect). Children score 1 point when they choose an image that adequately represents an English word read to them. In **Figure 19**, we visually presented the children's score for each item with the words associated. In general, children in both grades scored high on all items. Among all, the two items, *Ball* and *Book,* appear easiest for children in our sample. In **Figure 20**, we presented the same information on the expressive vocabulary subtest, which was scored on a scale of 0 (incorrect), 1 (partially correct), and 2 (correct). Children score 2 points when they provide an adequate English word to the image shown to them and 1 point when they provide an adequate answer in the local language.

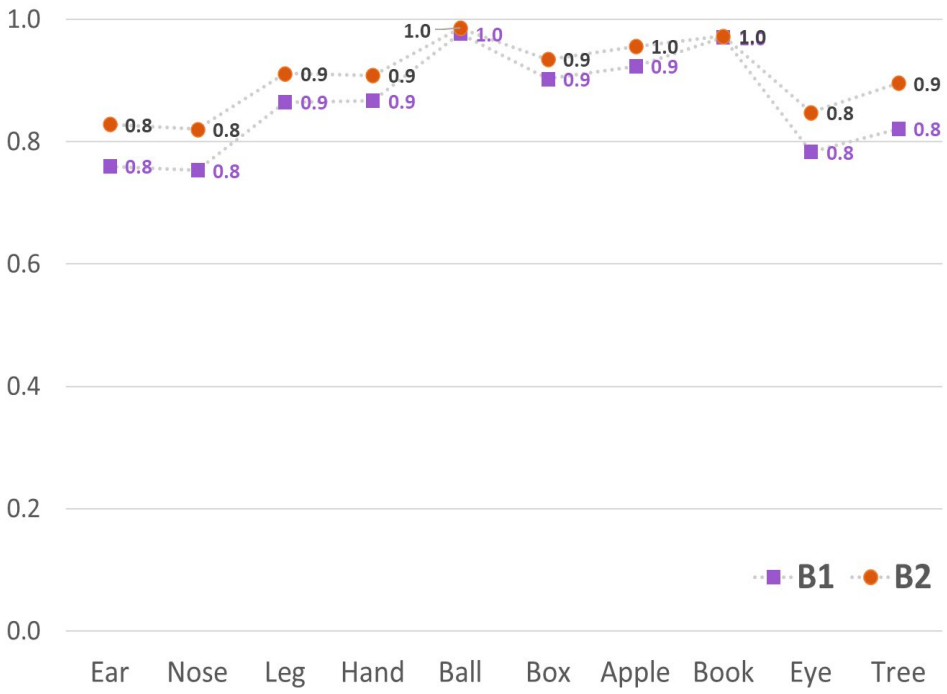


Figure 19. Score distribution at the item level for ELM receptive vocabulary B1 and B2

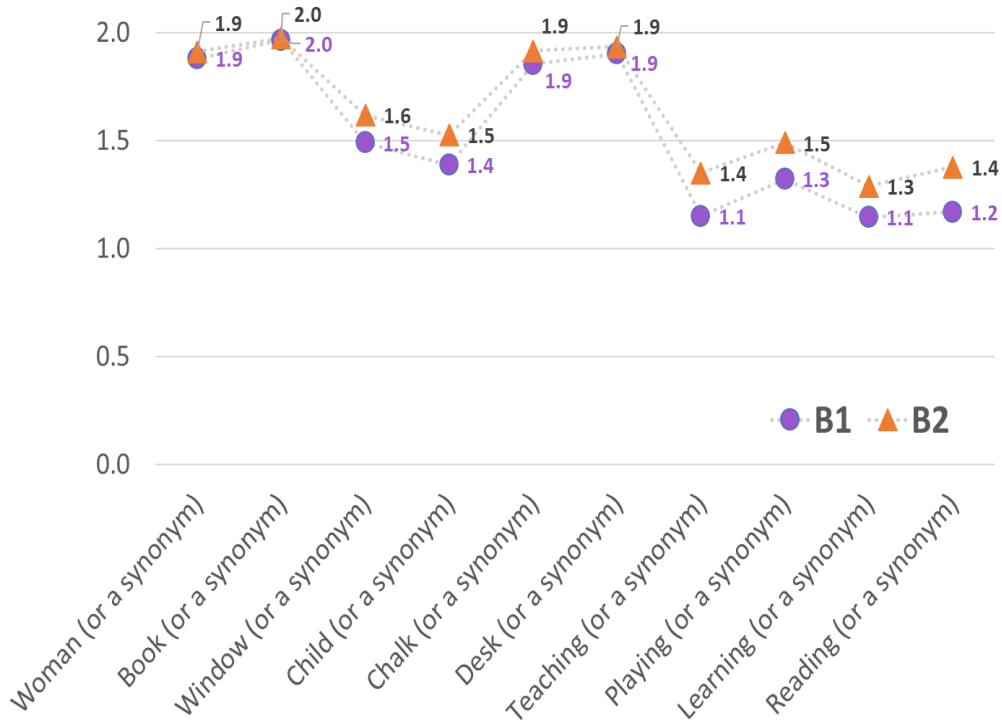


Figure 20. Score distribution at the item level for ELM expressive vocabulary B1 and B2

STORY RE-TELLING AND INFERENCE MAKING

In this section, we examine the story retelling and meaning subtests of ELM at the individual item level. Consistent with the previous section, we focused on cross-group trends in B1 and B1. Story retelling, both short and long, is scored on a scale of 0 (incorrect), 1 (minimally correct), 2 (partially correct) and 3 (correct). Children score higher when they can retell all the important details of the story. Story meaning, both short and long, is binary. Children score 1 point when they can give an inferential conclusion to the story by identifying characters and causal connections. In **Figure 21**, we visually presented the percentages of children across different score points on story retelling and meaning in B1. All in all, we noticed that about 75% of children were able to recall some or all of the important details of the story read to them, whether long or short. 12% of children were able to recall all the details of the short story while 4% were able to do so with the longer story. In contrast, only 14 to 20% children were able to draw an adequate conclusion of these stories, meaning children who could recall the facts struggled to make a meaning of them. In **Figure 22**, we presented the same information in B2. The pattern was similar with what was observed in B1 except that more children were able to recall some or all of the important details of the stories and also make adequate inferences.

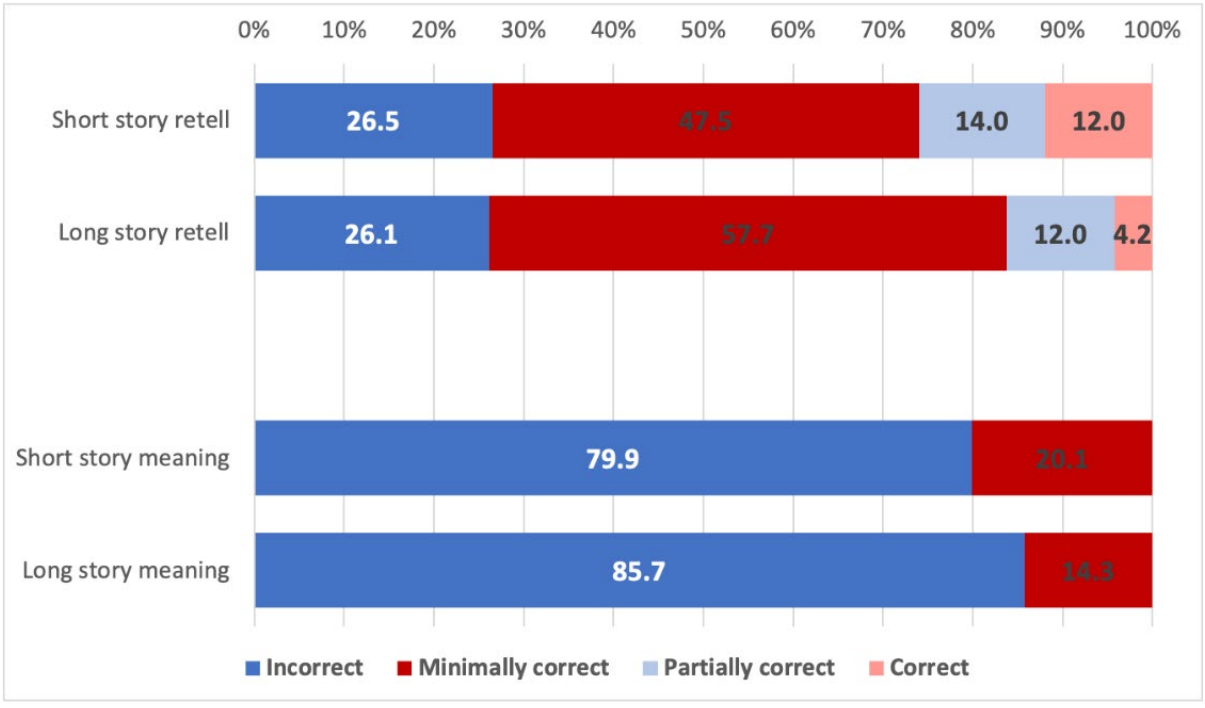


Figure 21. Percentage of children across different score points for story retelling and meaning in B1

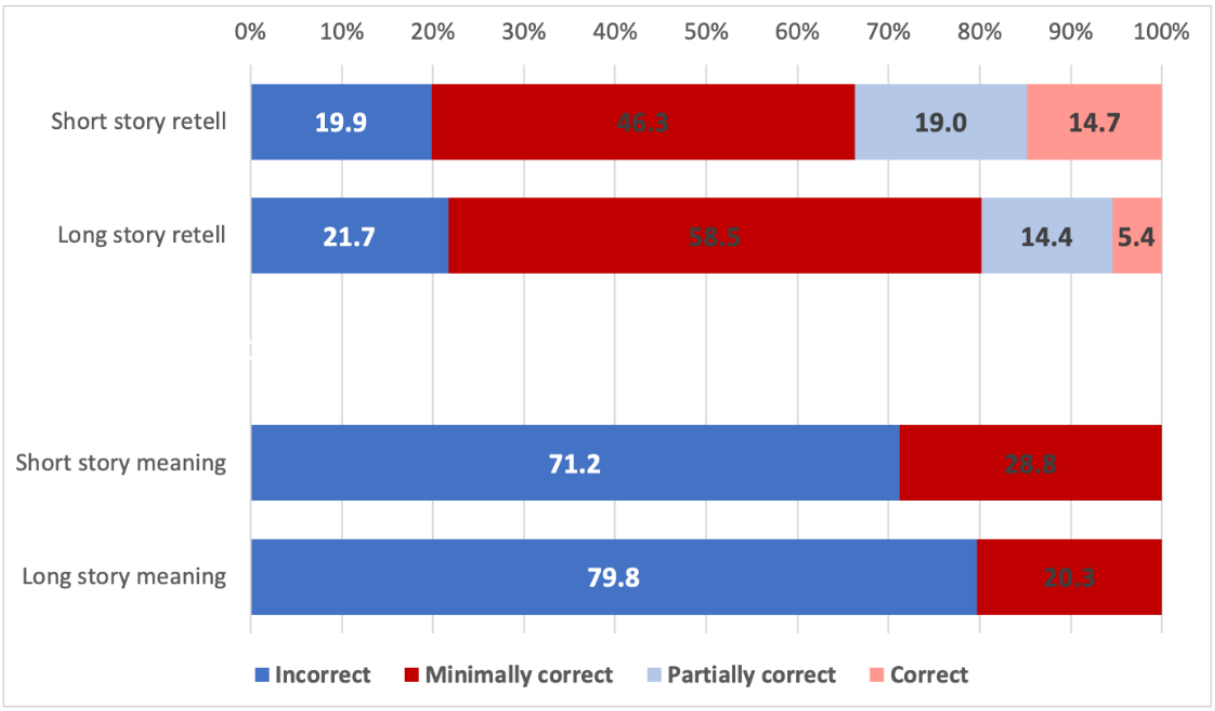


Figure 22. Percentage of children across different score points for story retelling and meaning in B2

SUBGROUP ANALYSIS OF LANGUAGE AND READING OUTCOMES

Over the next few pages, we present children's language and reading outcomes disaggregated by different subgroups across the treatment and control groups in B1 and B2 respectively. These within-grade subgroup comparisons may be useful to understand how children with different social and family backgrounds were performing at baseline and which subgroups were more disadvantaged, and thus would require greater learning support in the future. It is important to note that the raw scores of ELM receptive vocabulary range from 0-10 and the raw scores of expressive vocabulary range from 0-20. In this section, these scores are re-scaled to range from 0-100 to avoid misleading visuals when presented together with EGRA scores. Raw scores of ELM story meaning items range from 0-1. These scores are re-scaled to range from 0-3, consistent with the re-telling items, to avoid misleading visuals when all story items were presented side by side. Bonferroni correction was applied to all statistical tests of significance.

BY PLACE OF RESIDENCE

Figures 23 and 24 show the EGRA and ELM scores for the treatment and control groups with statistically meaningful differences highlighted in blue or yellow boxes in B1 and B2. In both grades, children in urban areas perform significantly better than those in rural areas in all language and reading outcomes. For example, for English letter sound identification, children in urban regions were able to read 27 letter sounds per minute whereas children in rural regions were lower by almost 10 score points. The gaps were also notable in local language letter sound identification, receptive and expressive vocabulary, and

short and long story retelling. All in all, the stark urban-rural divide shows that children in rural regions need more targeted, additional learning support to be able to catch up with their peers in urban regions.

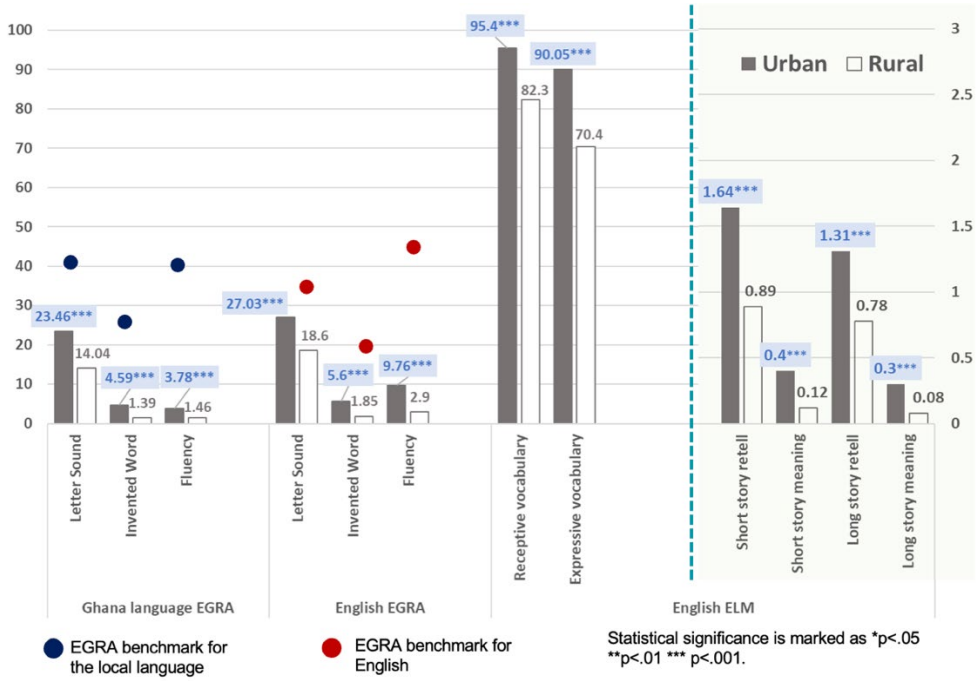


Figure 23. EGRA and ELM score comparison between children in rural and urban regions in B1

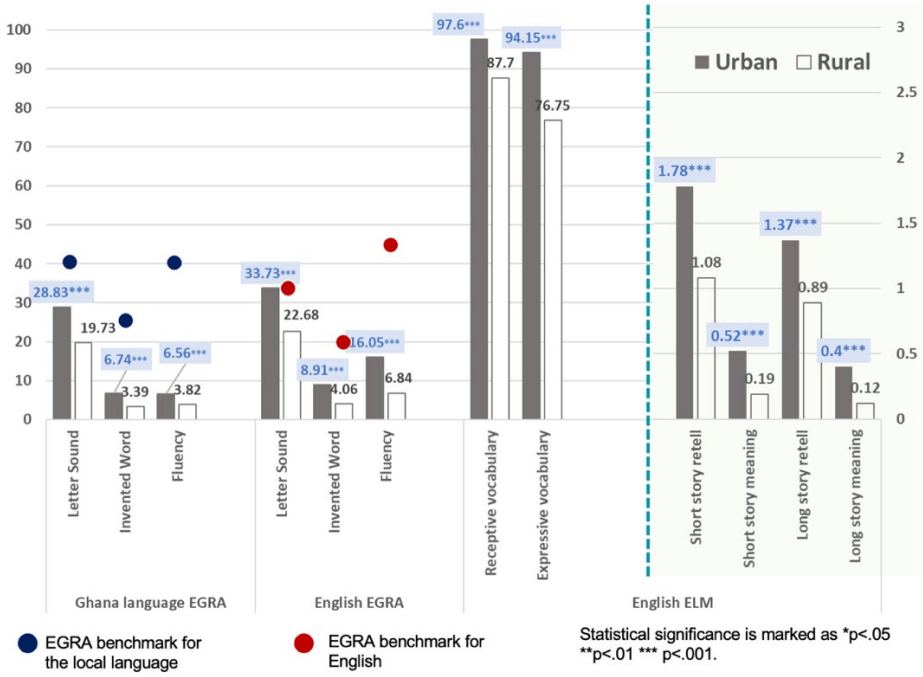


Figure 24. EGRA and ELM score comparison between children in rural and urban regions in B2

BY GENDER

When comparing by gender, in both B1 and B2 girls perform slightly better than boys in almost all EGRA subtests in the local language and in English, though there was no significant difference in ELM subtests. **Figures 25 and 26** show these comparisons in each grade.

