Preschool Experience and Intellectual Abilities of Primary School Pupils: Evidence from Ghana

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Abstract

This study examined the factors that influence access to preschool education and the intellectual outcomes of pupils with or without preschool experience in two regions in Ghana. A mixed-bag of stratified, simple random and purposive sampling techniques was employed to select 863 pupils in basic grades 2, 3, and 4 from eight selected schools for the study. The research design was ex post facto and explored preschool experience and intellectual outcomes of primary-aged pupils. The results revealed that access to preschool does not depend on type of locality, parental income or parental educational background but the type of preschool experience (private or public) pupils received depended, to a large extent, on parental income levels. In addition, the type of preschool experience predicted pupils' intellectual abilities. Therefore, preschool programmes that target preschoolers from lower socio-economic backgrounds would greatly improve their intellectual abilities.

Keywords

Preschool Experience, Intellectual Ability, Primary Pupils, Rural-Urban, Ghana

Introduction

School education in all societies is an institution that socializes individuals to play specific and expected roles (Agyeman, 1986; Forojalla, 1993) and governments across countries and regions spend large sums of money and logistics to realize this novel objective. Indeed, it is thought that only when learners develop appropriate intellectual capabilities that they may translate these abilities into useful ends (Cornell & Hartmann, 1998). In most developing countries, especially in sub-Saharan Africa, however, the problems of education persist. They include inadequate personnel, decrepit infrastructure, poor skills learned and poor academic achievements. Perhaps the most important and worse affected dimensions of education are academic achievement and intellectual abilities. Theoretical debates and empirical evidence suggest that preschool education (also called

early childhood care education) is one strategy that helps develop requisite intellectual capacities for learners. Although some research findings suggest that extra instruction has little or no effect on the intellectual development of children especially those from very stimulating environments (Scarr, 1984), empirical evidence generally supports the advantages derived from preschool programmes and their effects on intellectual development. Indeed, findings are consistent on the gains derived from preschool programmes for children especially those from disadvantaged environments. Hunt (1982) observed that quality preschool programmes that offer individual attention increase children's school readiness and decrease their likelihood of repeating a grade or being placed in special education. Zigler and Styfco (2001) further observed that preschool education provides a boost to emotional intelligence. In particular, preschool programmes create better attitudes towards learning and thus reduce both school dropouts (Myers 1992) and tendencies towards criminality (Reynold, Temple, Robertson, & Manri, 2001). Furthermore, Barnett (1992) observed long-term cognitive effects of preschool education on achievement and school performance than intelligent quotient (IQ). For him, children with preschool experience enter school with richer experiences of problem-solving, learning strategies and other cognitive advantages which serve as the building blocks for the accumulation of more knowledge and skills in school. In addition, Ceci and Williams (1997) discuss the overall benefits of schooling and argue that schooling and intelligence contribute to each other. They believe that although higher intelligence is conducive to prolonged schooling, intelligence scores tend to rise during the school year and drop during recess. Thus programmes towards (pre) schooling simultaneously shape the development of intellectual abilities. Despite the benefits associated with preschool programmes, their utilization is often mediated by the economic position of families. Researchers (Grantham-McGregor, 1983; Pozner, 1983) have shown that lower socio-economic status deprives most children in developing countries (e.g. Ghana), access to preschool programmes as well as mentally stimulating materials such as toys, books, and other learning aids. Thus, most children enter primary school with little or no preschool experience and the adverse affects on their academic achievement and intellectual abilities are glaring as they progress through school to adult life. A thorough understanding of the nature of early childhood care programmes in Ghana should thus involve an investigation into access factors, determinants and outcomes of quality preschool education.

