



LINKING SOCIOECONOMIC BACKGROUND TO LEARNING OUTCOMES

New Evidence from Nigeria

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ABSTRACT

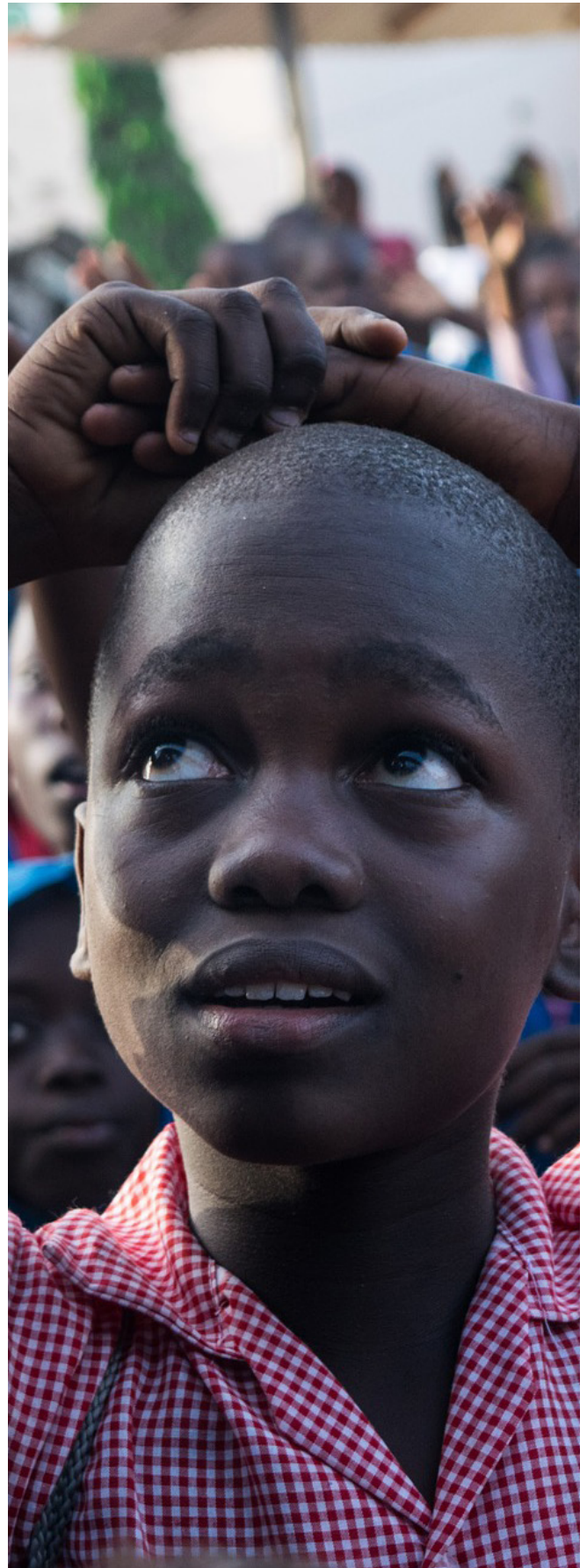
Socioeconomic status is recognised as a predictor of learning outcomes. Poverty is notable for its detrimental influence on cognition, school achievement and socio-emotional wellbeing. According to the World Bank Report on education (2018), students' average scores are significantly affected by family socioeconomic status, which implies that the prospects of children are tied to the status of their parents. The poor learning outcomes of children from poor backgrounds perpetuates a cycle of poverty as they are unable to access higher levels of education that present opportunities for higher-order skills and better employment opportunities. This position is generic to the global population but more persistent in developing countries, particularly in Sub-Saharan Africa.

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household surveys preclude child testing while school-based assessments typically do not provide household data, there is very limited data which empirically establishes links between socioeconomic status of children and their learning outcomes.

The LEARNigeria survey which provides data on learning levels and home background of over 40,000 children within 26,230 households. The results reveal that children from poor socioeconomic background may perform better in numeracy, even with poor literacy skills. In Kano, beginner level children in literacy and numeracy constitute the largest proportion of children assessed within the lower tercile of the wealth index. However, in Ebonyi, while most of the children within the lower tercile households are at beginner level in literacy, the highest proportion were graded at multiplication, being the highest numeracy level, with only 5% considered as beginners. The implication of this data is that further consideration of influence of socioeconomic status on learning outcomes should explore effect of regional differences, particularly, major occupation of the region.