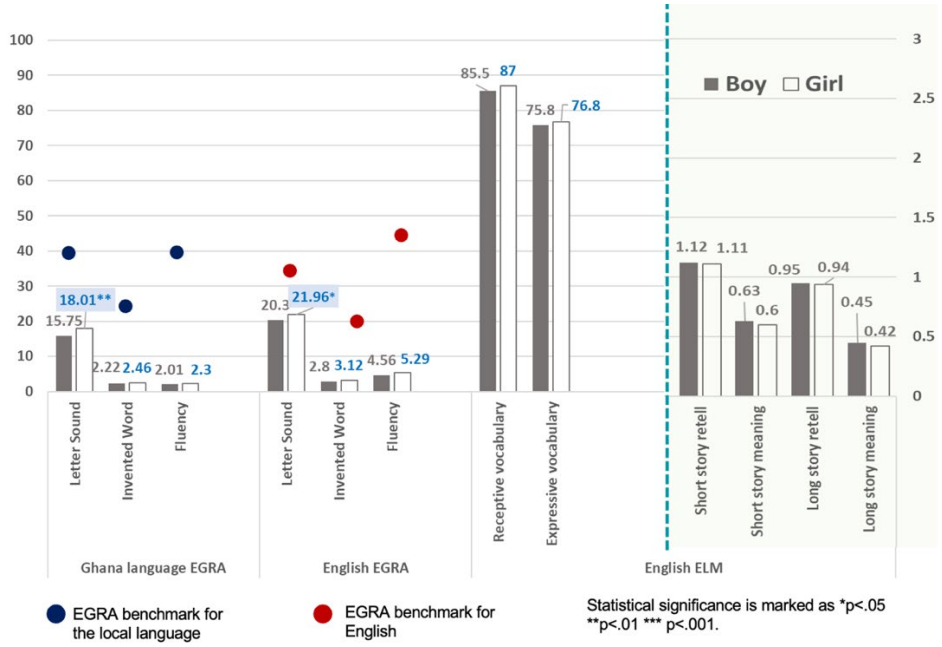


Figure 25. EGRA and ELM score comparison between boys and girls in B1

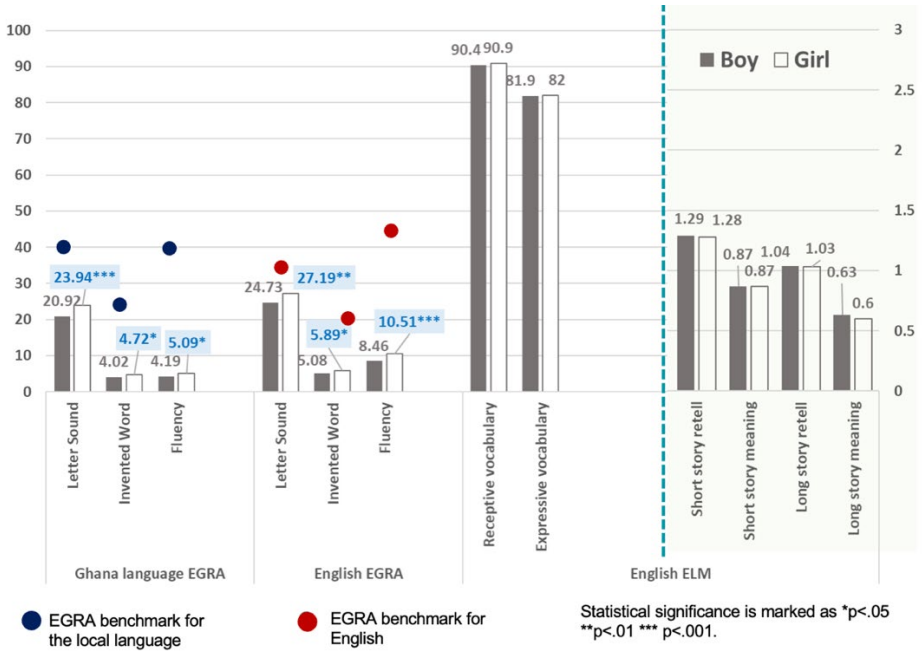


Figure 26. EGRA and ELM score comparison between boys and girls in B2

BY LANGUAGE MATCH

When comparing by match and mismatch between the child's L1 and the instructional language at school, in both B1 and B2, children in the language match group performed slightly better in all local language EGRA subtests. This pattern is explicable given these children spoke the same language in the home and school. The results were mixed on English EGRA and ELM. On receptive vocabulary, children in the language matched group didn't perform any better than the mismatched group. Of those that were statistically significant, the magnitudes of these differences appeared to be small. **Figures 27 and 28** show this below.

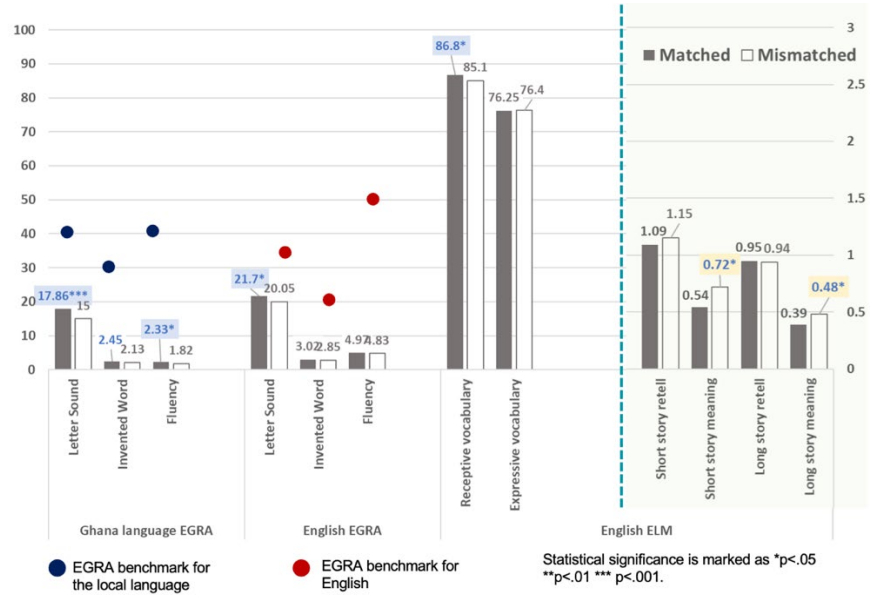


Figure 27. EGRA and ELM score comparison between home-school language match and mismatch in B1

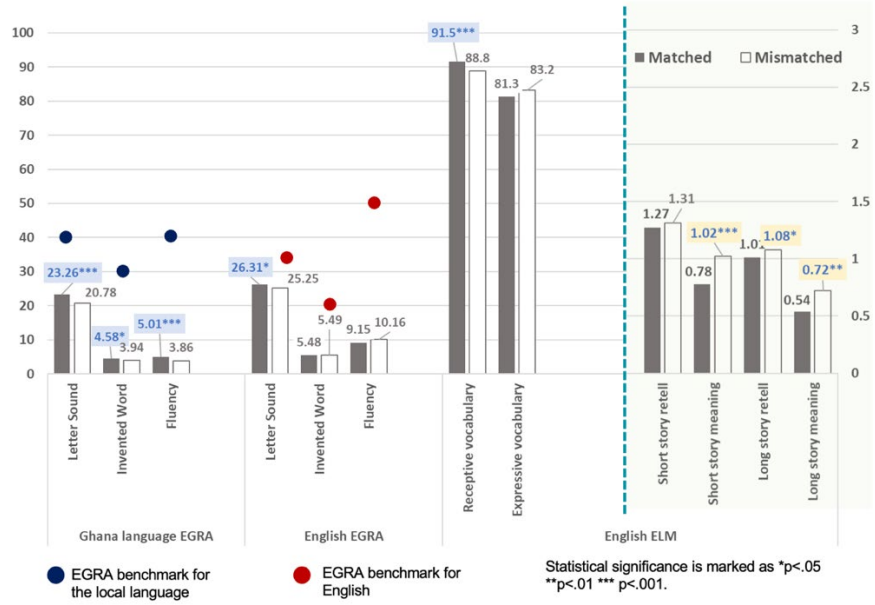


Figure 28. EGRA and ELM score comparison between home-school language match and mismatch in B2

BY FAMILY SOCIO-ECONOMIC STATUS

We measured the children's socio-economic status (SES) via principal component analysis of various household assets such as radio, phone, tv, electricity, fridge, bicycle, motorbike, and toilet. The resulting index score is standardized with a mean of 0. The high SES group includes children whose SES scores are greater than 0. The rest are in the low SES group. Similar to the urban-rural divide, children from high SES families significantly outperformed children from lower SES families in both B1 and B2. **Figures 29 and 30** demonstrate this.

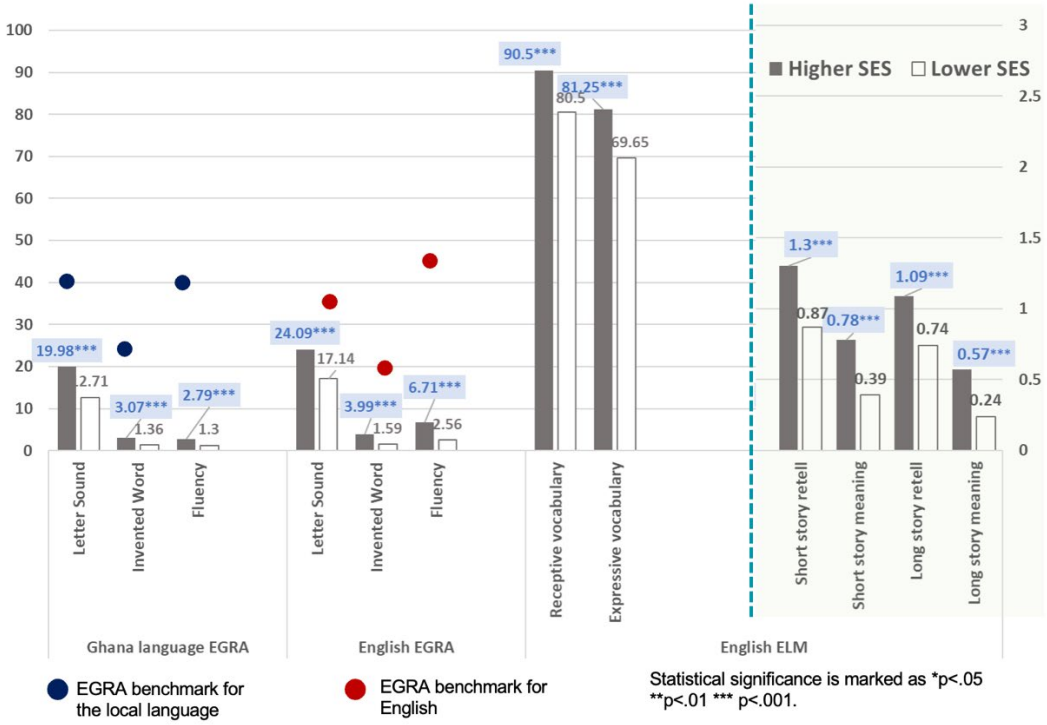


Figure 29. EGRA and ELM score comparison between high and low family socio-economic status in B1

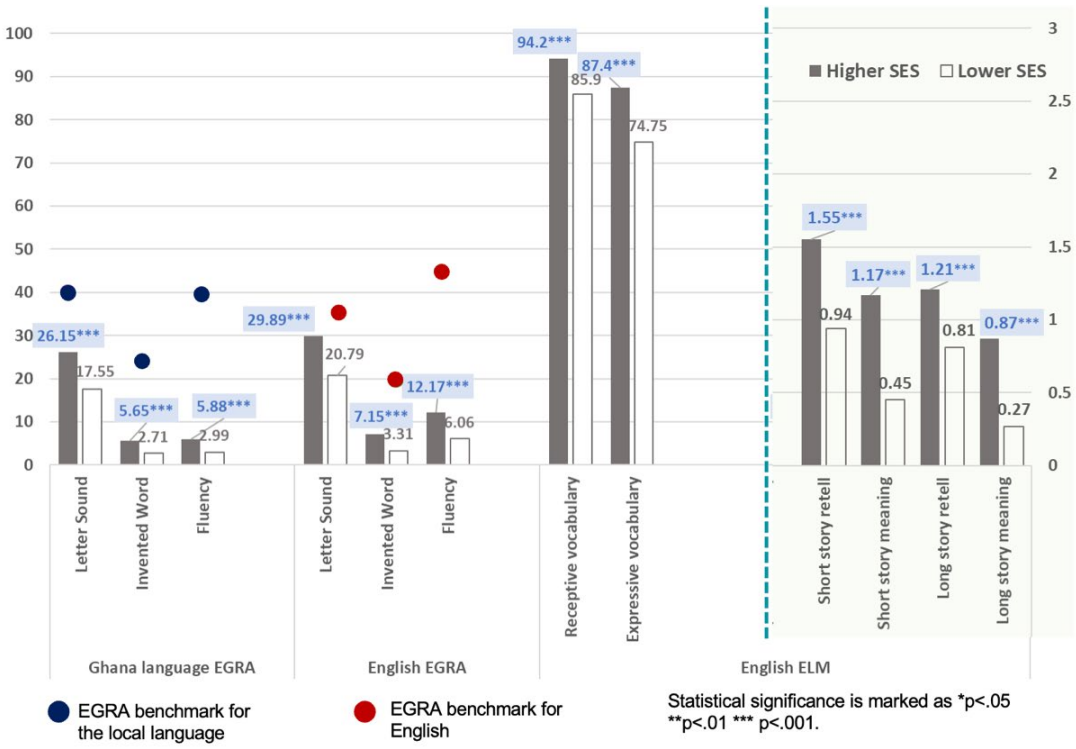


Figure 30. EGRA and ELM score comparison between high and low family socio-economic status in B2

BY HOME LITERACY ENVIRONMENT

We measured children's home literacy environment (HLE) via principal component analysis of a set of reading resources such as storybook, textbook, magazine, newspaper, comics, and religious books. The resulting index score is standardized with a mean of 0. The high HLE group includes children whose HLE scores are higher than 0. The rest are in the low HLE group. Similar to the high-low SES divide, children in the high HLE group significantly outperformed children in the low HLE group in both B1 and B2. **Figures 31 and 32** illustrate this.

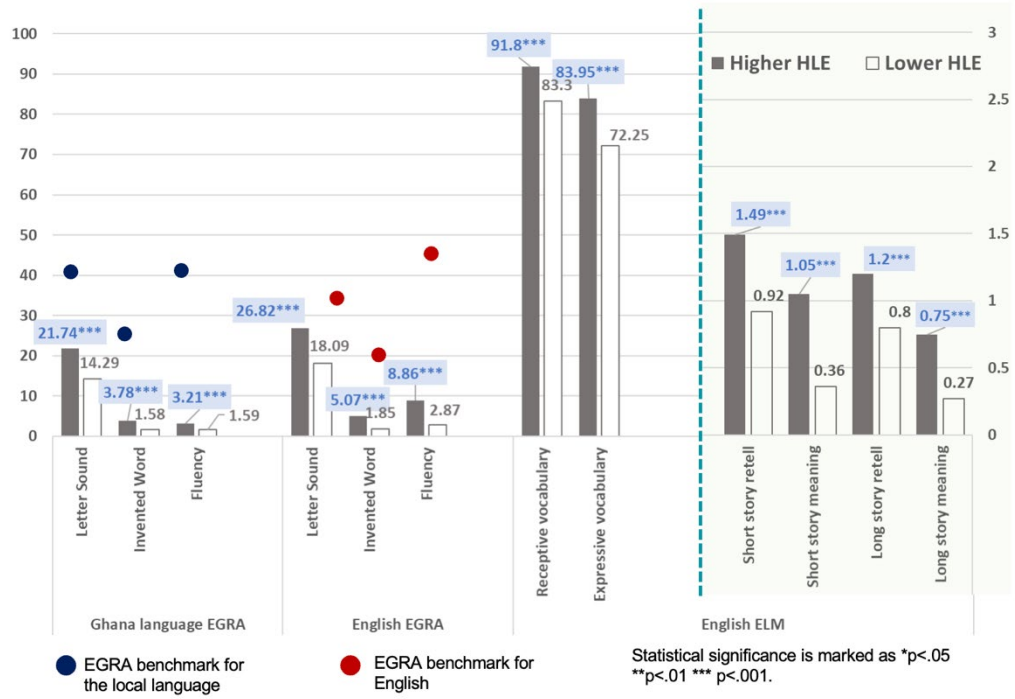


Figure 31. EGRA and ELM score comparison between high and low home literacy environment in B1

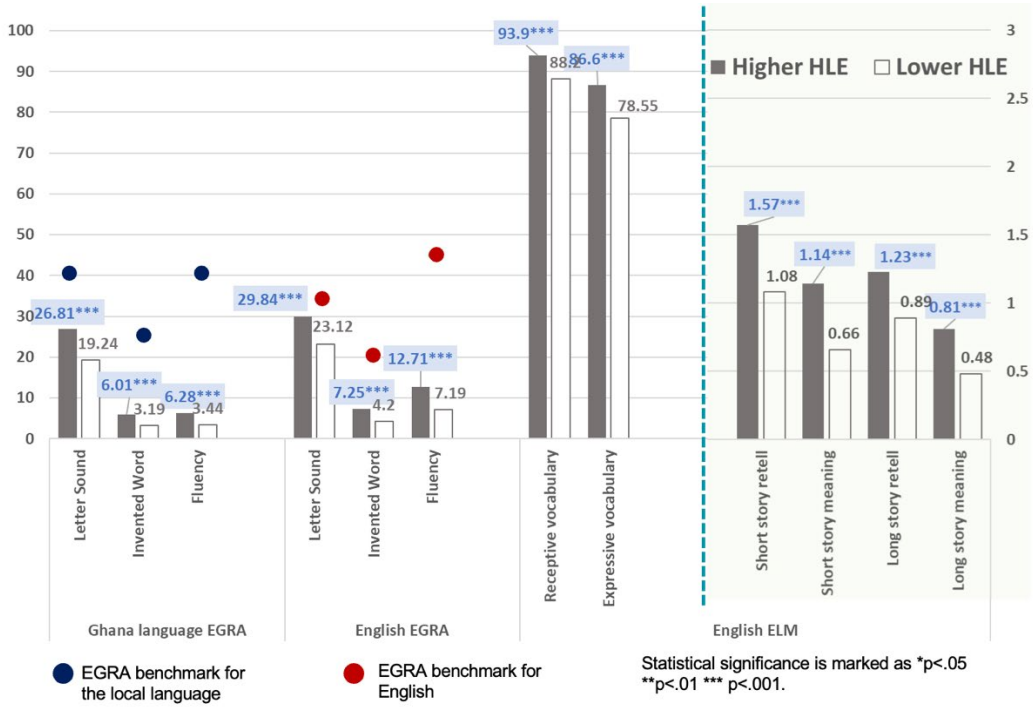


Figure 32. EGRA and ELM score comparison between high and low home literacy environment in B1

CONCLUSION

Taken all together, the findings in this baseline report offer several areas of consideration for the T2E+ evaluation activities and analysis at endline. First, the baseline data show the average language and reading scores of the children we surveyed were far below the highest obtainable scores or grade appropriate standards set by the MoE. Among all, the performance was particularly weak in higher-level skills such as EGRA reading fluency, which requires reading with speed and accuracy, and ELM story meaning, which requires constructing meaning or inferences of stories, beyond simply decoding individual letters and sounds. On one hand, these findings demonstrate that T2E+ is responsive to the learning needs of children in many public primary schools in Ghana. A significant next step is therefore to examine if T2E+ is also effective to enhance children's language and reading achievements, which defines our evaluation activities at endline as a follow-up of the present baseline analysis. At the same time, it is important to note that the weak performance observed in the baseline data reflect children's performance before their full engagement or completion of the full cycle of T2E+. Therefore, we anticipate children's performance would increase by endline as children learn how to read at school. And if T2E+ was effective, the improvement would be more notable in the treatment group.