The Problem and Context

Ghana's educational system has witnessed numerous reforms and reviews (Tonah, 2009) in an effort to improve content and quality. In spite of the advantages associated with preschool education, little attention and commitment have been given to this intervention programme. Although the Six Dakar Goals (EFA Goals) seek to expand and improve comprehensive early childhood care and education especially for the vulnerable and disadvantaged (UNESCO, 2002), research evidence shows that preschool attendance has not been very encouraging. Indeed, the gross and net enrolment rates stood at 41.6 percent and 27.2 percent respectively for the 2004/05 academic year (UNESCO, 2006). The Ghanaian situation elucidates this point: the preschool system is classified as crèche for children under 2 years of age; daycare centers for 2-3 years children; nursery for those aged 3-4 years; and kindergarten for children aged five. Even though the benefits from preschool education have long been acknowledged, it was not formally sanctioned until 2002 when the President's Committee on Review of Education Reforms in Ghana (also the Anamuah-Mensah Committee) recommended the incorporation of kindergarten into basic education system (GoG, 2002). Prior to the 2002 reforms, preschool education was neither free nor compulsory and the statistics on attendance were startling. UNESCO (2006) noted that there were 5,441 public kindergartens and 3,742 registered private preschool facilities in Ghana in 1996 and again, in 1997, 427,000 children enrolled in public

kindergartens while about 156, 000 pupils attended private preschool facilities. That figure represented just over 50 percent of enrolment in preschool programmes. In particular, preschool education is yet to make an impact in rural areas where the bulk of the population resides.

Participation in preschool programmes in Ghana, as elsewhere in developing countries (Tashakkori, Haghighat, & Yousefi, 1988), is informed by several misconceptions and opinions two of which are dominant. The first view is that some parents believe preschool programmes are not necessary because they are avenues for learning what could be learnt in primary school. The second view, on the other hand, holds that due to the general economic situation, only affluent families could afford the high cost of quality preschool education for their wards. Therefore as happens in most developing countries (Grantham-McGregor, 1983; Pozner, 1983), many Ghanaian children, especially from lower socio-economic backgrounds, enter primary school without any preschool experience. From the above view points, it is plausible that socio-economic status together with the misconceptions interact to keep a number of children away from experiencing early childhood care programmes and thus inhibit their potential to develop intellectual competencies for actual school work. Against the backdrop of the misconceptions and lower participation in preschool programmes, this paper explores the extent to which socio-economic factors influence access, type of preschool and the intellectual outcomes provided by preschool setup in the Ghanaian context. The objective of the paper is twofold: to explore the influence of preschool education on the intellectual abilities of pupils and to explain the differences in access and intellectual abilities of pupils with- and without preschool experience across the different socio-economic groupings and localities.

Hypotheses

The paper treats the following hypotheses:

H1: Pupils from urban families have greater access to preschool facilities than those from rural families

H2: Pupils from affluent homes have greater access to preschool education than those from less affluent families.

H3: Pupils with private preschool education have more intellectual abilities than those with public preschool education.

H4: Pupils with preschool experience have higher intellectual maturity than those with no preschool experience.

Theorizing Preschool Education and Intellectual Abilities

Research in preschool outcomes benefits from the line of thinking that intelligence is not static quantifiable attribute but could be continuously modified and thus intelligence is multiple. Sternberg (1999) agreeing with Gardner (1999) posits that individuals do not have an intelligence but instead have multiple intelligences, each relatively independent of the other. Sternberg (1999) thus distinguishes three aspects of intelligence: analytical (or academic problem-solving) intelligence which assesses intelligence through tests on well-defined problems with a single right answer; creative intelligence which is expressed by the individuals reactive adaptation to novel situations and generating novel ideas; and practical intelligence which is required for everyday tasks that are frequently ill-defined with multiple solutions. Sternberg (1999) suggests that the multiple abilities can contribute to life successes and that the different gifts add spice to life and challenges for

education. Other researchers argue further that school enrichment programmes could alter intelligence. Feuerstein (1980, 2000) and Feuerstein et al. (1988) focusing on the quality of teacher-learner interaction demonstrate that through systematic and planned enrichment, intelligence can be modified, expanded, and developed further. What these perspectives bring to the fore is that through early childhood care programmes, the various constituencies of intelligence for each child may be unearthed and combined in different mixes that lead to success in school and beyond.