1. INTRODUCTION

1.1 Background and Literature Review

Goal 4 of the Sustainable Development Goals (SDGs) for Education seeks to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”. Therefore, educational policies and advocacy need to see a shift from a focus on access to basic education to other aspects of education that promote lifelong learning opportunities for all. However, learning outcomes of children cannot be examined as a standalone issue, there are several factors which predict learning that must be taken into consideration. Studies have shown that among other factors, the socio-economic background from which a child originates is pivotal to predicting the

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learning outcomes of the child. The World Bank Report on Education (2018) also corroborates the notion that students' average scores are significantly affected by family socio-economic status. From the psychologists' perspective, socio-economic background of a child can be indicated by variables such as household income, parental education and occupation, parental housing tenure and neighbourhood of residence. Studies have shown a significant association between socio-economic status and the brain structure of a child, especially as it relates to memory, executive control and emotion (Brito & Noble, 2014). For instance, low income is associated with low academic achievements and other challenges that impede child development (Brody et al., 1994; McLeod & Shanahan, 1993; Mistry et al., 2002; Sameroff et al., 1993; Sampson & Laub, 1994). This implies that beyond genetic factors, strong cognitive development in a child is significantly affected by the socio-economic background which in turn determines learning outcomes.

The link between socio-economic background and academic achievement has long been debated and discussed in developed country context. In the

UK for example, studies have found that children from families within the high socio-economic brackets of the society perform better than their counterparts who hail from families of lower socio-economic status (Bynner & Joshi, 2002; Morris, Dorling & Smith, 2016). In the UK and the US, this dichotomy in academic performance is seen in children from as early as pre-school (Centre for Market and Public Organization [CMPO], 2006; Cunha, Heckman, Lochner, & Masterov, 2006; Feinstein, 2003; Goodman & Gregg, 2010; Morris, Dorling & Smith, 2016). In a study conducted in Australia, family socioeconomic position was also found to be one of the strongest predictors of learning outcomes among others like the child's approach to learning and a consistent parenting style (Barnett, Gaillo, Kehaler, Goldfeld & Quack, 2018).

Research has gone further by extending this investigation beyond an individual level to examining the influence of socioeconomic status of the school a child attends on learning outcomes. A study conducted for Canada and Australia, given the similarities in both country's history and systems, shows a strong association between school socio-economic status and student outcomes in mathematics, irrespective of students' individual socioeconomic background (Perry & McConney, 2013). Children who are privileged to attend a school with quality classroom environment record higher learning achievement than those who do not have the same opportunities. This lends credence to the pertinence of socio-economic factors when attempting to explain the learning outcomes observable in an educational system.

Poor learning outcomes are more evident in developing countries as they exhibit larger skill deficit than generally observed from school enrollment and education attainment data (Hanushek and Wößmann, 2007; Majgaard and Mingat, 2012). Sub-Saharan Africa which accounts for the highest poverty rates on a global scene also accounts for the poorest learning outcomes in education. The Monitoring Learning Assessment (MLA) conducted over the period of 1996 to 2009 showed an Africa Student Learning Index (ASLI) average score of 45 for low income sub-Saharan countries which is an indicator of the