Second, the baseline data confirm that the treatment and the control groups we created for the T2E+ impact evaluation are comparable in almost all background characteristics as well as language and reading outcomes we are interested in except for a few. This holds true for both B1 and B2. The comparability between the treatment and control groups will allow us to adequately attribute differences in children's language and reading outcomes to the treatment, in this case T2E+, at endline. To preserve this evaluation condition, it is important to minimize learner attrition. To reduce attrition, we will adopt two strategies proposed in the work of Brueton and colleagues (2011): sending school directors routine reminders of endline school visits via phone calls, text messages or other communication channels; and conducting community entry prior to endline data collection to gain support from parents and community leaders in areas the T2E+ evaluation is being conducted. Specifically, the UDS team in Ghana will assign a team of research coordinators to three regional clusters, including: coastal (Western, Western North, Central, Greater Accra and Volta), middle belt (Ashanti, Bono West, Bono East, Ahafo and Oti) and savannah (Savannah, Northern, North Eastern, Upper East and Upper West). The community entry and engagement outreach focus will involve in person meetings with national, regional and district education directorate and allied agency leaders and officials before field data collection. The process will also include sending out introduction letters for regional and district education directorates.

Third, we plan to adjust for the areas where the treatment group exhibited marginal outperformance over the control group, such as local language and English letter sound identification, by incorporating a difference-in-differences technique (Murnane & Willett, 2010). This means we will compare relative growth of the two groups between baseline and endline as opposed to just looking at the endline scores. As such, we will calculate the treatment effect as the growth of the treatment group (i.e., what children may gain with support from T2E+) less the growth of the control group (i.e., what children may naturally gain in typical, non-experimental school environments in Ghana). Finally, the subgroup comparisons also show that children from more disadvantaged families, defined as families in rural regions, as well as those with lower levels of household assets and reading resources for children were underperforming compared to those from relatively more advantage families, who live in urban regions with higher levels of household assets and reading resources for children. At endline, we will explore, if feasible, how children with different backgrounds experience T2E+.

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APPENDICES

APPENDIX I: EVALUATION STATEMENT OF WORK

SUMMARY INFORMATION

Strategy/Project/Activity Name	USAID/Partnership for Education - Learning Activity
USAID Office	USAID Ghana
Implementer(s)	FHI 360
Cooperative Agreement/Contract #	Cooperative Agreement AID-641-A-15-00004
Total Estimated Ceiling of the Evaluated Project/Activity (TEC)	$92,000,000
Life of Strategy/Project/Activity	July 2021 - December 2022
Active Geographic Regions	National
Development Objective(s) (DOs)	Development Objective 2: Quality services delivered with accountability
External or internal evaluation?	External

EVALUATION TEAM COMPOSITION

The SHARE team will bring in its regional sub-awardee, the Resilient Africa Network (RAN) which covers Sub-Saharan Africa, and their accompanying partner in Ghana, the University of Development Studies (UDS) Ghana. UDS Ghana has already identified a strong team of education experts with experience in conducting EGRAs as well as qualitative research methods. This assessment could be particularly delicate given the letter sound recognition (the sounds of the letters vs the "name" of the letter) inherent in EGRAs in English and possibly even more so should we determine the need to apply EGRA in multiple languages. The UDS team will assemble research team members and enumerators who can bring perspectives across genders and different ethnic groups. Enumerators will be recruited such that they are able to speak the local languages needed for the areas where the research will be carried out. Both RAN and the local research institution will support the research design process, development and validation of the assessment tools, identification and training of enumeration staff, preliminary data collection and quality assurance, data cleaning, and analysis. SHARE will also bring on a researcher to support the analysis of the costing data in support of RQ3. The data to be analyzed will be provided by USAID's local implementing partner. The research efforts will be spearheaded by SHARE's Technical Advisor, Dr. Jeongmin Lee at the University of Notre Dame with substantial experience in leading program impact evaluations in education in low resource environments. Dr. Lee will oversee the research design process, tool identification, data quality assurance, analysis, and presentation of findings.

Planned Baseline Evaluation Schedule

Date or Duration	Proposed Activities	Important Considerations
7/5 - 8/11	Subawarding and Preparation of the evaluation design	Will depend in part on duration to make subawards
8/12/21 - 8/18/21	USAID review of the evaluation design	Based on availability of Mission personnel
8/19/21 - 8/25/21	Inception Report	
8/26/21 - 9/3/21	Develop research tools	EGRA tool for different grades and qualitative screeners

9/6/21 - 9/10/21	USAID review of research tools	Note U.S. Labor Day Holiday
9/13/21 - 10/1/21	Institutional Review Board	Will be carried out within University of Notre Dame and with Ghana national Institutional Review Board
10/18/21- 10/22/21	Enumerator Training	To be timed just before start of data collection
1101/21 - 12/03/21	Data collection	Approximately 100 treatment + 100 control schools, 3 grades for each school and 15 students per grade; additional qualitative across treatment areas
12/6/21 - 01/21/22	Data analysis	Analysis of over 9,000 EGRAs and additional qualitative research
02/25/22	Presentation of preliminary findings and recommendations development	
03/02/22	Final Presentation	
02/11/22 - 03/04	Report writing	
03/7/22 - 3/18/22	USAID review of draft report	Consider lengthening based on availability of US personnel during this period.
3/21/22 - 4/30/22	Incorporate USAID comments and prepare final report	Duration allows for an additional review by USAID Ghana Mission if needed.
5/30/22	Submit dataset(s) to Development Data Library	
5/30/22	Submit final report to Development Experience Clearinghouse	

Estimated Level Of Effort In Days By Position

Position	Pre-paration	Travel to/from Country	In-Country Data Collection	Analysis and Presentation of Findings	Total LOE in days
UND Team Lead *(Education evaluation specialists)*	40		4	42	86
Additional SHARE Support	20		10	45	75
Regional education team (RAN)	50			50	50
Additional regional support staff (RAN)	100	18	30	80	228

Ghana Team Lead (UDS)	40		30	30	100
Ghana education experts (UDS)	50		30	60	140
Ghana Statistician	20			50	70
Ghana Evaluation Coordinator (UDS)	40		60		100
Ghana Administrator (UDS)	40			60	100
Totals	**400**	**18**	**164**	**417**	**949**

APPENDIX II: EVALUATION METHODS

Design

This study uses a sequential mixed-methods research design in which the quantitative strand of the research is conducted prior to the qualitative strand of the research that is built on the findings from the quantitative strand. The quantitative strand addresses RQs 1, 2 and 4. Specifically, RQ1 estimates the average treatment effects of T2E+ via a cluster randomized controlled trial study with a treatment group and a control group. RQ2 estimates the cost of different elements of T2E+ interventions via a cost analysis. RQ3 examines factors affecting program effectiveness quantitatively via a regression analysis as well as qualitatively via interviews with teachers, parents, and other system-level actors in Ghana's primary education system. RQ4 examines the association between growth in local language reading skills and English reading skills via a regression analysis. Finally, results from the quantitative and qualitative strands are brought together at the stage of interpretation to generate higher level research and practice implications regarding the study purpose. Over the next few pages, we illustrate methods used in each of the evaluation questions summarized above.

Quantitative Strand

The effect of the T2E program (Q1): The T2E+ program is implemented in grades KG2 to B3. Among these grades, the proposed T2E+ evaluation involves learners in B1 and B2. The school is the unit of treatment assignment, and different schools are randomly assigned to one of the following two treatment conditions: a treatment group or a control group. Schools in the treatment group will receive a full cycle of the T2E+ program from September 2021. Schools in the control group will be precluded from the T2E+ program while the present evaluation is taking place. These schools may retain a regular government primary curriculum. The child is the unit of outcome assessment. We initially planned to sample and assess a group of 4,800 learners in B1 and B2 across 100 treatment and 100 control schools at baseline and re-assess 18 months later at endline. Learners' oral language and reading outcomes are compared between the T2E schools and the control schools to assess the average treatment effects of the T2E program.

The cost of the T2E program (Q2): Given competing priorities and scarce resources in the education sector in Ghana, policymakers and donors can benefit from evidence not only about the effects of reading interventions such as the T2E program, but also about their costs. To provide such information, this study follows the 2021 USAID's Cost Analysis Guidance, analyzes the costs of different elements of the T2E program such as material provision, teacher training, coaching and monitoring, and estimates an average cost per beneficiary.

Factors affecting program effectiveness (Q3 – Quantitative): Curriculum interventions are inevitably influenced by local adaptation and contextual dynamics such as teacher buy-in, intervention compliance, language attitudes, implementation support from head teachers, or other institutional conditions such as class sizes or teacher-student ratios (Fixsen et al., 2009; Kam et al., 2003). We will examine contextual factors that may affect program outcomes in different school settings via a regression analysis.

The association between growth in local language reading skills and growth in English reading skills (Q4): To explore the relationship between local language reading skills and English reading skills, we employ a regression analysis with child data collected via the CRCT. It is important to note that the statistical relationship analyzed in this particular research question is not causal but correlational. Hence, results should not warrant that growth in local language reading skills causes growth in English skills.

Qualitative Strand

Factors affecting program effectiveness (Q3 - Qualitative): Beside the quantitative investigation of factors affecting program effectiveness, we will examine factors key program stakeholders, such as teachers, head teachers, curriculum leads, and School Improvement Support Officers and other government officials such as Assistant Directors of Supervision perceive to be supportive of and barriers to program effectiveness via a qualitative interview analysis.

APPENDIX III: STATISTICAL COMPARISON OF BACKGROUND CHARACTERISTICS AND EGRA/ELM SCORE TABLES

Average background characteristics and comparability between treatment and control groups in B1:

Variable	All children	Treatment	Control	Difference between Treatment and Control	P value
Individual characteristics					
Age in years	8.08	7.99	8.18	-0.19	0.09
Girl (ratio)	0.50	0.50	0.49	0.01	0.53
Physically disabled (ratio)	0.06	0.05	0.07	-0.02	0.09
LOI-Child-Teacher mismatch (ratio)	0.65	0.67	0.64	0.02	0.70
Days absent last week	1.63	1.60	1.65	-0.04	0.59
Ate before coming to school (ratio)	0.78	0.77	0.79	-0.02	0.54
Family environments					
Family's SES*	-0.01	-0.09	0.06	-0.14	0.16
Home reading resources*	0.08	0.09	0.07	0.02	0.79
Parents read to the child (ratio)	0.26	0.26	0.26	0.00	0.92
Siblings read to the child (ratio)	0.43	0.43	0.43	-0.01	0.87
Communication with child					
Teachers use English outside classroom (ratio)	0.79	0.77	0.82	-0.05	0.28
People use English in community (ratio)	0.33	0.33	0.33	0.00	0.94
School environments					
Urban school (ratio)	0.30	0.27	0.33	-0.06	0.38
School has a library (ratio)	0.07	0.09	0.04	0.05	0.19
Weekly lesson hours for reading	5.04	4.73	5.34	-0.61	0.11

*Note: Statistical significance is marked as *p<.05 **p<.01 *** p<.001. We measured the child's socio-economic status (SES) via principal component analysis of various household assets such as radio, phone, tv, electricity, fridge, bicycle, motorbike and toilet. The resulting index score is standardized with mean of 0 and standard deviation of 1. We measured children's home literacy environment (HLE) via principal component analysis of a set of reading resources such as storybook, textbook, magazine, newspaper, comics, and religious books. The resulting index score is standardized with mean of 0 and standard deviation of 1.

Average background characteristics and comparability between treatment and control groups in B2:

Variable	All children	Treatment	Control	Difference between Treatment and Control	P value
Individual characteristics					
Age in years	9.24	9.19	9.28	-0.09	0.38
Girl (ratio)	0.50	0.51	0.49	0.01	0.32
Physically disabled (ratio)	0.09	0.09	0.10	-0.01	0.72
LOI-Child-Teacher mismatch (ratio)	0.67	0.67	0.66	0.01	0.91
Days absent last week	1.75	1.79	1.71	0.08	0.37
Ate before coming to school (ratio)	0.76	0.78	0.74	0.04	0.19
Family environments					
Family's SES*	0.01	-0.05	0.07	-0.12	0.24
Home reading resources*	-0.08	-0.07	-0.09	0.01	0.88
Parents read to the child (ratio)	0.25	0.23	0.28	-0.05	0.18
Siblings read to the child (ratio)	0.43	0.40	0.47	-0.07	0.10
Communication with child					
Teachers use English outside classroom (ratio)	0.79	0.75	0.83	-0.08	0.09
People use English in community (ratio)	0.35	0.32	0.38	-0.05	0.20
School environments					
Urban school (ratio)	0.30	0.27	0.33	-0.06	0.39
School has a library (ratio)	0.06	0.09	0.04	0.04	0.25
Weekly lesson hours for reading	4.99	4.73	5.31	-0.59	0.12

*Note: Statistical significance is marked as *p<.05 **p<.01 *** p<.001. We measured the child's socio-economic status (SES) via principal component analysis of various household assets such as radio, phone, tv, electricity, fridge, bicycle, motorbike and toilet. The resulting index score is standardized with mean of 0 and standard deviation of 1. We measured children's home literacy environment (HLE) via principal component analysis of a set of reading resources such as storybook, textbook, magazine, newspaper, comics, and religious books. The resulting index score is standardized with mean of 0 and standard deviation of 1.

Baseline EGRA and ELM scores and the difference between treatment and control groups in B1

	Outcome	National bench-mark	All children	Treatment	Control	Difference between treatment and control
EGRA: Early Grade Reading Assessment	***Local Languages***					
	Letter-sound identification	40	16.8	18.7	15.0	3.7 *
	Non-words reading	25	2.3	2.4	2.2	0.2
	Oral reading fluency	40	2.1	2.1	2.1	0.0
	English					
	Letter-sound identification	35	21.0	21.9	20.1	1.8
	Non-words reading	20	2.9	2.8	3.0	-0.2
	Oral reading fluency	45	4.9	4.5	5.3	-0.8
ELM: Expressive Language Module	***English***	Highest score obtainable	All children	Treatment	Control	Difference between treatment and control
	Receptive vocabulary	10	8.6	8.6	8.7	-0.1
	Expressive vocabulary	20	15.3	15.2	15.3	-0.1
	Short story retelling	3	1.1	1.2	1.1	-0.1
	Short story inference	1	0.2	0.2	0.2	0.0
	Long story retelling	3	0.9	1.0	0.9	0.1
	Long story inference	1	0.1	0.1	0.2	-0.1

Note: Statistical significance is marked as *p<.05 **p<.01 *** p<.001.

Baseline EGRA and ELM scores and the difference between treatment and control groups in B2

	Outcome	National bench-mark	All children	Treatment	Control	Difference between treatment and control
EGRA: Early Grade Reading Assessment	***Local Languages***					
	Letter-sound identification	40	22.4	25.4	19.4	6.0**
	Non-words reading	25	4.4	5.0	3.7	1.3*
	Oral reading fluency	40	4.6	5.2	4.0	1.2
	English					
	Letter-sound identification	35	26.0	28.0	24.3	3.4*
	Non-words reading	20	5.5	5.8	5.2	0.6
	Oral reading fluency	45	9.5	9.5	9.5	0.0
ELM: Expressive Language Module	***English***	Highest score obtainable	All children	Treatment	Control	Difference between treatment and control
	Receptive vocabulary	10	9.1	9.1	9.0	0.1
	Expressive vocabulary	20	16.4	16.4	16.4	0.0
	Short story retelling	3	1.3	1.3	1.3	0.0
	Short story inference	1	0.3	0.3	0.3	0.0
	Long story retelling	3	1.0	1.0	1.0	0.0
	Long story inference	1	0.2	0.2	0.2	0.0

Note: Statistical significance is marked as *p<.05 **p<.01 *** p<.001.