Preschool Education Provision in Ghana

Like most developing countries, early childhood care education (ECCE) programmes in Ghana is illustrative. The ECCE programmes in Ghana have mostly been provided informally through the home-based method. Indeed, as observed by the President's Committee on Review of Education Reforms in Ghana (GoG, 2002), while nursery and kindergarten have been in existence for a long time, it was not until 2002 that the preschool system became an integral part of the regular education system. According UNICEF (2008), in 2006 there was about 1,813,000 (927,000 males and 886,000 females) preschool-ready children aged 3-5 years. Out of this figure, the total net enrolment ratio was 35.5 percent with 34.6 percent for males and 36.5 percent for females. Similarly, the gross enrolment ratio as observed by UNESCO (2008) was 55 percent with 53.7 percent for males and 56.4 percent for females. Despite the gross enrolment improving to over 80 percent (1,328,454) in 2009, it did so at a decreasing rate (MoE, 2010). While enrolment and attendance have not been encouraging, adequate teaching staff at the preschool level has presented its own set of challenges. Indeed, the number of teachers at the preschool level in 2005 stood at 29,014 but only 22.2 percent of the teachers were trained and over 90.8 percent of the preschool teachers were females. The point deduced from these data is that lower rates of enrolment and staffing as well as quality of personnel conspire to inhibit the realization of the preschool commitments set out in the EFA goals.

Preschool Care Giving and Pedagogy

Although the content of preschool instruction and who delivers it largely predicts important outcomes, there are several debates about the nature of the pedagogy for preschoolers. These arguments on the pedagogy center around three themes namely social-emotional versus academic; child-initiated versus adult-directed; and play versus instruction orientations. Lee's (2006) study of appropriate preschool pedagogy by teachers found that the teachers thought preschool education should be fun, engaging and not stressful. They also believed that the curriculum should be based on children's interests and everyday life and should also allow them to direct their own play and exploration. Preschool education was also seen as seeking to promote social, emotional and physical wellbeing and not so much of academic work. However, some researchers (Bredakamp & Copple 1997; King 1983) suggest a middle ground that brings the various arguments under one rubric because they are quite compatible and most effective when combined. For King (1983), despite the preference for preschool programmes to compensate for a hostile home environment and preparing for an equally hostile school environment through the learning of school-coping skills, there is the need to incorporate intellectual qualities in preschool activities. Another key feature in the preschool literature is the differences that exist in the programmes offered in urban and rural preschools. It has been observed that urban centers are abundant in quality preschool facilities and programmes compared to rural area. In their study of the preschool systems in Zimbabwe and India, Cleghorn and Prochner (2003) observed that differences in preschool education and outcomes exist because urban and rural preschools are exposed to different stimulating environments. Yet while the rural preschoolers are exposed to inferior stimulating environments, it is they who experience the greatest

effect of preschool education compared with urban children (see Grantham-McGregor, 1983; Pozner, 1983).

The preschool curriculum in Ghana is described as child-centered allowing the child to learn from the known to the unknown and prepares them for a more routine and formal education (MoE, 2004). The curriculum identifies syllabuses in the following subject areas: language and literacy (pre-reading and pre-writing) pre-mathematics (e.g. writing of numerals), creativity and critical thinking (memory drawing and painting of the human body parts), problem-solving, construction and assemblage, music (listening and singing for creativity), physical exercises (for gross motor activities), and psychosocial skills (self-confidence and assertiveness) for preschoolers. In spite of the positive outcomes promised in the curriculum, quality of personnel continues to impede the attainment of these outcomes. King (1983) argues that in developing countries, it is necessary to predicate preschools on unqualified staff whose own education may be a little beyond primary school. This observation mirrors the Ghanaian situation in which there are efforts to address the shortfalls in trained preschool. They include a national nursery training center offering a 3-month training for nursery educators; a 3-year diploma in preschool education at the colleges of education; and a 4-year bachelor of education in early childhood care at the University of Education, Winneba and the University of Cape Coast (UNICEF, 2006). That notwithstanding, only 22.2 percent of preschool caregivers in 2005 had received appropriate training (UNESCO, 2006) which might account for the use of inappropriate curricula by some preschools that made it difficult for preschoolers to comprehend (Ofosu-Appiah, 2008). The study now explores how the provision of preschool programmes and outcomes obtain in both rural and urban settings.