percentage of the curriculum that students have absorbed and comprehended at the time of testing. While the average value of this indicator for the middle-income Sub-Saharan African countries is 54 per cent for students in Morocco and Tunisia (outside of the Sub-Saharan African region), significantly higher averages of 62 and 69 are recorded respectively. The average score for the Organisation for Economic Co-operation and Development (OECD) countries, converted to the MLA scale, is about 80. By implication, students in low-income Sub-Saharan African countries have on average, learned less than half of what is expected of them (Majgaard and Mingat, 2012). In the case of Nigeria, assessment data shows that the learning levels of those in education are far below expectation. Adefeso-Olateju (2016) found that pass rates averaged 30% at secondary school leaving level, which implies that 3 out of 10 children who sat for final examinations passed. Outcomes like these have been blamed on a number of factors. Fakolade and Oloruntoba (2017) identified self-esteem and peer influence as determinant of students' performance in Mathematics in a research conducted for Oyo State, Nigeria. In another study conducted in Oyo State, parental attitude to children education was found to have significant effects on students' reports of academic achievement (Ogunsola, Osuolale & Ojo, 2014). According to Kapur (2018), factors influencing academic performance include attitude of students, school resources, school leadership, skills and ability of teachers, classroom environment, role of parents, social circle, physiological and health related factors, motivation and encouragement, guidance and counselling, teaching method management and home environment. Apart from genetic factors, it is arguable that all other predictors of learning outcomes are directly or otherwise affected by the socioeconomic status of a child. This is because socio-economic status of a child impacts on the quality of his or her nutrition, cognitive development, self-esteem, emotional well-being, school environment, educational resources, peers association, teacher support and other home background and school factors that can be identified as predictors of learning outcomes.

There is a worrying tendency for children from poor backgrounds to continue in a cycle of poverty,

Factors influencing academic performance include attitude of students, school resources, school leadership, skills and ability of teachers, classroom environment, role of parents, social circle, physiological and health related factors, motivation and encouragement, guidance and counselling, teaching method management and home environment.

as limitations from early education could affect their ability to access higher educational levels, which in turn limits their opportunities to develop higher order skills which are often requisites for better job opportunities. According to Diemer and Ali (2009), children from higher social economic backgrounds are better positioned to succeed in forming career aspirations and also well prepared for the job market because of access to resources such as career offices, guidance counselors, better schools, high level "social actors," and familial experience with higher education. Factors that predict learning levels are therefore important in the discourse on education and lifelong learning opportunities for all. This discussion will focus on the link that exists between socio-economic background and the learning outcomes of a child in education as evidenced in Nigeria.

1.2 Research Question

In light of this background, this study seeks to answer the following question:

- Is the link between socioeconomic background and learning outcomes in numeracy and literacy the same for children in southeastern and northwestern Nigeria?

2. DATA

2.1 The LEARNigeria Survey

The data used for this study is drawn from the LEARNigeria 2017/18 survey. LEARNigeria is a citizen-led assessment, advocacy and action programme which is designed to generate empirical data on the foundational literacy and numeracy skills that Nigerian children possess, and inform and inspire targeted interventions for improving learning. LEARNigeria is part of the global citizen-led assessment body, the PAL Network.

As with other citizen-led assessments, trained volunteers visit households in rural and urban locations to administer the survey which in 2017/18 enumerated children aged 3-15 years and tested children aged 5-15 years. The survey design ensures that the learning levels of all children are captured - those in school, those who have dropped out of school, those who have never been in school, those in government schools, those in private schools and those in non-formal schools. Assessment data collected at the household level is more likely to be inclusive of all these categories than assessment data collected at school level.

LEARNigeria assesses children on the foundational literacy and numeracy skills that they are required to learn as part of the Nigerian curriculum. The highest level in the assessment corresponds to the learning outcome benchmarks of grade two (the second year of formal education) according to the Nigerian curriculum. In addition to assessment, information is collected from the households on household size, socioeconomic status, and parental education, which are indicators believed to influence children's educational status and learning outcomes. LEARNigeria also visits one government school and one private school in each enumeration area or Local Government Area (LGA) sampled to collect information on school infrastructure, enrolment and attendance, and teacher characteristics to understand the environment where children receive their formal education. After the assessment, parents receive instant feedback on learning levels, community and government stakeholders are engaged in interactive feedback and action planning sessions. These catalyse action by inspiring and equipping parents

and communities with basic tools and charging them with the responsibility to help improve their children's learning outcomes. The data also informs the implementation of the LEARNigeria Remedial Programme which is showing a significant positive relationship between its methods and learning levels of children.