APPENDIX IV: DATA COLLECTION INSTRUMENTS

Child background survey

Section 1: Location and IDs

1. Date (dd/mm/yy): _____

2. Assessor name: _____

3. Assessor code: _____

4. Region (name and code): _____

5. District (name and code): _____

6. School (name and code): _____

Section 2: Child profile

7. Child name (family name + given name) _____

8. Gender
   1) Boy
   2) Girl

9. How old are you? (In years)

10. Which grade are you in?
    1) Basic 1
    2) Basic 2

11. Did you eat before coming to school today?
    1) Yes
    2) No

12. In the last week, how many days were you absent from school?
    1) Never
    2) 1 day
    3) 2 days
    4) 3 days
    5) 4 days
    6) Entire week

Section 3: Family and home profile

13. In your home, does your family have...?
    - Radio
      1) Yes [ ] 2) No [ ]

- Mobile phone
  1) Yes [ ] 2) No [ ]
- Television
  1) Yes [ ] 2) No [ ]
- Electricity
  1) Yes [ ] 2) No [ ]
- Refrigerator
  1) Yes [ ] 2) No [ ]
- Bicycle
  1) Yes [ ] 2) No [ ]
- Motorbike
  1) Yes [ ] 2) No [ ]
- Toilet
  1) Yes [ ] 2) No [ ]

14. In your home, do you have….?
- Newspaper
  1) Yes [ ] 2) No [ ]
- Magazine
  1) Yes [ ] 2) No [ ]
- Textbook
  1) Yes [ ] 2) No [ ]
- Story books
  1) Yes [ ] 2) No [ ]
- Comic books
  1) Yes [ ] 2) No [ ]
- Religious books
  1) Yes [ ] 2) No [ ]

Section 4: Language profile

15. What is the language you most often speak at home? (Select only one)
1) English
2) Akuapem Twi
3) Asante Twi
4) Dagaare
5) Dagbani
6) Dangme
7) Ewe

8) Ga
9) Gonja
10) Gurene
11) Fante
12) Kasem
13) Nzema
14) Other language

16. (*If the child chose 'other language') Specify:_____

17. Do other adults in your school teach or speak to you in English outside the classroom?
1) Yes 2) No

Section 5: Reading behavior

18. Who do you live with? (Select all that apply)
1) Parents/Guardians
2) Siblings (e.g., sister(s), brother(s)
3) Other members (e.g., grandma, grandpa)

19. (For each person the child names): In this last week, did your (Selected Family Member) read to you?
1) Yes 2) No

EGRA (e.g., Akuapem Twi)

Sub-test 1. ORAL VOCABULARY	Page 1	
🗣 **Eyinom yɛ nneɛma ahorow bi mfonini.Mepa wo kyɛw, bɔ ade biara din wɔ Borɔfo kasa mu. [point to the bird] Sɛ ebia: Eyi yɛ "bird" mfonini. Sɛ wuhu saa mfonini yi a, ka asɛmfua "bird".**Here are pictures of some objects. Please tell me the name of each object in English. For example, [point to the bird], this is a picture of a bird. When you see this picture, you say the word "bird." **Ma me ne wo nyɛ bi nhwɛ:Bɔ saa ade yi din wɔ Borɔfo kasa mu. [point to the dog]** Let's practice. Tell me the name of this object [point to the dog]. ✓🗣**Mo.Eyi yɛ "dog".** Good. That is a dog. ✗🗣[point to the dog] **Eyi yɛ "dog". Bɔ saa ade yi din wɔ Borɔfo kasa mu.** This is a dog. Tell me the name of this object in English. **Sɛ wudu mfonini a wunnim ne din so a, kɔ nea edi so no so.Fa wo nsateaa si mfonini a edi kan no so.**If you come to a picture that you do not know, go on to the next picture. Put your finger on the first picture. **Woayɛ krado? Ma yemfi ase.**Ready? Let's Begin. book | frog | plane | duck trousers | monkey | banana | flower	⏱✗ ➲If a child hesitates for 3 SECONDS, go on to the next word. ✋If the child does not provide a single correct response on the first line (4 items), say "Thank you!", discontinue this subtask, check the box at the bottom, and go on to the next subtask. If the child does not respond in English, stop the child and ask him/her to respond in English – do this only once, and after that mark any non-English responses as incorrect.
🚫 Exercise discontinued because the child had no correct answers in the first line	

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

Sub-test2. LETTER SOUND IDENTIFICATION	Page 2	60 seconds

🗣 **Wɔakyerɛw Borɔfo kasa nkyerɛwde wɔ saa kratafa yi so. Mepa wo kyɛw, ka nkyerɛwde yi nnyigyei dodow biara a wubetumi wɔ Borɔfo kasa mu. Ɛnyɛ wɔn din na mmom wɔn nnyigyei.**Here is a page full of letters of the ENGLISH alphabet. Please tell me the SOUNDS of as many letters of the alphabet as you can. Not their names, but their sounds.

[point to the letter T]**Nhwɛso. Akyerɛwde yi mu nnyigyei ne /t/.**For example, the sound of this letter is /t/.

[point to the letter M]**Afei yenni dwuma no. Ka nnyigyei a wote fi saa akyerɛwde yi mu.**Let's practice: Tell me the sound of this letter.

✓🗣 **Eye, woatwa, ɛyɛ [m] nnyigyei**Good, the sound of this letter is /m/.

✗🗣 **Nnyigyei no ne /m/.**The sound of this letter is /m/.

[point to the letter S]**Bɔ foforo bio. Ka akyerɛwde yi nnyigyei kyerɛ me.** Now let us try another one. Tell me the sound of this letter.

✓🗣 **Eye, woatwa, nnyigyei no yɛ /s/.**Good, the sound of this letter is /s/.

✗🗣 **Nnyigyei a efi akyerɛwde yi mu no ne /s/.**The sound of this letter is /s/.

[point to first letter]**Minya ka se 'Fi Ase' a, fi ase wɔ ha na wie kratɑa no so de nyinaa.Fa wo nsa si akyerɛwde no so na bɔ nne nnyigyei no dennennen.Wudu akyerɛwde bi so na wunnim ne nnyigyei no a, kɔ akyerɛwde foforo so.Fa wo nsateaa si akyerɛwde a edi kan no soMetumi afi ase? Hyɛ ase.**When I say "Begin," start here and go across the page. Point to each letter and tell me the sound of that letter in a loud voice. Read as quickly and carefully as you can. If you come to a letter you do not know, go on to the next letter. Put your finger on the first letter. Ready? Begin.

Start the timer when the child reads the first letter.

➲If a child hesitates or stops on a letter for 3 SECONDS, point to the next letter and say "Go on"

If the child does not respond in English, stop the child and ask him/her to respond in English – do this only once, and after that mark any non-English responses as incorrect.

✋When the timer reaches 0, say "stop."

✋If the child does not provide a single correct response on the first line (10 items), say "Thank you!", discontinue this subtask, check the box at the bottom, and go on to the next subtask.

- (/) Mark any incorrect letters with a slash
- (Ø) Circle self-corrections if you already marked the letter incorrect
- ( ]) Mark the final letter read with a bracket

Examples: t m s

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	
o	T	i	A	E	N	e	E	r	t	*(10)*
o	s	L	o	S	R	L	S	n	s	*(20)*
R	t	M	a	e	D	A	c	m	A	*(30)*
I	y	i	p	R	E	s	N	U	w	*(40)*
e	k	E	t	i	R	g	I	b	S	*(50)*
S	Z	n	e	c	s	a	i	O	n	*(60)*
N	d	r	M	A	u	E	a	I	d	*(70)*
s	D	f	r	I	J	P	T	Y	W	*(80)*
B	V	a	F	T	h	p	G	K	M	*(90)*
X	E	f	Q	O	H	I	r	I	T	*(100)*

- Time remaining on stopwatch at completion (number of SECONDS)
- Exercise discontinued because the child had no correct answers in the first line

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

Sub-test3. NON-WORD READING	Page 3	60 seconds
🗣 **Eyinom yɛ nsɛmfua bi a wɔahyehyɛ no Borɔfo kasa mu. Mepɛ sɛ wokenkan dodow biara a wubetumi. Ɛnsopɛle na mmom kenkan.** Here are some made-up words in ENGLISH. I would like you to read as many as you can. Do not spell the words, but read them. [point to the word "ut"]**Sɛ ebia saa asɛmfua yi yɛ 'ut'.** For example, this made-up word is: "ut". [point to the word "dif"]**Yɛnsɔ bi nhwɛ: Mesrɛ wo kan asɛmfua yi.** Let's practice: Please read this word. ✓🗣 **Mo, Asɛmfua yi yɛ 'dif'.** Good, This made-up word is "dif." ✗🗣 **Saa asɛmfua yi yɛ 'dif'.** This made-up word is "dif." [point to the word "mab"]**Afei san kenkan foforo bio: mesrɛ wo kenkan asɛmfua yi.** Now let us try another one. Please read this word. ✓🗣 **Mo, asɛmfua yi yɛ "mab."** Good, This made-up word is "mab." ✗🗣 **Asɛmfua yi yɛ "mab."** This made-up word is "mab." [point to first word] **Meka sɛ "Fi Ase" a, fi ase wɔ ha na kenkan kɔ saa ara.Fa wo nsateaa si asɛmfua biara so na ka no den.Bɔ mmɔden kenkan no yiye ne ntɛmntɛm.Wudu asɛmfua bi so na wunnim ne nnyigyei no a, kɔ asɛmfua foforo so.Fa wo nsateaa si asɛmfua a edi kan no so.Metumi afi ase? Hyɛ ase.** When I say "Begin," start here [point to first word] and read across the page [point]. Point to each word and read it in a loud voice. Read as quickly and carefully as you can. If you come to a word you do not know, go on to the next word. Put your finger on the first word. Ready? Begin.	Start the timer when the child reads the first word. ➲If a child hesitates or stops on a letter for 3 SECONDS, point to the next word and say "Go on" If the child does not respond in English, stop the child and ask him/her to respond in English – do this only once, and after that mark any non-English responses as incorrect. ✋When the timer reaches 0, say "stop." ✋If the child does not provide a single correct response on the first line (5 items), say "Thank you!", discontinue this subtask, check the box at the bottom, and go on to the next subtask.

✎ (/) Mark any incorrect words with a slash
(Ø) Circle self-corrections if you already marked the word incorrect
( ]) Mark the final word read with a bracket

Examples: ut dif mab

1	*2*	*3*	*4*	*5*	
dit	fut	lus	leb	gak	*(5)*
huz	jod	lek	tob	kib	*(10)*
reg	san	nom	rop	hig	*(15)*
tup	nad	wix	ral	nep	*(20)*
sim	tat	yod	lut	sig	*(25)*
nup	sen	en	kad	mon	*(30)*
taw	lew	zuv	sal	paf	*(35)*
gof	vom	riz	ved	kag	*(40)*
beb	et	maz	ver	kol	*(45)*
lim	tib	dov	yag	lef	*(50)*

✎ Time remaining on stopwatch at completion (number of SECONDS) ☐

✎ Exercise discontinued because the child had no correct answers in the first line ☐

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

Sub-test 4a. ORAL READING PASSAGE	60 seconds	Sub-test 4b: READING COMPREHENSION
Page 4 Show the child the sheet in the student stimulus booklet as you read the instructions.	➲ If a child hesitates or stops on a letter for 3 SECONDS, say "Go on"	**X** After the child is finished reading, REMOVE the passage from in front of the child. Ask the child only the questions related to the text read. A child must read all the text that corresponds with a given question. If the child does not provide a response to a question after 10 seconds, mark "no response" and continue to the next question. Do not repeat the question.
Abasɛm tiawa bi ni. Mepɛ sɛ wokenkan no dennennen, ne ntɛmntɛm ma me.Wokenkan wie a, mebisabisa nsɛm bi afa nea woakenkan no ho.Meka sɛ "Fi Ase" a kenkan abasɛm no sɛnea wubetumi biara.Wudu asɛmfua bi so na wunnim a, kɔ asɛmfua foforo so.Fa wo nsateaa si asɛmfua a edi kan no so.Metumi afi ase? Hyɛ ase. Here is a short story. I want you to read it aloud, quickly but carefully. When you finish, I will ask you some questions about what you have read. When I say "Begin," read the story as best as you can. If you come to a word you do not know, go on to the next word. Put your finger on the first word. Ready? Begin.	If the child does not provide a single correct word before the word in a box, say "Thank you!", discontinue this subtask and check the box at the bottom. Do not ask any comprehension questions. If a child says "I don't know," mark as incorrect.	**Afei mebisabisa wo nsɛm kakra afa abasɛm a wokenkan no ho.Bɔ mmɔden sɛ wubeyiyi nsɛmmisa no ano sɛnea wubetumi.Wubetumi de kasa biara a wopɛ ayiyi nsɛmmisa no ano.** Now I am going to ask you a few questions about the story you just read. Try to answer the questions as well as you can. You can provide your answers in whichever language you prefer.
(/) Mark any incorrect letters with a slash (Ø) Circle self-corrections if you already marked the letter incorrect ( ]) Mark the final letter read with a bracket		(✓) 1 = Correct (✓) 0 = Incorrect (✓) . = No response.

		Questions [Answers]			
There is no doctor in the village where Ama lives. Father is **sick**.	13	**Who is sick?** [Father]	1	0	.
Ama says that when she grows up she will be a **doctor**.	25	**What does Ama want to be when she grows up?** [a doctor]	1	0	.
She will help people who are sick like **father**.	35	**Why does Ama want to be a doctor?** [to help people / to help people who are sick]	1	0	.
Kojo wants to be a teacher. He will teach boys and girls to be **healthy**.	46	**What will Kojo teach boys and girls?** [to be healthy]	1	0	.
Father smiles. He is happy with both of his **children**.	56	**Why is father happy with his children?** [they want to be doctors / they want to help people]	1	0	.

Time remaining on stopwatch at completion (number of SECONDS)	
Exercise discontinued: the child had no correct answers in the first line	

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

Sub-test 5. LISTENING COMPREHENSION	🕮X			🕐 X
🗣**Merebɛkenkan abasɛm tiawa bi baako pɛ dennennen akyerɛ wo, na mabisabisa wo nsɛm kakra afa ho.Mesrɛ wo tie no yiye na bua nsɛmmisa no sɛnea wubetumi biara.Wubetumi de kasa biara a wopɛ ayiyi nsɛmmisa no ano.Metumi afi ase? Yemfi ase.**I am going to read you a short story aloud ONCE and then ask you some questions. Please listen carefully and answer the questions as best as you can. You can answer the questions in whichever language you prefer. Ready? Let's begin.				Remove the pupil stimuli booklet from the child's view. Do not allow the child to look at the passage or the questions. If a child says "I don't know," mark as incorrect.
(✓) 1 = Correct (✓) 0 = Incorrect (✓) . = No response.				
Issa was very sad. He lost his grandfather's sheep. He could not go to look for them. Grandfather came to look for them. Soon he returned with the sheep. Issa is smiling now.				
Why was Issa sad? [he lost his sheep; he could not go to look for his sheep]	1	0	.	
Who went to look for the sheep? [Grandfather]	1	0	.	
Why is Issa smiling now? [Grandfather returned with his sheep; his sheep are back; Grandfather found the sheep]	1	0	.	

Mo! Woayɛ ade. Yɛnkɔ ɔfa a edi so no so. Good effort! Let's go on to the next section.

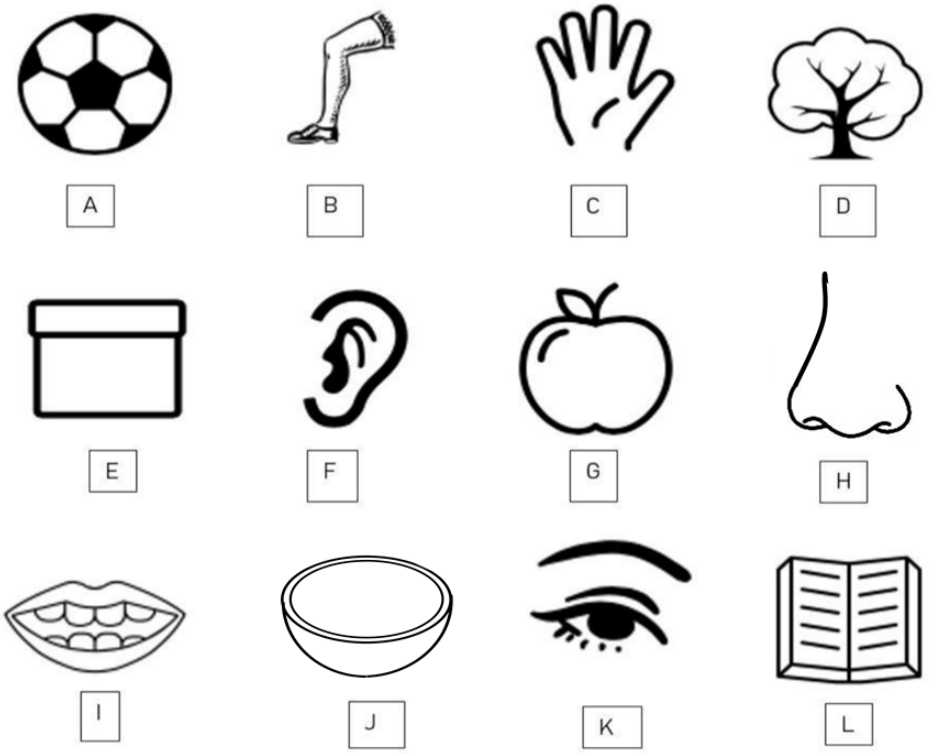
ELM English

Subtask 1: Receptive Vocabulary

Q1	**Say in English "Show me an ear"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q2	**Say in English "Show me a nose"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q3	**Say in English "Show me a leg"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q4	**Say in English "Show me a hand"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q5	**Say in English "Show me a ball"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q6	**Say in English "Show me a box"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q7	**Say in English "Show me an apple"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q8	**Say in English "Show me a book"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999
Q9	**Say in English "Show me an eye"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0

	No response	999
Q10	**Say in English "Show me a tree"**	SCORE
	(Correct) Student identifies the word in English	1
	(Incorrect) Student cannot identify the word	0
	No response	999

Receptive Vocabulary Images



Subtask 2: Expressive Vocabulary

Q1	**Point to the teacher and ask the student in English "Who is this?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., Madam, teacher, lady, woman, girl etc)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q1-A	Specify the response provided by the children: _____	
Q2	**Point to the book and ask the student in English "What is this?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., book, notebook, reader, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q2-A	Specify the response provided by the children: _____	
Q3	**Point to the window frame and ask the student in English "What is this?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., window, window frame, glass, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q3-A	Specify the response provided by the children: _____	
Q4	**Point to the children and ask the student in English "Who are they?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., children, kids, students, pupils, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q4-A	Specify the response provided by the children: _____	
Q5	**Point to the teacher's left hand and ask in English "What is the teacher holding?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., chalk, pencil, pen, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0