Empirical Data and Methods

Research Design, Study Population and Sampling

The study employed the ex post facto design to retroactively assess the effects of preschool experiences on the intellectual maturity of pupils in grades 2, 3 and 4 from Ashanti and Central regions in Ghana. Educational infrastructure and socio-economic indicators informed the choice of the regions; both have superior education infrastructure but the Ashanti Region ranks among the top three regions with higher socio-economic well-being while the Central Region is among the bottom four in the socio-economic ranking. This difference in socio-economic well-being enabled comparisons in access to preschool, achievement scores, and intellectual maturity of pupils across the various socio-economic levels. Pupils in basic grades 2, 3, and 4 in private and public basic schools in the two regions were targeted because they constitute suitable age groups for the drawing test instrument used in the study. The study employed a mixed-bag of purposive, stratified and simple random sampling techniques. First, primary schools in the two regions were stratified into public and private schools. Four schools (two public and two private schools with preschool facilities) were selected in each region for the study. The capital city/metropolis in each region was purposively selected after which one district was randomly selected from each region followed by a random selection of one educational circuit from the selected districts/metropolises. To ensure the rural-urban dichotomy, one non-urban community which had both private and public primary schools was randomly picked from each selected education circuit. The next step was the random selection of one public and one private school in each of the circuits. The last stage was the selection of pupils' grades. In schools with multiple streams, one class was randomly selected at each grade while in single stream schools the three classes were automatically picked. In each of the selected

classes, all the pupils present at the time of the study were used. The combined sample gives a total of 863 pupils and the breakdown of the sample is as follows:

Central Region: Cape Coast Metropolis (St. Nicholas Anglican Primary, 126 and University Primary School, 113 both in the OLA/Aboom circuit) and Twifo-Hemang Lower Denkyira District (Jukwa Methodist, 126 and Jabez High Academy, 86 both in the Jukwa circuit).

Ashanti Region: Kumasi Metropolis (Suame M/A Primary, 155 and Holy Rosary Catholic Preparatory School, 119 both in the Suame circuit) and Efigya-Kwabre District (Soko D/A Primary School, 94 and Holy City International School, 44 both in the Boamang circuit).

Data Instruments and Collection Procedure

Two sets of questionnaires were used to collect data for the study. The first instrument sought information on both the achievement and intellectual maturity of pupils in basic grades 2, 3 and 4. The researchers and the assistants completed the achievement portion using existing information from pupils' end-of-term exams from school files. Pupils' scores on the Draw-A-Man Test (DMT) (Harris, 1963) were used for assessing intellectual maturity. The DMT is more appropriate for gauging the intellectual maturity of young children especially those aged between 4 and 8 years. The second instrument sought information on socio-economic status of pupils through their heads of households or guardians. Pupils were assigned unique ID numbers to correspond with mini-questionnaires given to their parents (with the help of their class teachers) seeking information about parents' socio-economic status. This information from parents' occupation and annual income was used to assess the socio-economic status (SES) of pupils studied. The return rate of the SES questionnaire was 77.9 percent out of 863 pupils. The instruments were piloted in selected primary schools in Cape Coast and Jukwa which proved invaluable in assessing the feasibility and improvements in the final instruments for the main study.

Variables and Measures

The DMT standard test (Harris 1963) as a measure of intellectual maturity was used to gauge pupils' intellectual abilities having been used in other studied in developing countries (Tashakkori, Haghighat, and Yousefi 1988). Pupils' socio-economic background was measured by parental income, education, occupation, number of children in the family, number of school-aged children, and number of children in school. Income levels were measured using the income quintiles provided by the Ghana Statistical Services (GSS) (2008). The quintiles from the lowest to the highest are: GH¢ 1-999; GH¢ 1,000-1,097; GH¢ 1,098-1,262; GH¢ 1,263-1,543; and GH¢ 1,544+ (the exchange rate in 2010 was US$ 1= GH¢ 1.45). For rural-urban dichotomy, the GSS (2002) in the 2000 Population and Housing Census defines a rural area as any place with a population of less than 5,000 people while an urban area is any place with more than 5,000 people. Therefore Kumasi (1,170,270) and Cape Coast (82,291) were urban while Boamang (2,436) and Jukwa (4,602) were rural at the time of the study. Preschool experience was measured by asking the pupils whether they attended nursery/kindergarten and the names of the programmes and were validated by responses from parents. Teachers assisted in classifying these kindergartens into public and private.