2.2 LEARNigeria Sampling Technique

In collaboration with the National Population Commission and National Bureau of Statistics, a probability sampling procedure was adopted in selecting households for the survey using a sampling design that involved multi-stage stratified sampling. Six states representing Nigeria's geopolitical spread (Plateau, Taraba, Kano, Ebonyi, Akwa-Ibom and Lagos) were purposively selected for the survey using several criteria. Thirty-six Local Government Areas (LGAs) were covered in the six selected states (6 LGAs per state) using the stratified random sampling technique. The LGAs that were included in the survey in each state were sorted using several stratification variables of interest such as: the senatorial district they belong to, the location (urban or rural) and the size of the target population. The 49,408 eligible children that were surveyed from 21,600 households in the 36 LGAs are the aggregate of the sample size (1,800 children or 600 households) calculated for each LGA. The first stage is the selection of Primary Sampling Units (PSUs) or EAs or clusters. To ensure adequate coverage and representation of all heterogeneous settings in each reporting domain (LGA), the required number of eligible households (600) was selected from 30 clusters/EAs in each LGA with 20 households selected from each cluster/EA. In all 1,080 clusters/EAs were selected for the survey in the 36 LGAs. The clusters for each LGA were allocated proportionate to the urban and rural sectors in the LGA; where urban centre is defined as a locality with a population size of 20,000 or above.

In every LGA, the clusters formed in each location type (rural or urban) were allocated to the localities that made up the location type of the LGA with probability proportional to estimated size (PPeS of the locality). All the localities that belong to each location type in the LGA were arranged according to their geographic location with their size (i.e. projected population).

For example, all urban localities in each state were arranged in order of their geographic location with their population. The population being the measure of size (MOS), the cumulative measure of size was obtained (CMOS) and by systematic sampling procedures the required EAs or clusters were allocated to localities. This ensured that the number of EAs or clusters allocated to a locality (0 or 1 or more) was with probability proportional to size. The next stage was the collation of the Census Enumeration Areas of the localities that were allocated 1 or more clusters from the first stage. The EAs of these localities were arranged in their geographic order and by systematic sampling procedure, EA(s) equivalent to the number of clusters allocated to the locality were selected. The selected EAs were used as the point of listing and sampling.

2.3 LEARNigeria assessment tools and administration

The LEARNigeria assessment tools were designed in partnership with the federal ministry of education, the Universal Basic Education Commission, national curriculum development agencies, teachers, academics, international assessment experts and other educators in Nigeria. Children were assessed using the literacy (English & local languages) and numeracy assessment tools.

The literacy assessment comprised five levels of student proficiency benchmarked at beginner, letter, word, paragraph and story levels. Children were assessed starting from letter up to the story level. Children were graded at a level if they completed the questions at that level, and if a child could not cope at a particular level, the child would be marked at the previous level (so if a child could not read letters, the child would be marked at the beginner level). However, if a child completed the question sequence of the assessment to the story level, they were marked at story level, interpreted as the attainment of foundational literacy.

The Numeracy assessment comprised six levels of proficiency: Counting (0-9), Number recognition (0-9), Number recognition (10-99), Addition, Subtraction and Multiplication. Children were assessed from counting up to multiplication level. They were graded at a level if they completed the questions at that level,

and if a child could not cope at a particular level, the child would be marked at the previous level (so if a child could not count numbers 0 to 9, the child would be marked at the beginner level. However, if a child completed the question sequence of the assessment to the multiplication level, they were marked at multiplication level, interpreted as attainment of foundational numeracy.

3. METHODOLOGY

In this study, we employed descriptive and graphical analysis to examine the differences in the learning outcomes of children in literacy and numeracy and the link between those outcomes and socioeconomic background. To measure socioeconomic background, we identified wealth index and highest educational level of the household head as proxies. The household wealth index variable was calculated using Principal Component Analysis (PCA) which is a technique used to reduce the number of variables in a dataset to a smaller number of dimensions. It creates components from a dataset, and each component is a linear weighted combination of the initial variables. The asset variables in PCA are weighted and the assets that are more unequally distributed between households are assigned more weight in a PCA (Vyas & Kumaranayake, 2006). After estimating the principal components of the asset data, a score is predicted which represents the wealth index score for each child based on the variables included in the PCA, the higher the values of the wealth index score, the more wealth advantage a person has. The second proxy for socioeconomic background is the highest educational level of the household head. Inferential analysis using t-test was used to examine the significant differences in learning outcomes of children across the wealth terciles. Learning outcomes were measured using the results of the numeracy and literacy assessment administered to children in the LEARNigeria survey.