	No response	999
Q5-A	Specify the response provided by the children: _____	
Q6	**Point to the desk and ask the student in English "What is this?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., desk, table, workspace, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q6-A	Specify the response provided by the children: _____	
Q7	**Point to the teacher's left hand, and ask in English "What is the teacher doing?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., teaching, writing, reading, listening, looking, watching, holding, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q7-A	Specify the response provided by the children: _____	
Q8	**Point to the children outside the window, and ask in English "What are these children doing?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., playing, running, kicking, having recess, playing football, having fun, being healthy, practicing sport, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q8-A	Specify the response provided by the children: _____	
Q9	**Point to the students in the classroom, and ask in English "What are they doing?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., learning, studying, listening, watching, sitting, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1
	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q9-A	Specify the response provided by the children: _____	
Q10	**Point to the student with the book, and ask in English "What is she doing?"**	SCORE
	(Correct) Student may say a proper response in English (e.g., reading, following, following along, listening, learning, studying, or other)	2
	(Partially correct) Student may say a proper response not in English but in another language	1

	(Incorrect) Student cannot an appropriate word	0
	No response	999
Q10-A	Specify the response provided by the children: _____	

Expressive Vocabulary Image



Subtask 3: Story Retell

PRACTICE QUESTION **Read aloud in English: "This is a story about a girl named Sara. Sara looked at the green bowl in her hands and felt sad. The bowl was her grandmother's."**	PART1 - RE-TELLING	
	SCORING: Score based on the best response provided by the child in retelling of the story. In scoring, only include responses that make sense in relation to the story.	SCORE
	Correct: Sara had a green bowl. It made her sad. It was her grandmother's bowl.	3
	Partially correct: Sara is sad. She has a bowl.	2
	Minimally correct: Any words from the story.	1
	Incorrect: People, objects, or events not listed in the story	0
	No response	999
	PART 2 - Ask the question: "Why do you think Sara is sad?"	
	Correct: Child gives an inferential conclusion to the story by identifying characters and causal connections.	1
	Incorrect: Child cannot explain the meaning of the story using characters or connections.	0

	No response	999
STORY 1: **Read aloud in English: "The grass and leaves were dry. Rabbit went looking for food. She saw fire in the bush. Rabbit jumped and ran. She yelled for help. Help! Help! Rabbit begins to cry. "**	PART1 - RE-TELLING	
	SCORING: Score based on the best response provided by the child in retelling of the story. In scoring, only include responses that make sense in relation to the story.	SCORE
	Correct: Child retells the story plot with beginning, middle, and end.	3
	Partially correct: Child retells story events but out of logical narrative order or missing key information.	2
	Minimally correct: Child lists one or more people, objects, and events from the story.	1
	Incorrect: People, objects, or events not listed in the story	0
	No response	999
	PART 2 - Ask the question: "Why is the Rabbit crying?"	
	Correct: Child gives an inferential conclusion to the story by identifying characters and causal connections.	1
	Incorrect: Child cannot explain the meaning of the story using characters or connections.	0
	No response	999
STORY 2 **Read aloud in English: "The animals in the zoo wanted to go outside and explore. One early morning, the villagers set off for work. Some were on their way to the farm. Others were going to the local market. Suddenly, animals from the zoo were in the road. The children were smiling as the animals walked down the road enjoying the sun. The adults were frightened but the animals were gentle. Soon the animals walked back to the zoo. A new lock was put on the gate by the adults."**	PART1 - RE-TELLING	
	SCORING: Score based on the best response provided by the child in retelling of the story. In scoring, only include responses that make sense in relation to the story.	SCORE
	Correct: Child retells the story plot with beginning, middle, and end.	3
	Partially correct: Child retells story events but out of logical narrative order or missing key information.	2
	Minimally correct: Child lists one or more people, objects, and events from the story.	1
	Incorrect: People, objects, or events not listed in the story	0
	No response	999
	PART 2 - "Why did the adults put on a new lock on the gate?"	
	Correct: Child gives an inferential conclusion to the story by identifying characters and causal connections.	1
	Incorrect: Child cannot explain the meaning of the story using characters or connections.	0

	No response	999

Teacher Survey

1. Date (dd/mm/yy): _____

2. Assessor name: _____

3. Assessor code: _____

4. Region (name and code):

5. District (name and code):

6. School (name and code):

7. Teacher's first name: _____

8. Teachers' family name: _____

9. Gender: 1) Male [ ] 2) Female [ ]

10. How old are you? (in years) _____

11. How long have you been a teacher? (in years) _____

12. What is the highest level of teaching certificate you have?

13. Which grade are you currently teaching?

14. How many "boys" are enrolled in your class? (in number) _____

15. How many "girls" are enrolled in your class? (in number) _____

17. What is the approved Ghanaian language of instruction at your school?
    1) Akuapem Twi
    2) Asante Twi
    3) Dagaare
    4) Dagbani
    5) Dangme
    6) Ewe
    7) Ga
    8) Gonja
    9) Gurene
    10) Fante
    11) Kasem
    12) Nzema

18. How confident do you feel about teaching children in (the selected language)?
    1) Very confident
    2) Somewhat confident
    3) Not very confident

4) Not at all confident

Head Teacher Survey

1. Region name: _____

2. School name: _____

3. 3. Which urbanicity category best describes your school?
   - ○ Urban school [ ]
   - ○ Rural school [ ]

4. How many teachers work in your school? : _____

5. How many boys and girls are enrolled in KG2?
   - ○ Boys: _____
   - ○ Girls:_____

6. How many boys and girls are enrolled in Basic 1?
   - ○ Boys: _____
   - ○ Girls:_____

7. How many boys and girls are enrolled in Basic 2?
   - ○ Boys: _____
   - ○ Girls:_____

8. How many sessions per week are dedicated to reading/language in Basic 1?:
9. How many sessions per week are dedicated to reading/language in Basic 2?:

10. Does your school have a school library where children can read and/or rent books?
    - ○ Yes
    - ○ No

11. What is the language of instruction that is being actually used in your school?

APPENDIX V: RESEARCH APPROVALS

In-country IRB in Ghana

RADIOLOGICAL AND MEDICAL SCIENCES RESEARCH INSTITUTE

In case of reply, number and date of this letter should be quoted.
Our Ref.: RAMS/RPT/SF.43/345

Your Ref.: .....

Telephone: +233-303-968-932
Fax: +233-302-400-807
email: ramsri.gaec@gmail.com
website: www.gaecgh.org

Ghana Atomic Energy Commission
P.O. Box LG 80
Legon – Accra

Date: 27th October, 2021

ETHICAL CLEARANCE

ID No: **RAMS/ERCP/SS/01/2021**

The Ethical Review Committee of the Radiological and Medical Sciences Research Institute reviewed your amended proposed Study Protocol titled: "**Supporting Holistic and Actionable Research In Education (Share) Ghana T2e Impact Evaluation" (RAMS/ERCP/SS/02/2021)**

Project Coordinator:

This approval requires that you submit the final full review to the Ethical Review Committee (ERC) at the completion of the study. The Ethical Review Committee may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification of the project must be submitted to the Ethical Review Committee for review and approval before its implementation.

You are also required to report all serious adverse events related to this study to the Ethical Review Committee within seven days verbally and fourteen days in writing.

You are requested to inform the Ethical Review Committee and your mother Organization before any publication of the research findings.

Please always quote the protocol identification number in all future correspondence in relation to this protocol.

Signed .....
Prof. George Obeng Adjei
Chairman RAMSRI ERC

University of Notre Dame IRB

UNIVERSITY OF NOTRE DAME

Office of Research Compliance
840 Grace Hall
Notre Dame, , IN eprotocol
TEL: (574) 631-1461
E-mail:compliance@nd.edu

NOTICE OF APPROVAL FOR EXEMPT HUMAN SUBJECT RESEARCH

DATE: October 29, 2021

TO:

FROM: Hall, Matthew, PhD, Exempt Review
PROTOCOL TITLE: SHARE Learning-T2E Impact Evaluation
FUNDING SOURCE: None
PROTOCOL NUMBER: 21-09-6778
Approval Date: October 29, 2021 Expiration Date: N/A

The Institutional Review Board (IRB) has reviewed your proposed amendment to the research protocol entitled: SHARE Learning-T2E Impact Evaluation

The amendment has been reviewed and determined to not affect the research 's exempt status. Exemption means that all research activities described in the protocol fall under one or more of the exemption categories specified by the Federal regulations (45 CFR 46.101).

Exempt status does not, however, lessen the ethical obligations to subjects articulated in the Belmont Report and in disciplinary codes of professional conduct. Thus, depending on the circumstances, investigators performing exempt studies may need to make provisions to obtain informed consent, protect confidentiality, minimize risks and address problems or complaints.

Modifications to the research activities could result in the research no longer falling under exempt status. Therefore, if you wish to modify the research activities, check with Notre Dame Research Compliance at 574-631-1461 or by email at compliance@nd.edu

This approval is issued under the University of Notre Dame 's Federal Wide Assurance (FWA00002462) with the Office for Human Research Protections.

If you have any questions, comments, complaints or concerns or wish to provide input, please do not hesitate to contact Notre Dame Research Compliance at 574-631-1461 or by email at compliance@nd.edu

Hall, Matthew, PhD

Office of Research Compliance

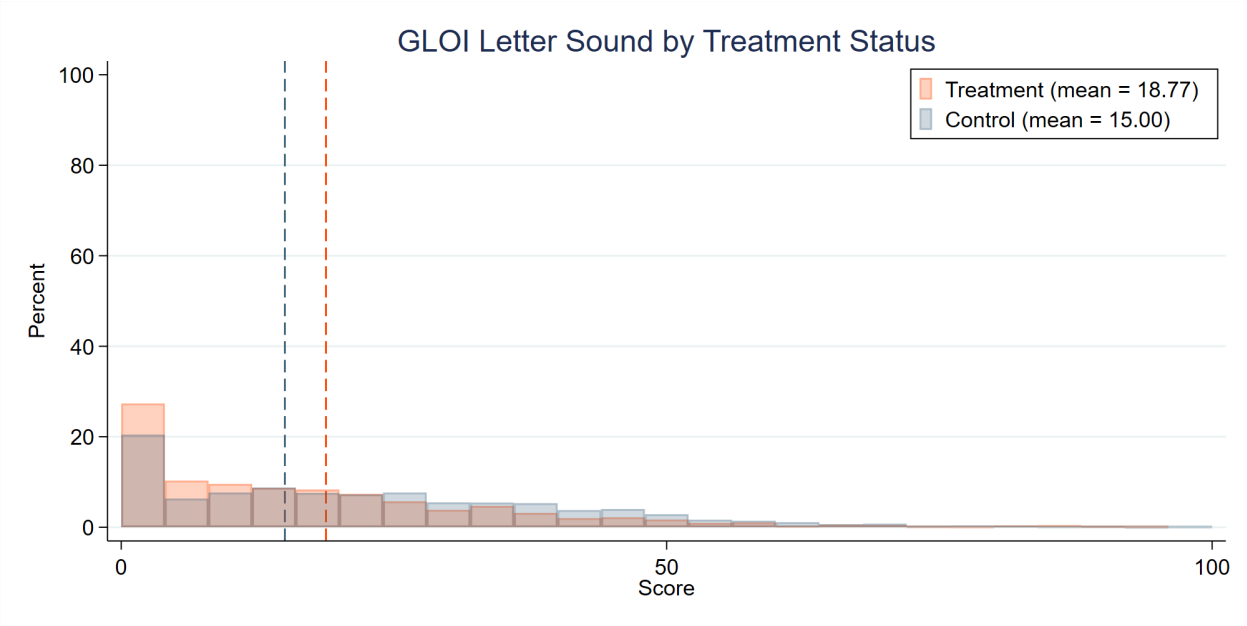
Review Type: EXEMPT
IRB Number: FWA 00002462 exp 4/1/2020

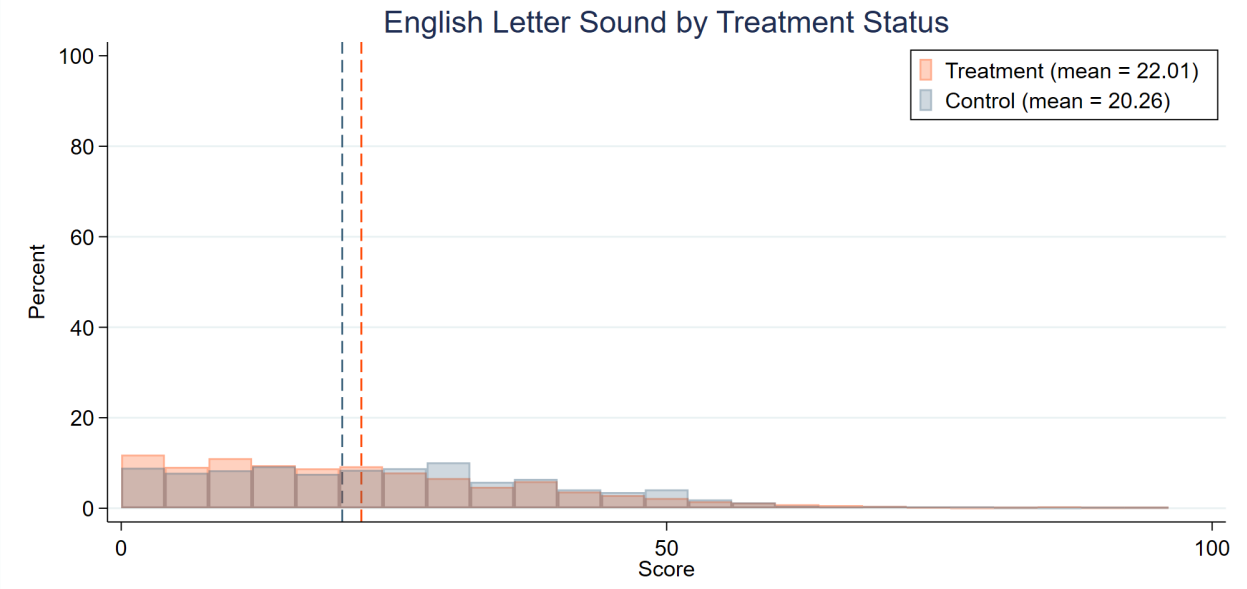
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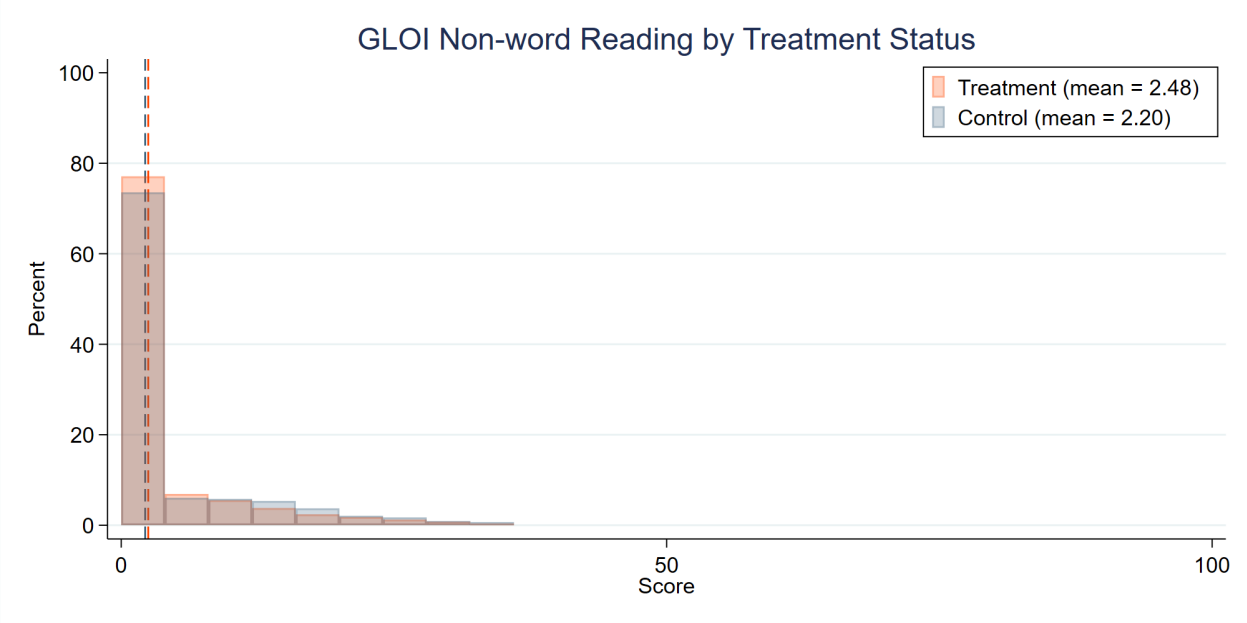
Date of Approval: October 29, 2021