4. ANALYSIS & FINDINGS

Ebonyi state is a southeastern Nigerian state created in 1996, made up of approximately two million people, of whom the vast majority are of the Igbo ethnic group. The state's capital and largest city is Abakaliki. It has other townships in up to 13 local government areas. Although, it is enriched with several solid minerals with few large scale commercial mining, the people of the state still rely primarily on agriculture. It has several primary and secondary schools and four tertiary institutions. Youth Literacy rate in Ebonyi state stood at 91.9% while adult literacy was 69.8% as at 2010 (National Bureau of Statistics, 2010).

Kano state on the other hand is located in northwest Nigeria. It was founded in 1967 and its capital city is Kano. It is the disputed most populous state in Nigeria of about 11 million residents who mainly speak Hausa. Although it is the largest industrial centre in Northern Nigeria, it still relies mainly on Agriculture as a main source of revenue. It has four universities, 12 other post-secondary institutions and several primary and secondary schools. There are 44 local government areas in Kano state. Being a predominantly Muslim state, there is prevalence of polygamy in the state which results in high fertility rate and high population. The state records poor educational statistics like high numbers of out-of-school children and low learning levels. Youth Literacy rate in Kano state stood at 41.9% while adult literacy was 27.8% as at 2010 (National Bureau of Statistics, 2010).

4.1 Socioeconomic background and learning outcomes

We examine the differences in the learning outcomes of children in Kano and Ebonyi state, and the link between learning outcomes and socioeconomic background as measured by wealth and the educational level of the head of the household (parental education). We expect that children from lower socioeconomic backgrounds will have lower learning outcomes than their peers from higher socioeconomic backgrounds. In Table 1 below, children in the lower wealth tercile (poorest group) are more likely to be at beginner level (lowest learning level), which means they are not able to identify letters. In Kano state, this represents 29% of those in the lower wealth index tercile that are at beginner level in literacy and similarly, in Ebonyi, 28% are at beginner level. The case is different in numeracy

as shown in Table 2 below. We find that only 5% of those in the lower tercile in Ebonyi are at beginner level, while in Kano state 31% of the children in the lower tercile are at beginner level.

Table 1: Attained literacy level for children in the lower wealth tercile in Ebonyi and Kano states

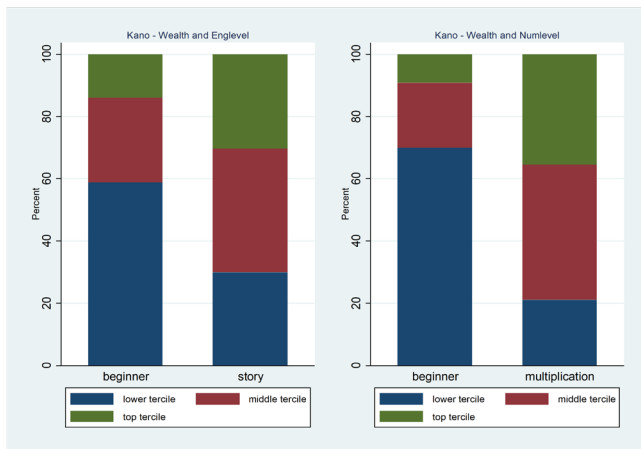
Literacy level	Ebonyi (%)	Kano (%)
Beginner	28	29
Letter	26	24
Word	17	17
Paragraph	11	13
Story	18	17
Total	100	100
Source:		

Table 2: Attained Numeracy level for children in the lower wealth tercile in Ebonyi and Kano States

Numeracy level	Ebonyi (%)	Kano (%)
Beginner	5	31
Counting (0-9)	9	16
No. of Recognition (0-9)	18	40
No. of Recognition (10-99)	18	6
Addition	17	4
Subtraction	10	2
Multiplication	23	2
Total	100	100

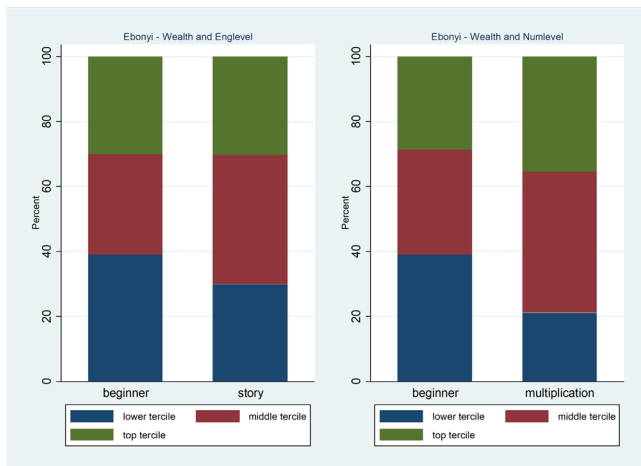
We further analyse the differences in learning outcomes of children in Kano and Ebonyi state considering socioeconomic background measured by wealth index. Graphs 1 & 2 below show that socioeconomic status of children may impact their learning differently depending on the state/region which children belong to. In Kano (graph 1), we can see that wealth matters for learning outcomes of children in the LEARNigeria survey. In English literacy and numeracy, students who are in the lower wealth tercile (poorest group) are more likely to be at the beginner level (lowest learning level), while wealthier children are more likely to have attained foundational literacy in English (story level) and Numeracy (multiplication).

Graph 1: Learning levels in English literacy and numeracy by wealth terciles in Kano



In Ebonyi state (graph 2), while a child's background still matters for learning, the differences between learning levels across the wealth index tercile are not that stark. Children at the lower wealth index tercile are still less likely to have attained the foundational literacy in English (story level) and numeracy (multiplication) than their peers who are at the top wealth index tercile.

Graph 2: Learning levels in English literacy and numeracy by wealth terciles in Ebonyi

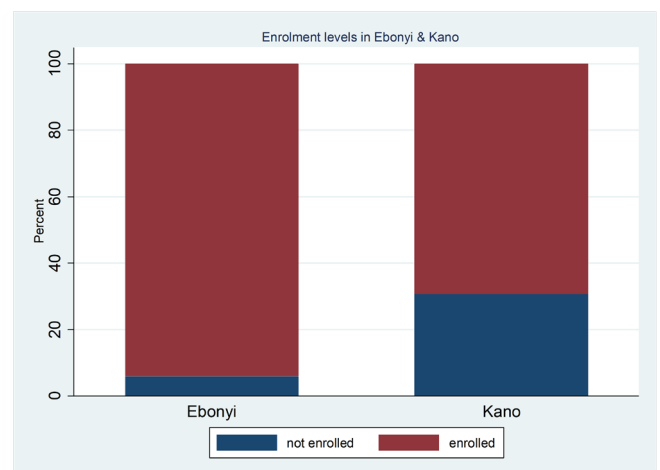


Upon further analysis of the differences between the learning levels and socioeconomic background, we found that wealth is a significant determinant of the child's learning level in numeracy and literacy in Kano state. On the contrary, for children in Ebonyi state, their wealth index does not significantly determine their learning levels in Numeracy and is slightly significant in literacy. When we examine the impact of wealth on learning outcomes of children in the entirety of the LEARNigeria survey, we find that wealth is a significant determinant of learning but by exploring

this relationship by state, we find that socioeconomic background impacts learning differently by state.

There are several routes through which the socioeconomic background of a child can impact their learning outcomes. Socioeconomic status is strongly linked to enrolment levels of children. The wealthier a household is, the more likely they are to be able to afford to educate their children. The children are also more likely to learn in school than their counterparts from poorer households because their families are better able to provide resources that aid their learning. We explored the data further to analyse the differences in the enrolment status of children in Kano and Ebonyi state.

Graph 3: Enrolment levels in Ebonyi and Kano



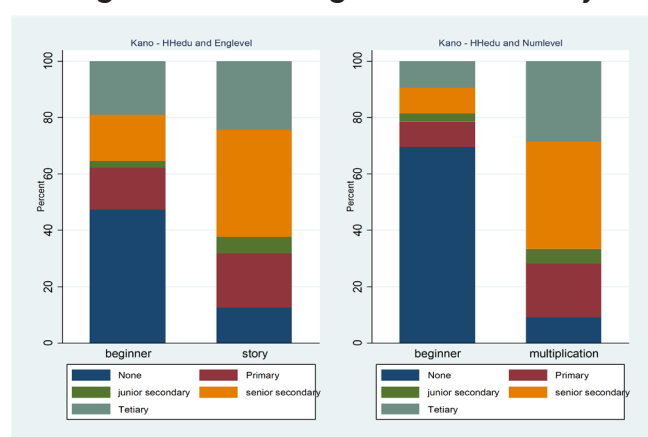
We can see from the Graph 3 above that children in the sample are more likely to be enrolled in Ebonyi state than in Kano state. In Ebonyi state, 93% of the children were enrolled while in Kano only 67% of the children were enrolled. However, the average age for respondents in both states were similar at about 8 years old. This provides evidence that one possible reason for which socioeconomic background matters more for children in Kano than their counterparts in Ebonyi is because most children in Ebonyi state are already enrolled in school and perhaps differences in their learning outcomes are more likely to be traced to differences in school factors than household factors - we can explore this in the data.