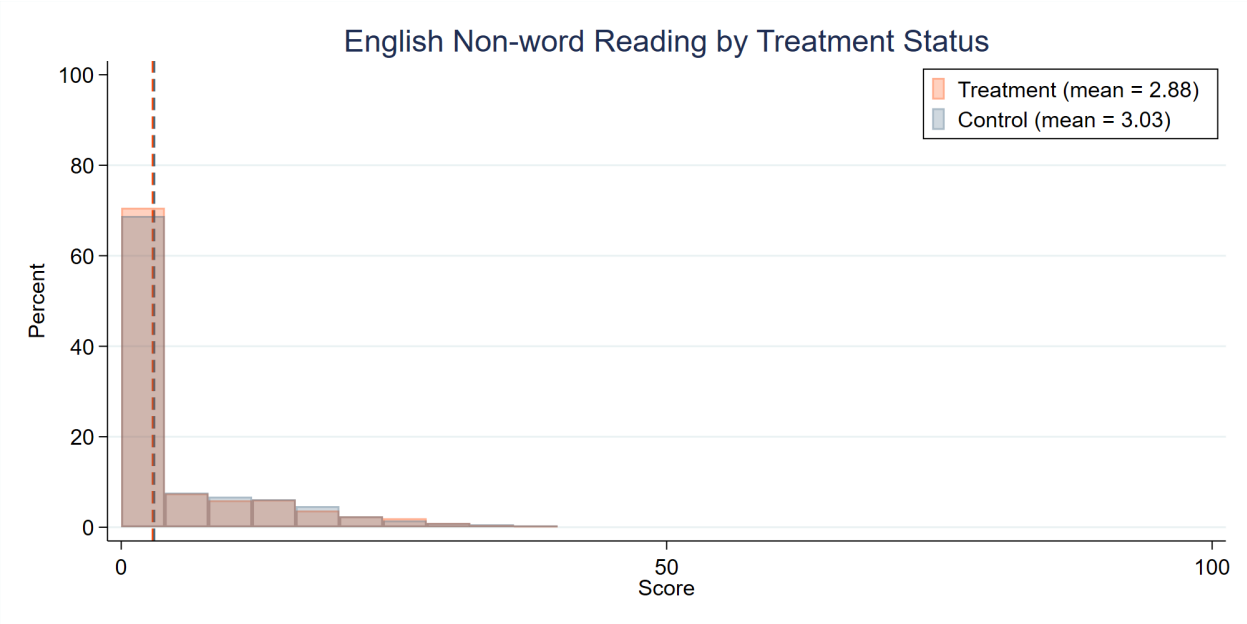
APPENDIX VI: ADDITIONAL ANALYSES

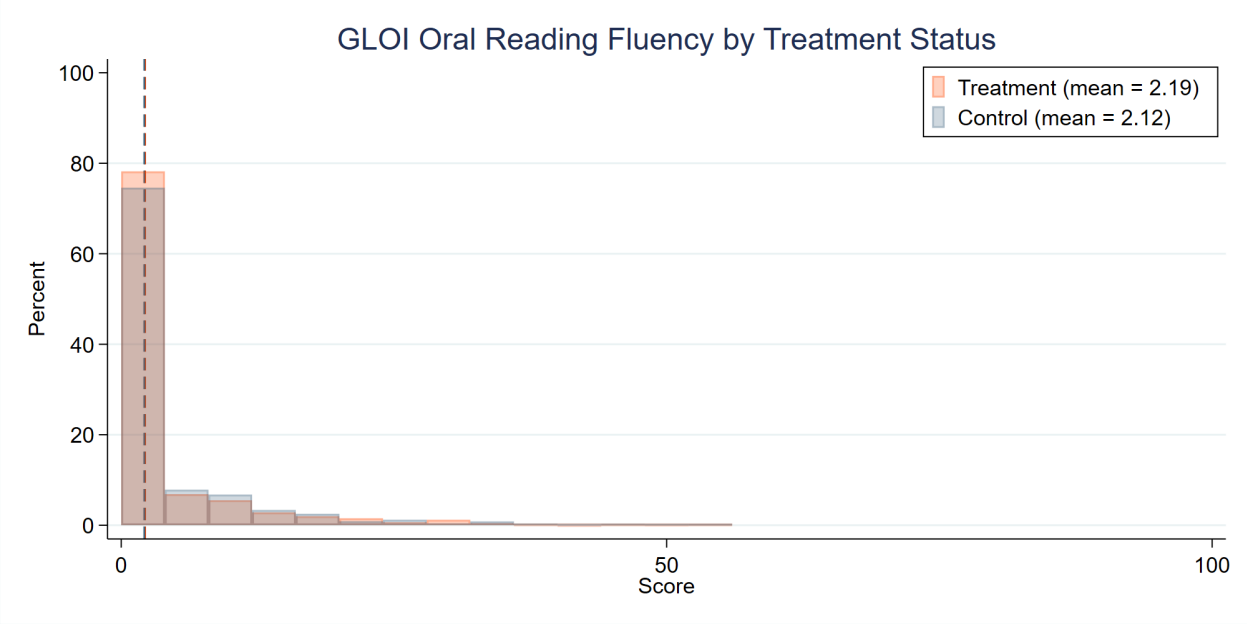
EGRA Subtests Score Distribution – Basic 1

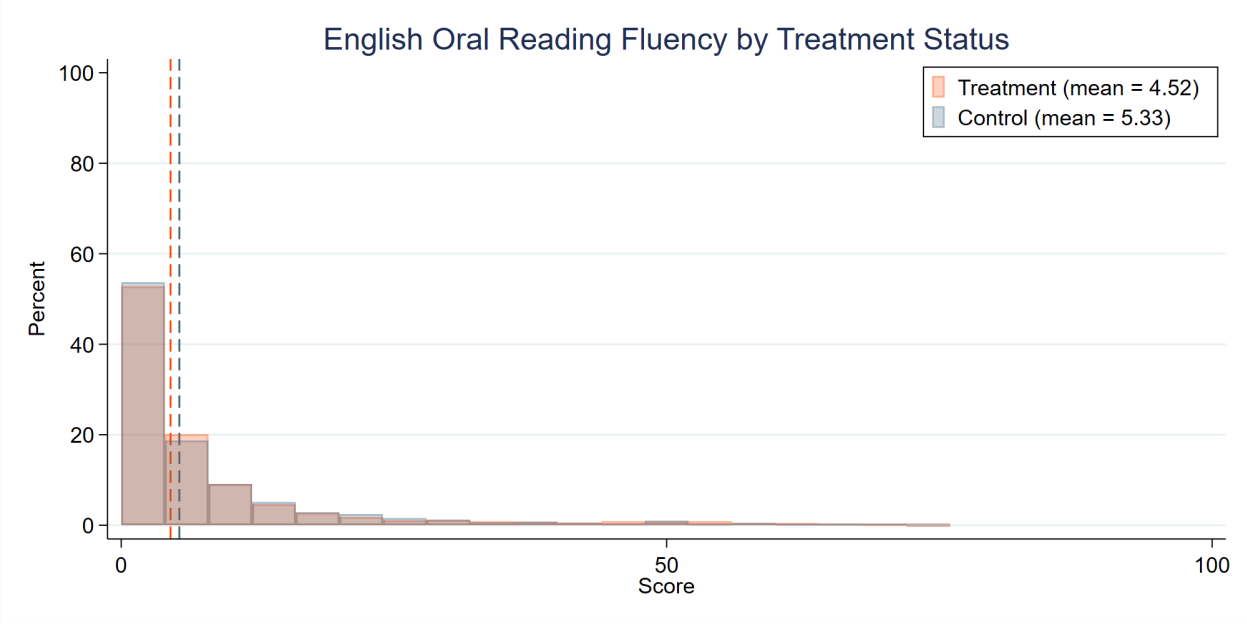




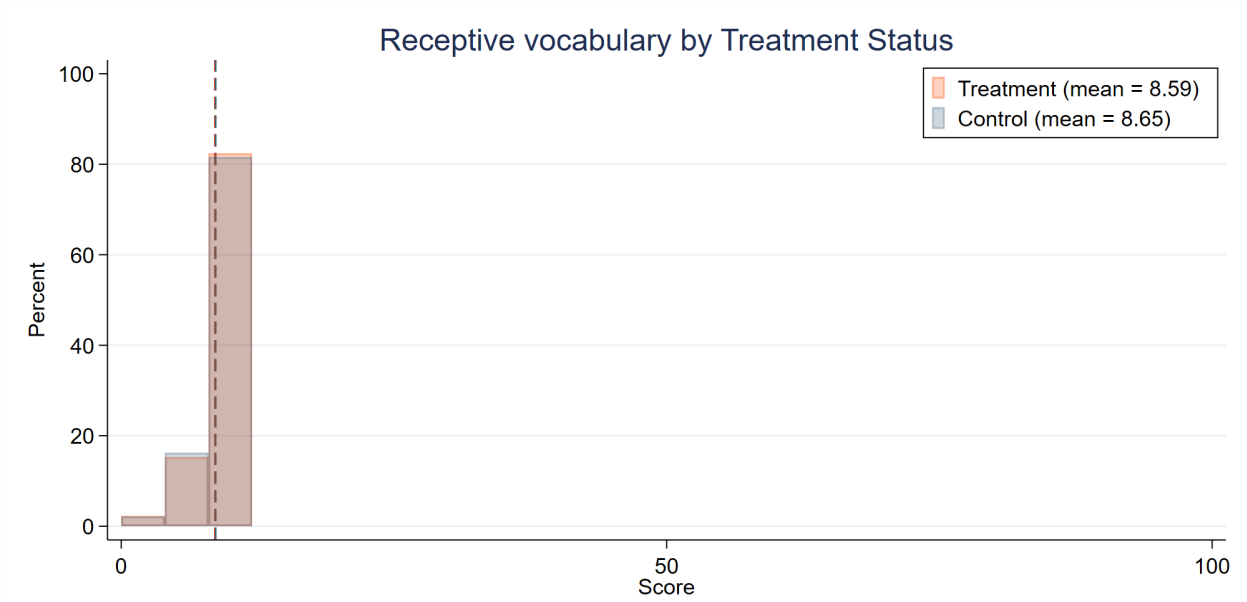

GLOI Non-word Reading by Treatment Status
Treatment (mean = 2.48)
Control (mean = 2.20)
Percent
0
20
40
60
80
100
0
50
100
Score

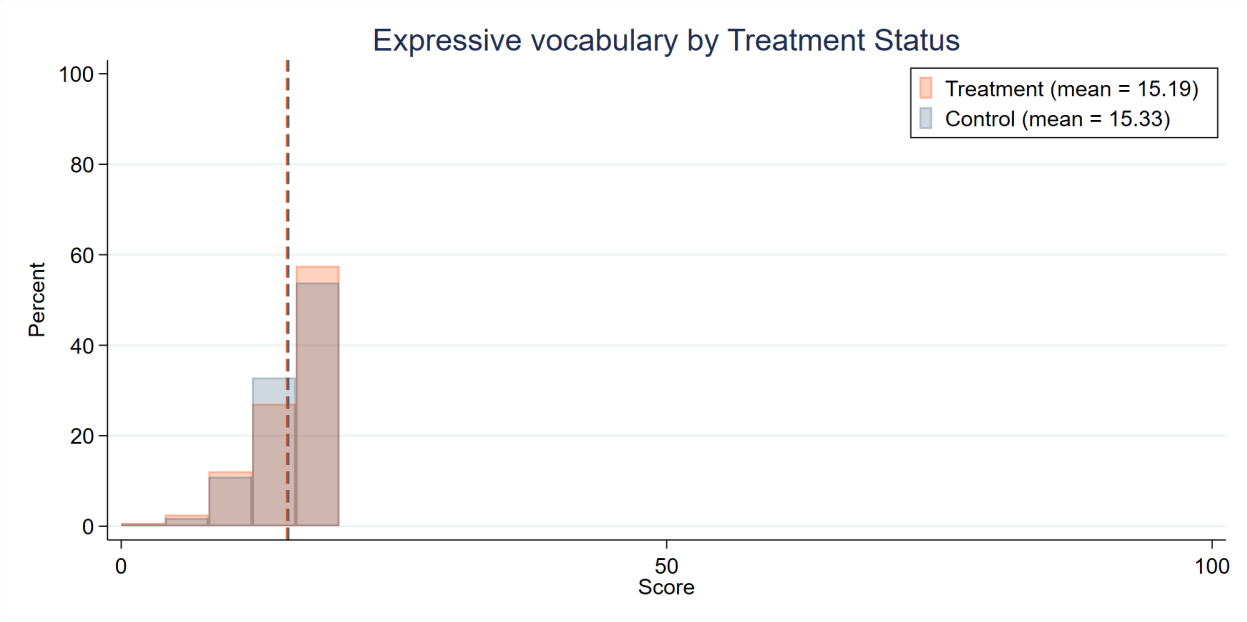

English Non-word Reading by Treatment Status
Treatment (mean = 2.88)
Control (mean = 3.03)
Percent
0
20
40
60
80
100
0
50
100
Score

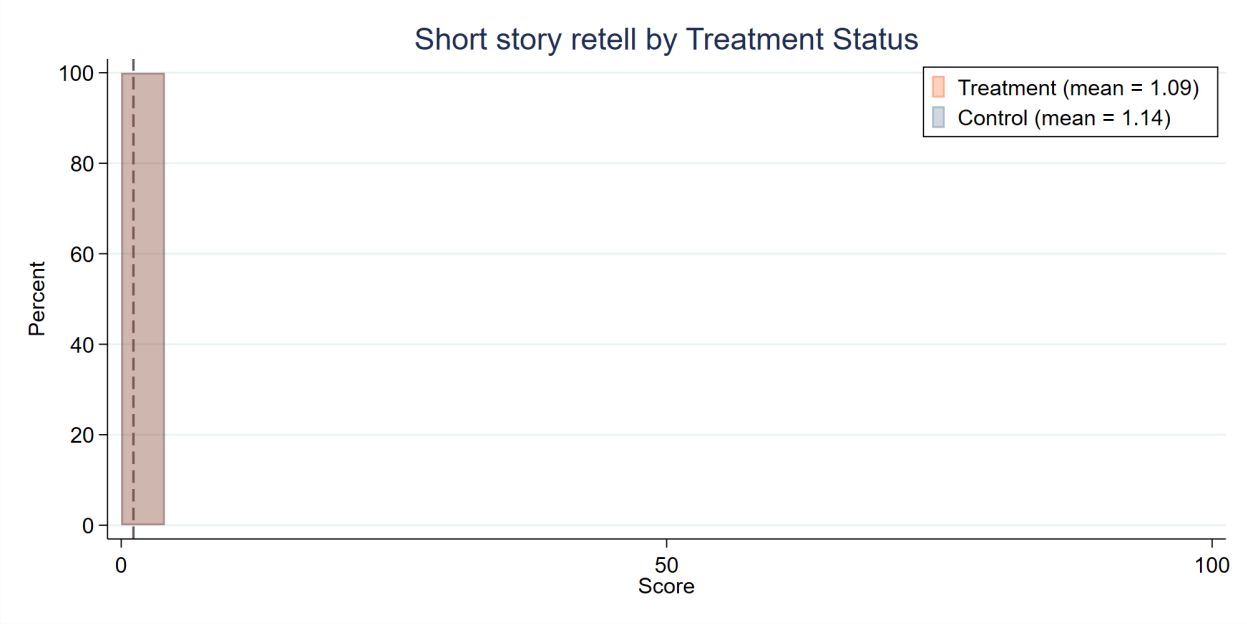

GLOI Oral Reading Fluency by Treatment Status
Treatment (mean = 2.19)
Control (mean = 2.12)
Percent
100
80
60
40
20
0
0
50
100
Score

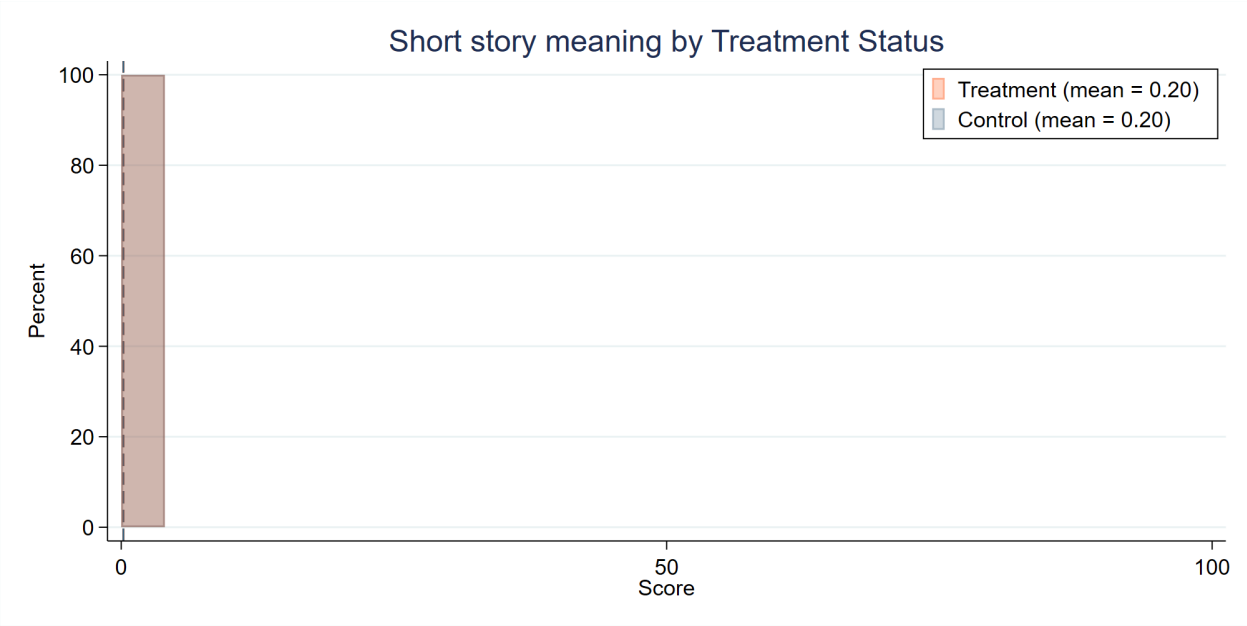

English Oral Reading Fluency by Treatment Status
Treatment (mean = 4.52)
Control (mean = 5.33)
Percent
100
80
60
40
20
0
0
50
100
Score