4.2 Parental education and learning outcomes

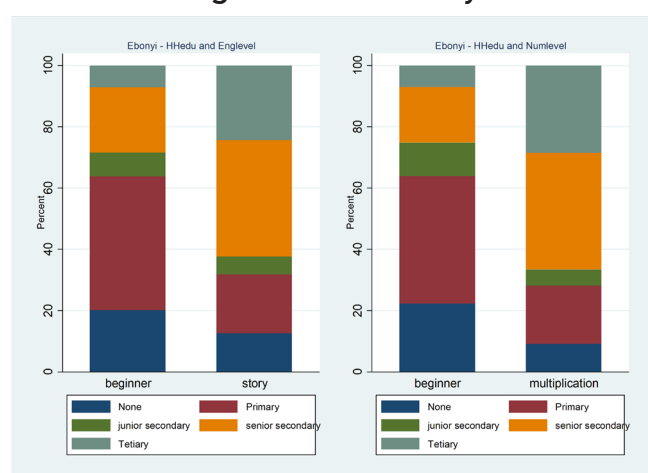
Next we explored the differences between the educational levels of the parent and the learning outcomes of children in the sample. In Graph 4 below,

we can see that there are differences in the learning outcomes of the children as the education level of the parents differ. Children whose parents have little or no education are more likely to be at beginner level in both numeracy and English language. Only 10% of the sample of children at the beginner level have parents who have had tertiary education. In Ebonyi, the children who attained foundational levels in numeracy (multiplication level) and English (story level) are more likely to have parents who have completed senior secondary or tertiary education.

Graph 4: Ebonyi - Parental education and learning outcomes in English and Numeracy



Graph 5: Kano - Parental education and learning outcomes in English and Numeracy



In the case of Kano in graph 5 above, we see that in English language, about 50% of the children at the beginner level have parents that have no education. Similarly, in numeracy, 70% of the children at the beginner level are from household where the parents have no education. The children who have attained foundational level in both numeracy (multiplication level) and English literacy (story level) are most likely

have parents that have completed secondary or tertiary education. Further analysis reveals that these differences between learning outcomes and parental education is significant in both Ebonyi and Kano state.

5. DISCUSSION

In this study we analysed the link between socioeconomic background of children between 5-15 years in the LEARNigeria survey, and learning outcomes. There has long been consensus in the literature on the link between socioeconomic background and learning outcomes, however, the LEARNigeria data allows us to analyse and compare how socioeconomic background could affect children differently depending on the subject and context.

In Kano state, where the children are from less wealthy backgrounds (table 3 in appendices) and are less likely to be enrolled in school (graph 3), socioeconomic background plays a bigger role in their learning outcomes. A child's socioeconomic background can affect his/her learning through the parent's ability to enrol the child in school and their ability to provide learning resources and a conducive learning environment for the child. We can see from the analysis that differences in socioeconomic background through wealth and parental education explain some of the difference in learning outcome and could also be responsible for inequalities in learning for children in this context. In Ebonyi on the other hand, socioeconomic background is found to affect a child's learning differently in numeracy and literacy. Children in the lower tercile of the wealth index score were marked at beginner level in literacy but in numeracy a number of them were found to have attained the foundational literacy level at multiplication level. Upon further analysis we found that socioeconomic background measured by wealth index score did not significantly affect their learning outcomes in Numeracy. However, because most children in Ebonyi state were already enrolled, school factors will likely explain some of the differences in their numeracy outcomes. This provides some evidence in favour of the argument that schooling could potentially be a leveller for children from disadvantaged backgrounds. Where parental education and wealth may cause children to have lower learning outcomes, the schooling advantage is

able to close some of those gaps. Given that this study was predominantly a household survey, information on the schooling outcomes of children in the survey were too limited to be included in the analysis

We find that children in Ebonyi are more likely to be enrolled in school than the children in Kano state and upon examining the difference in wealth across the two states, we find that the children from Ebonyi state were wealthier on average than their counterparts in Kano state and the children in Ebonyi state are more likely to be from families where the head of the household (parent) is educated than children in Kano state. We can conclude from these links and relationships that socioeconomic background measured by wealth and parental education is determinant of learning outcomes and can also affect learning outcomes through schooling. A child who is from a wealthier family is more likely to be enrolled in school than one from a poorer family and a child who is enrolled in school is more likely to have attained foundational learning capabilities than one who is not enrolled in school.

This study has provided more evidence to support the case for access to education for all children with a focus on learning, because access in itself does not guarantee learning. There is need to focus on providing the type of educational access that makes up for gaps that children from poorer families come to school with. More research is also needed to provide in-depth qualitative evidence in and around the context of the differences in learning outcomes as these could deepen the understanding of other avenues through which children from poorer backgrounds are able to learn at similar levels with their counterparts from wealthier households. This study employed a quantitative approach to analysing the large scale LEARNigeria dataset and is therefore limited in its ability to delve into the 'why' of the observed results. However, these limitations do not detract from the contributions of this study to the evidence on socioeconomic background and learning outcomes in the Nigerian context.

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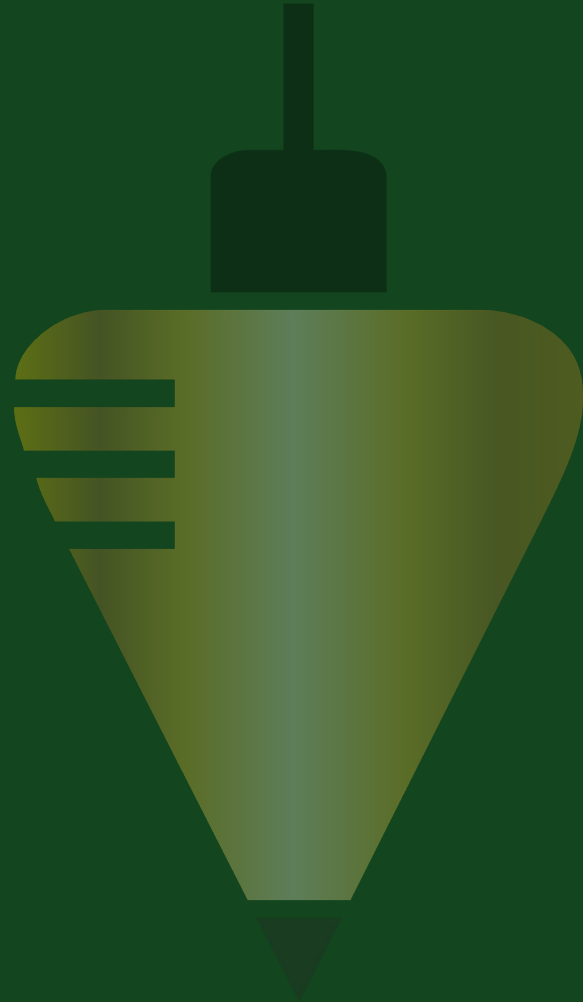
APPENDICES

Table 3: Percentage of children in terciles of wealth index across state

Wealth Tercile	Akwa Ibom	Ebonyi	Kano	Lagos	Plateau	Taraba
lower tercile	30.2	38.27	57.69	11.42	50.74	46.91
middle tercile	42.57	32.17	18.52	46.66	29.76	32.34
top tercile	27.23	29.56	23.79	41.91	19.5	20.74

Table 4: Number of children surveyed in each state

State	Number of children	Percent
Akwa Ibom	6,943	14.05
Ebonyi	8,424	17.05
Kano	9,140	18.5
Lagos	6,709	13.58
Plateau	8,464	17.13
Taraba	9,728	19.69
Total	49,408	100



The Education Partnership (TEP) Centre

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