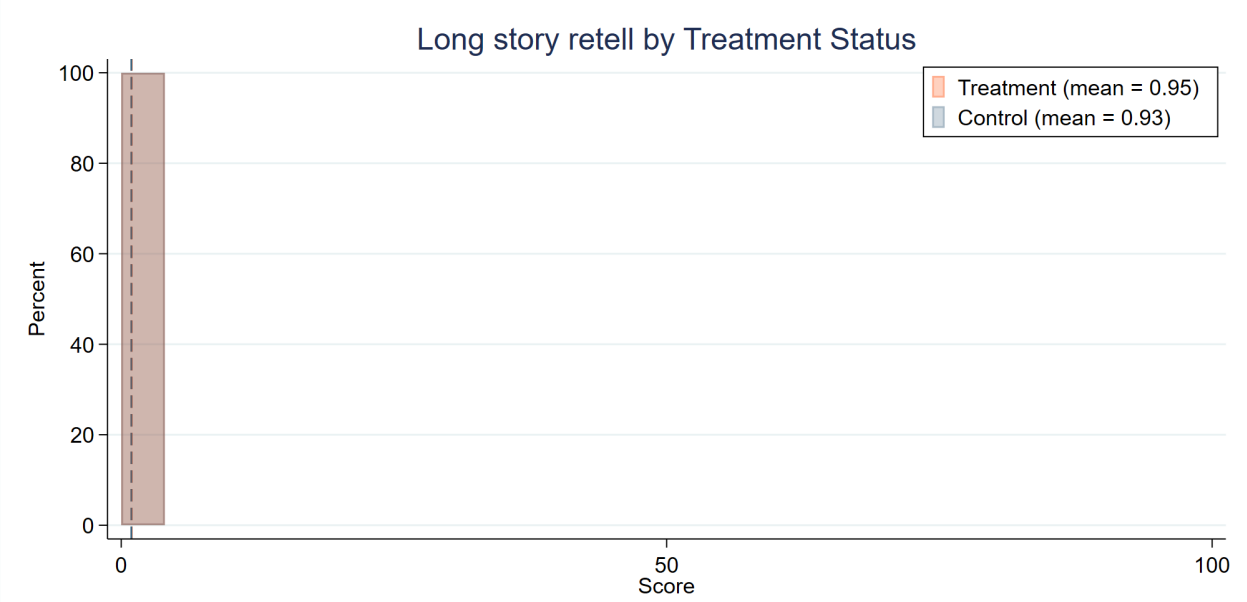
ELM Subtests Score Distribution – Basic 1

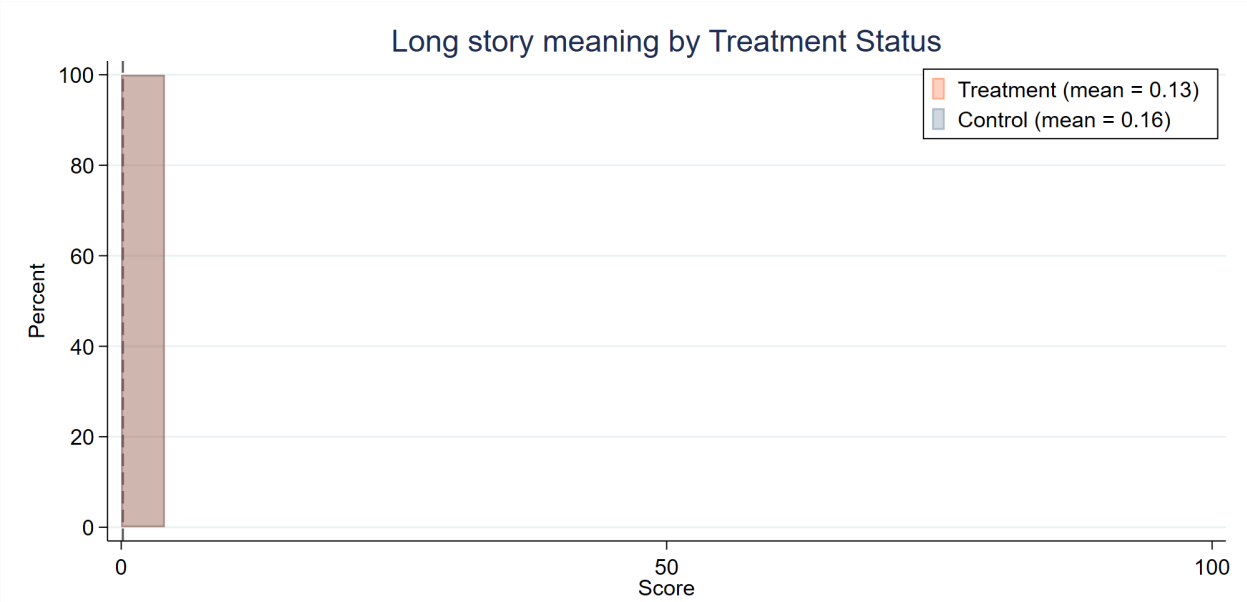




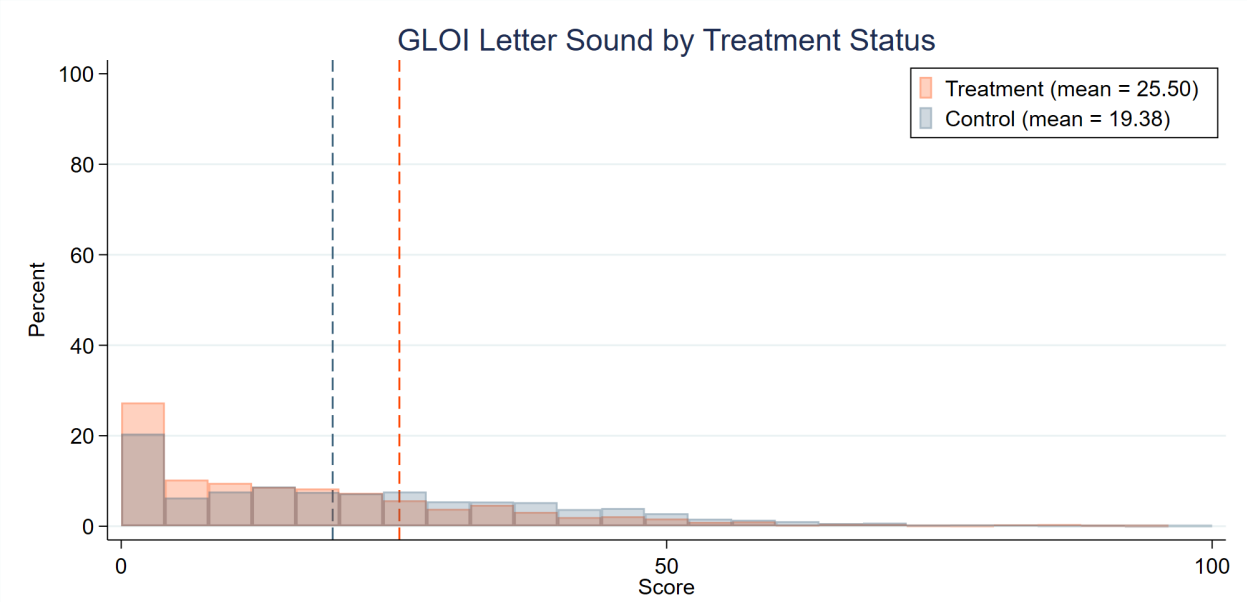

Short story retell by Treatment Status
Treatment (mean = 1.09)
Control (mean = 1.14)
Percent
100
80
60
40
20
0
0
50
100
Score

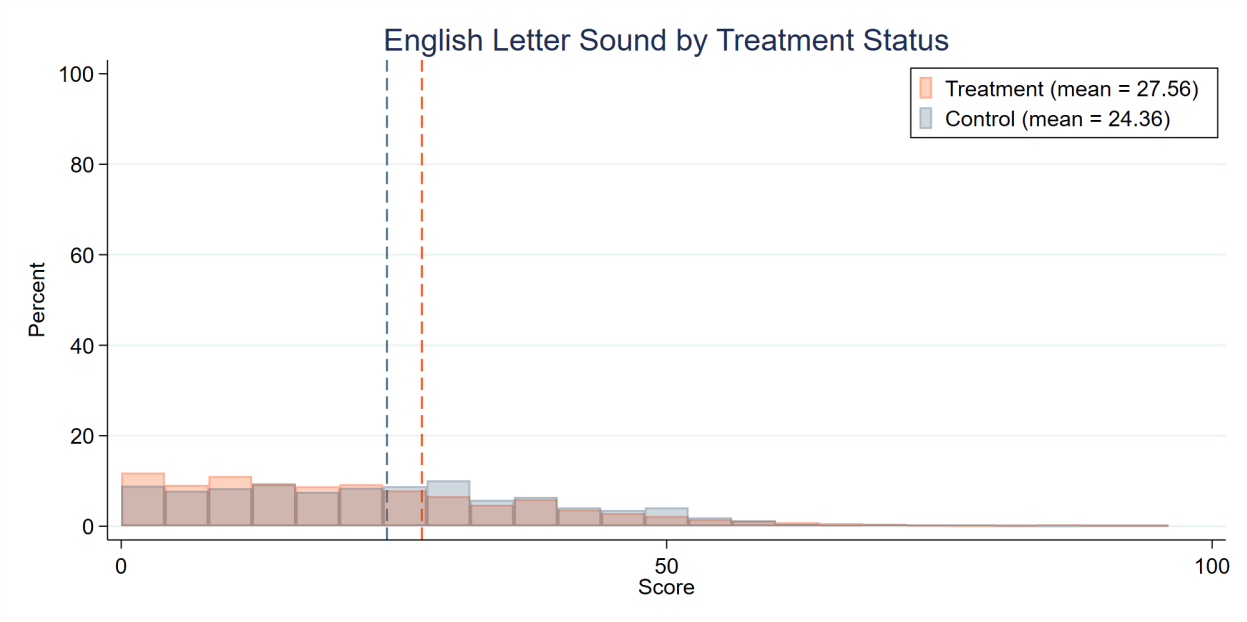

Short story meaning by Treatment Status
Treatment (mean = 0.20)
Control (mean = 0.20)
Percent
100
80
60
40
20
0
0
50
100
Score

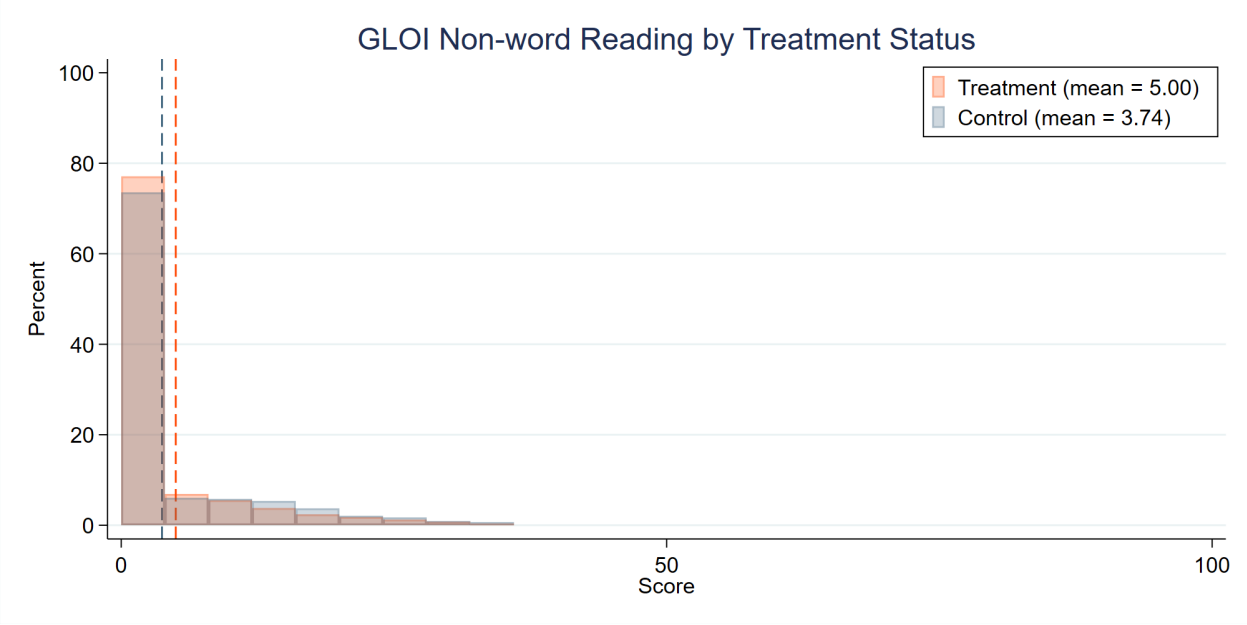

Long story retell by Treatment Status
Treatment (mean = 0.95)
Control (mean = 0.93)
Percent
100
80
60
40
20
0
0
50
100
Score

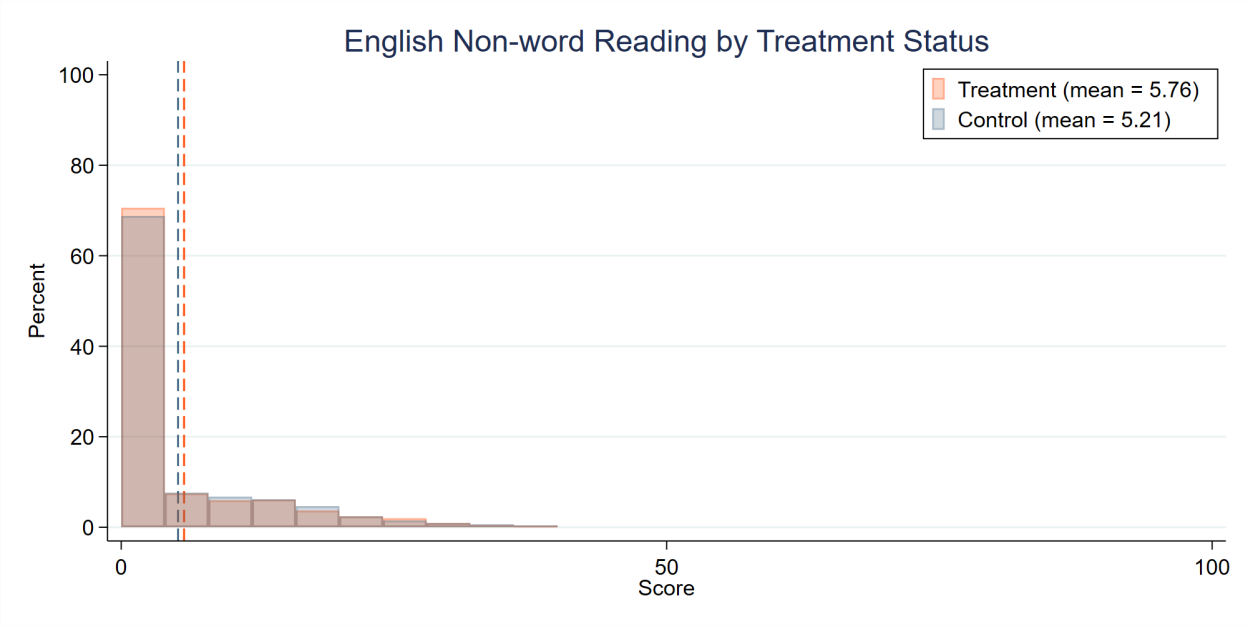

Long story meaning by Treatment Status
Treatment (mean = 0.13)
Control (mean = 0.16)
Percent
100
80
60
40
20
0
0
50
100
Score

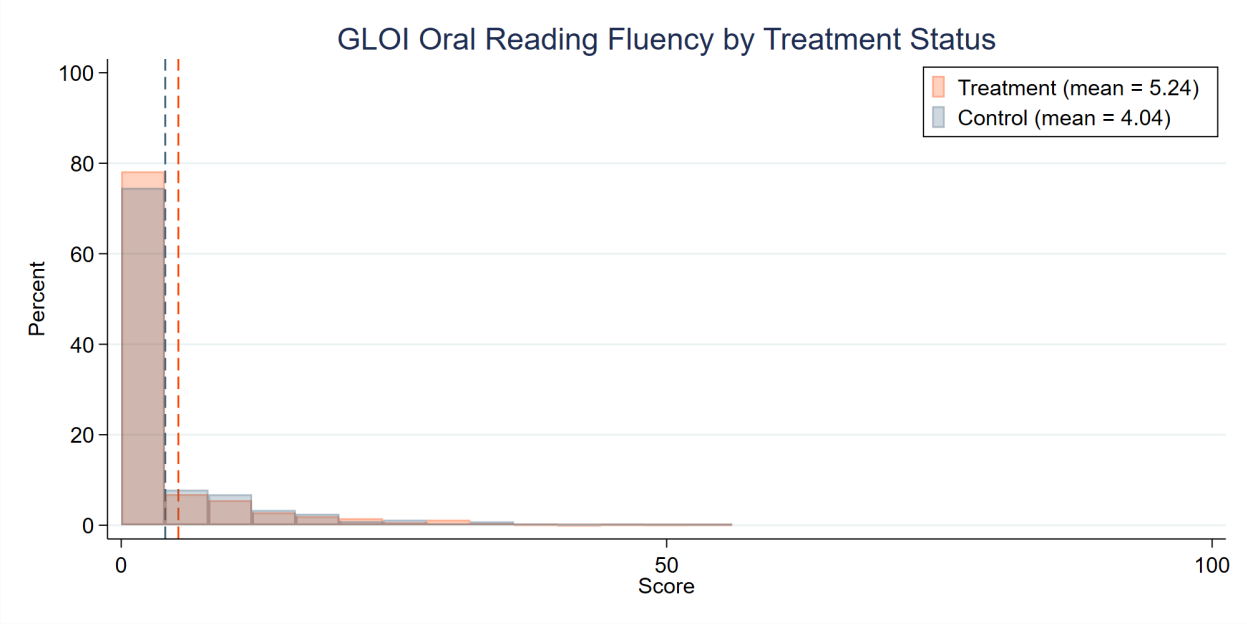
EGRA Subtests Score Distribution – Basic 2

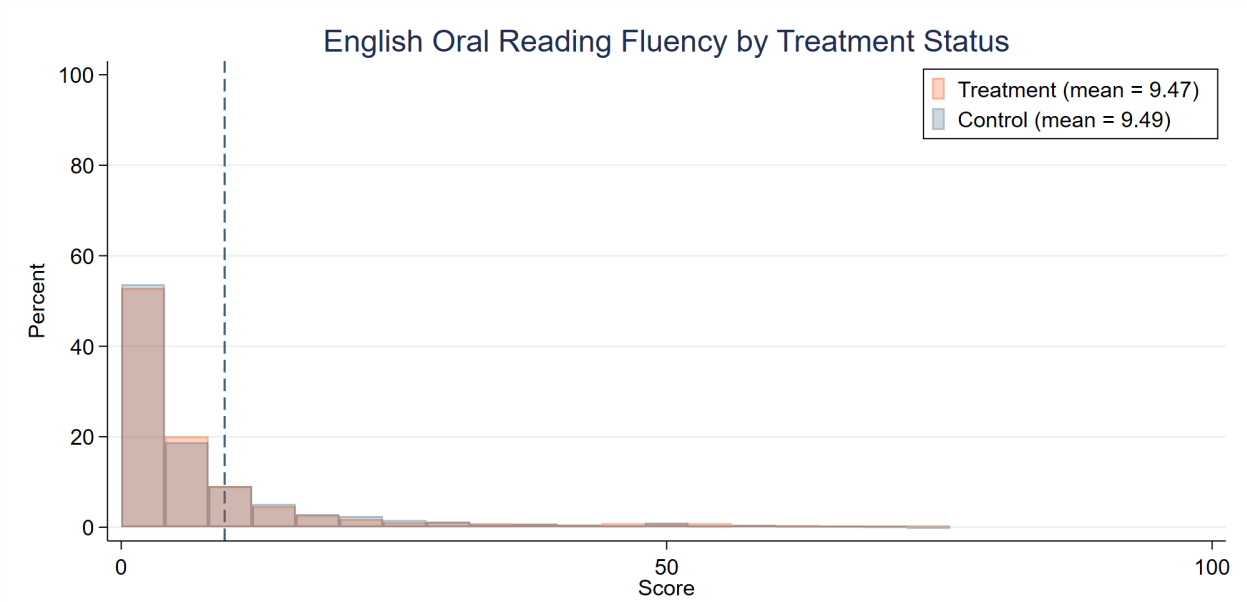




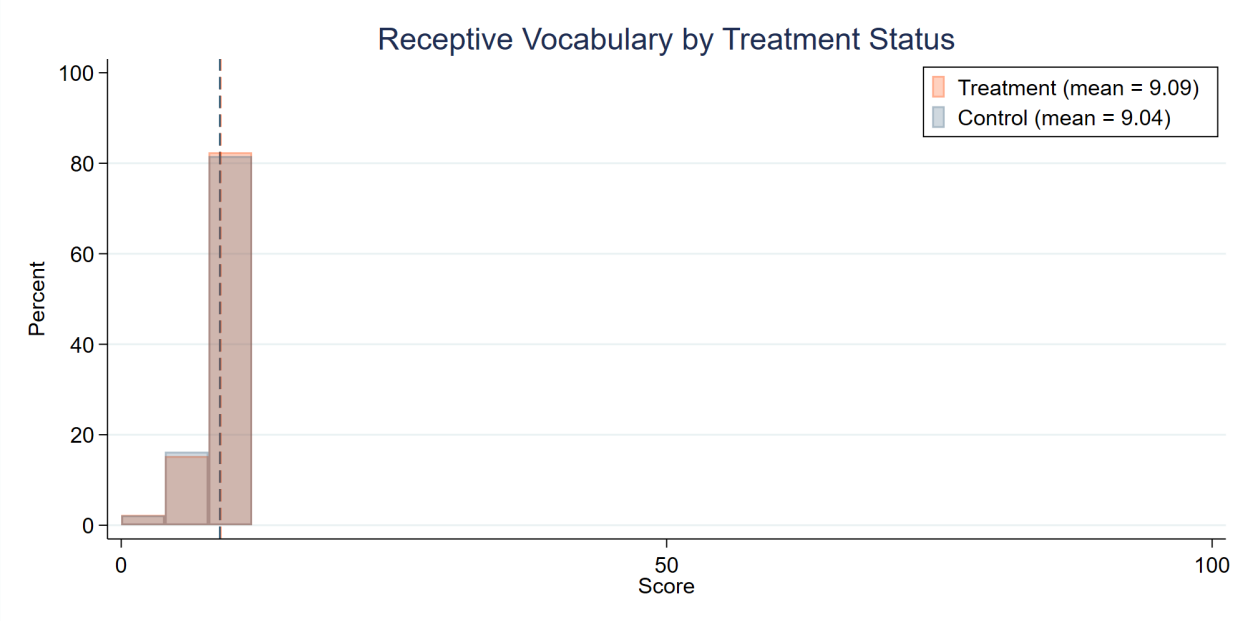

GLOI Non-word Reading by Treatment Status
Treatment (mean = 5.00)
Control (mean = 3.74)
Percent
0
20
40
60
80
100
0
50
100
Score

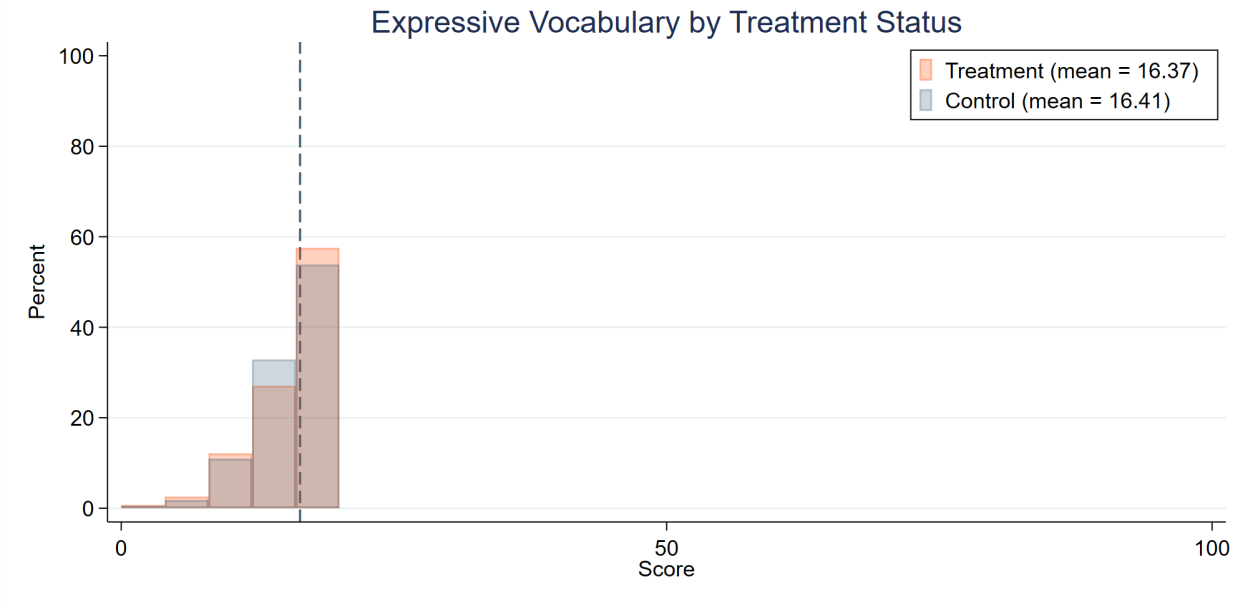

English Non-word Reading by Treatment Status
Treatment (mean = 5.76)
Control (mean = 5.21)
Percent
0
20
40
60
80
100
0
50
100
Score

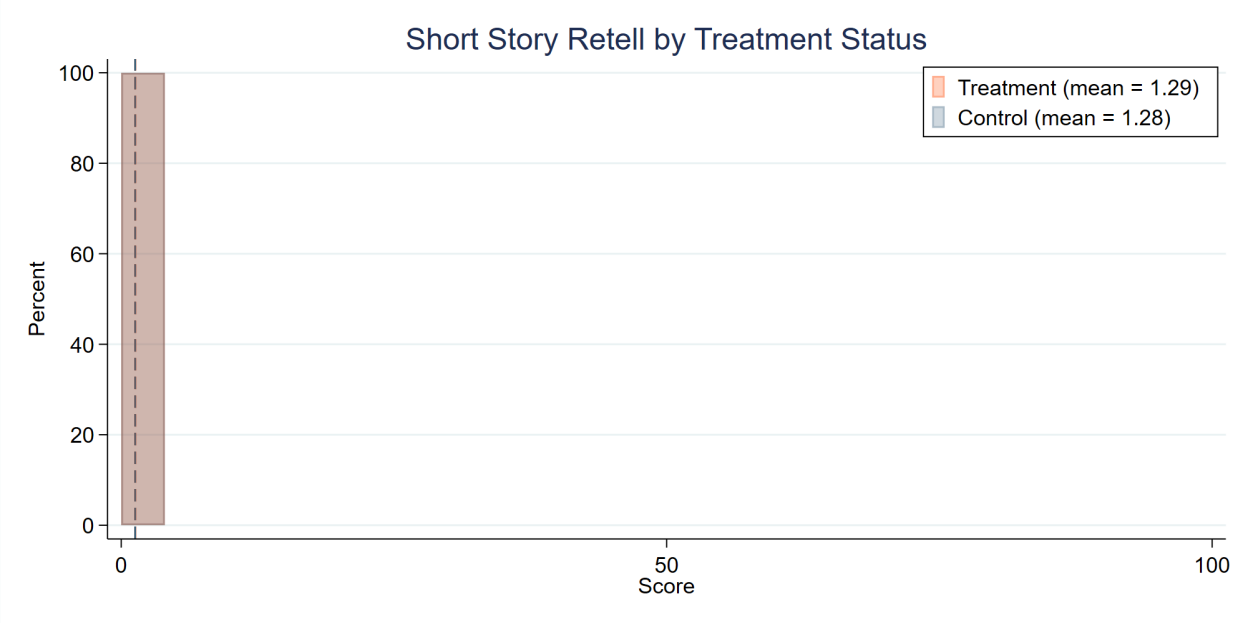

GLOI Oral Reading Fluency by Treatment Status
Treatment (mean = 5.24)
Control (mean = 4.04)
Percent
100
80
60
40
20
0
0
50
100
Score

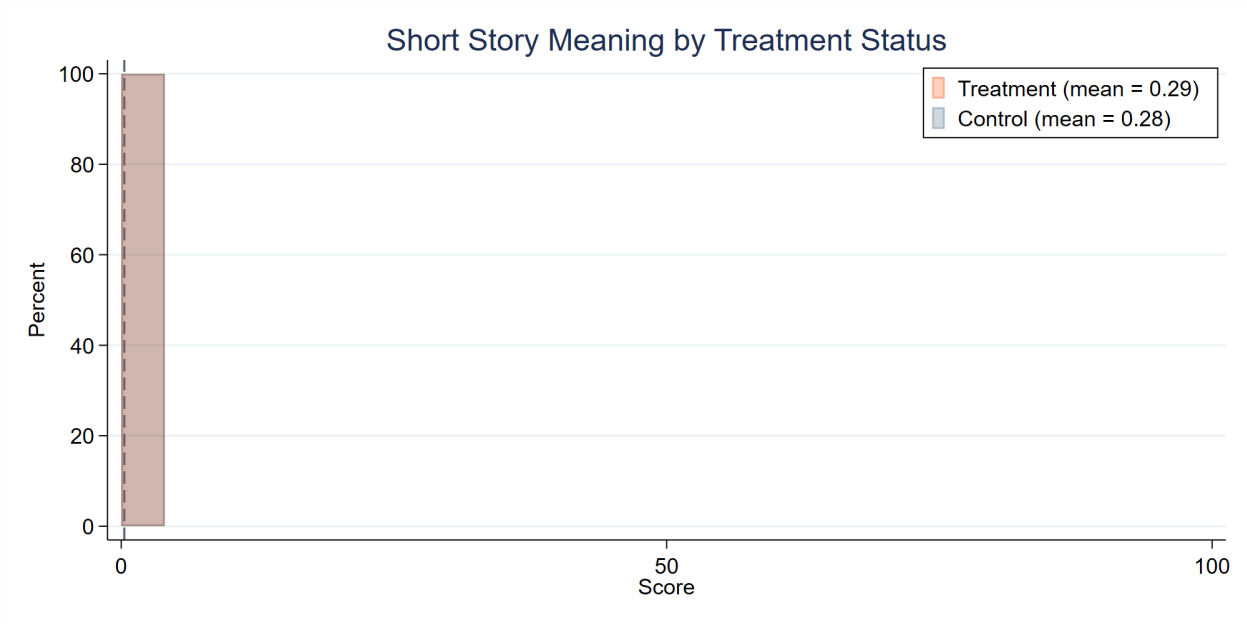

English Oral Reading Fluency by Treatment Status
Treatment (mean = 9.47)
Control (mean = 9.49)
Percent
100
80
60
40
20
0
0
50
100
Score

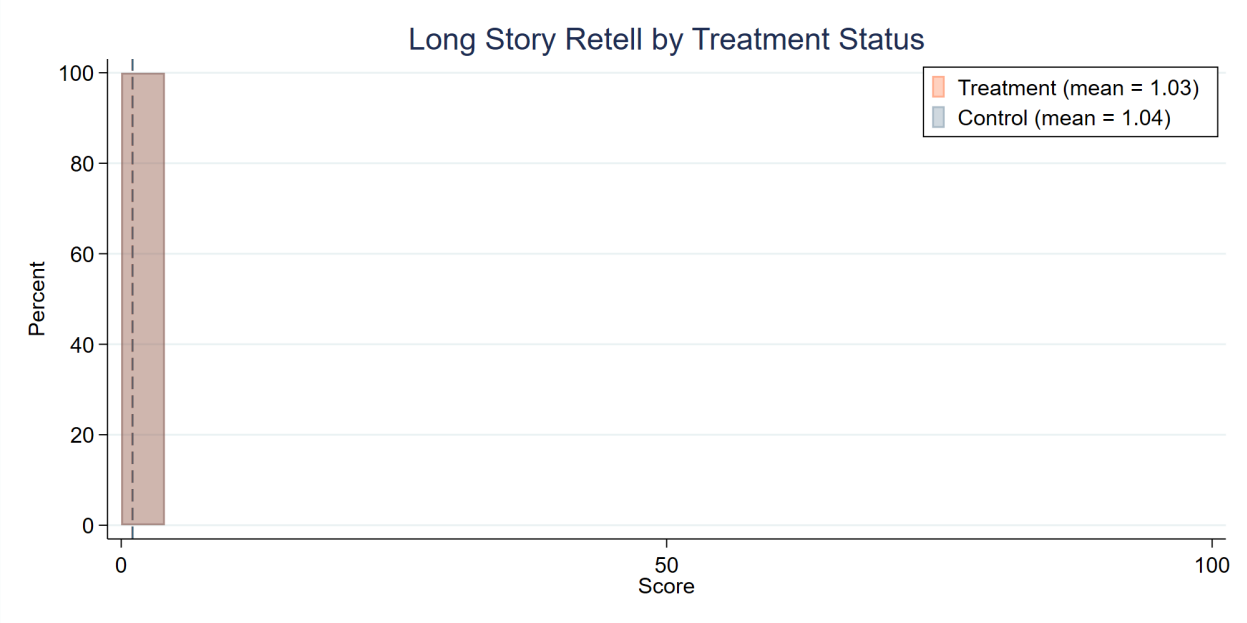
ELM Subtests Score Distribution – Basic 2

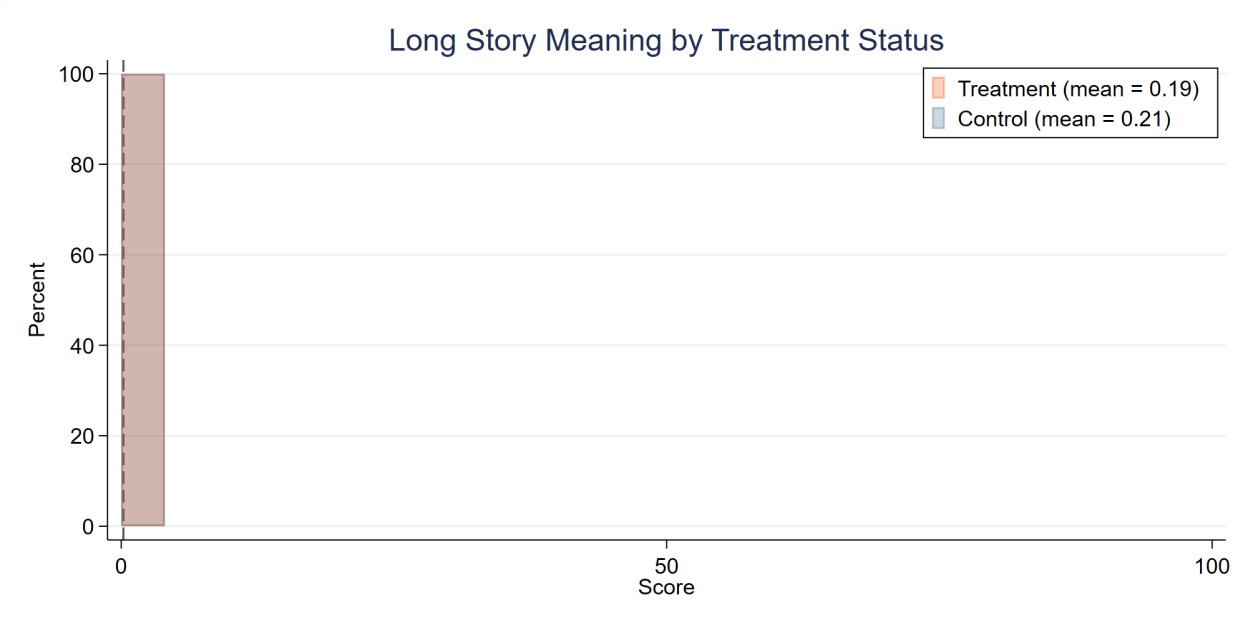





Short Story Retell by Treatment Status
Treatment (mean = 1.29)
Control (mean = 1.28)
Percent
100
80
60
40
20
0
0
50
100
Score


Short Story Meaning by Treatment Status
Treatment (mean = 0.29)
Control (mean = 0.28)
Percent
100
80
60
40
20
0
0
50
100
Score


Long Story Retell by Treatment Status
Treatment (mean = 1.03)
Control (mean = 1.04)
Percent
100
80
60
40
20
0
0
50
100
Score


Long Story Meaning by Treatment Status
Treatment (mean = 0.19)
Control (mean = 0.21)
Percent
100
80
60
40
20
0
0
50
100
Score