Processing and Analysis of Data

Pupils' drawings (DMT) were assessed by researchers who received training to evaluate the drawings using the test manual provided by Harris (1963). The raw scores were converted into standardized scores using the chronological age and raw score criterion. The manual provides different conversion tables for boys and girls. The SPSS version 16 was used to analyze data after

careful coding and processing of scores. Descriptive statistics namely: frequencies and means were used to describe the profile of the pupils. The following inferential statistical techniques were used to analyze the data: t-test was used to explore differences in mean scores for children from very affluent and less affluent homes; two-way analysis of variance was used to explore differences in mean scores for pupils from the eight (8) schools; and Chi-square test was used to explore relationships between access and type of preschool experience and pupils' intellectual maturity across the different socio-economic levels.

Results

Sex-Age Distribution of Pupils

There were 863 pupils studied and out of this number, 456 (52.8%) were boys while 407 (47.2%) were girls. Within the regions, 451 of the pupils were from the Central Region while 412 came from the Ashanti Region. Of the 451 pupils from the Central Region, 247 (54.8%) were boys while 204 (45.2%) were girls. Similarly, out of the 412 pupils from the Ashanti Region, 209 (50.7%) were boys and 203 (49.3%) were girls. The figures compared only fairly to the primary enrolment rates for the regions: for the Central Region pupils (73.0% for males and 72.3% for females) and for the Ashanti Region (78.9% for males and 79.0% for females) (GSS, 2003). The ages of the pupils were distributed as follows: 327 (37.9%) were aged up to 8 years; 413 (47.9%) were aged between 9 and 10 years; and 123 (14.2%) were aged 11 years and above. The Pupils were relatively younger (*M*= 9.08 yrs, *SD*=1.52). Within the regions, 176 (39.0%) out of the 451 pupils from the Central Region were aged up to 8 years; 219 (48.6%) were aged between 9 and 10 years; and 56 (12.4%) were aged 11 years and above. On the other hand, out of the 412 pupils from the Ashanti Region, 151 (36.7%) were aged up to 8 years; 194 (47.0%) were aged between 9 and 10 years; and 67 were aged 11 years and above. The Ashanti Region pupils look relatively older (M=9.20 yrs, *SD*=1.60) than their Central Region counterparts (*M*= 9.01 yrs, *SD*=1.50). Again, the rural pupils were relatively older (*M*=9.27 yrs, *SD*=1.67) than their urban counterparts (*M*=8.94 yrs, *SD*=1.38).

Table 1. Sex-age distribution of pupils by region (n=863)

		Region		
Sex	Age Group	Central (%)	Ashanti (%)	Total (%)
Boy	<8	93 (37.7)	80 (38.3)	173 (37.9)
(*n*=456)	9-10	120 (48.6)	96 (45.9)	216 (47.4)
	11+	34 (13.8)	33 (15.8)	67 (14.7)
Subtotal		247 (100)	209 (100)	456 (100)
Girl	<8	83 (40.7)	71 (35.0)	154 (37.8)
(*n*=407)	9-10	99 (48.5)	98 (48.3)	197 (48.4)
	11+	22 (10.8)	34 (16.7)	56 (13.8)
Subtotal		204 (100)	203 (100)	407 (100)
Total		451	412	863

Pupils' Spatial Location

The majority of the pupils lived in urban centers: 513 (59.4%) were from the urban centers compared with 350 (40.6%) from the rural communities. Within the regions, it was observed that 239 (53.0%) of the 451 pupils from the Central Region came from urban Cape Coast while 212 (47.0%) came from rural Jukwa. Similarly, out of the 412 pupils from the Ashanti Region, 274 (66.5%) lived in urban Kumasi while 138 (33.5%) came from rural Boamang. It is not surprising that larger-class sizes were found in urban centers given their high populations.

Category of School attended by Pupils

The data showed that majority of the pupils attend public schools. Of the 863 pupils studied, 501 (58.1%) attend public basic schools compared with 362 (41.9%) who attended private basic schools. Within regions, 252 (55.9%) of the 451 pupils from Central Region attended public basic schools while 199 (44.1%) attended private basic schools. Similarly, 249 (60.4%) out of the 412 pupils in the Ashanti Region attended public basic schools compared with 163 (39.6%) who attended private basic schools. Again, relating category of school to nature of locality (rural or urban), it was observed that 281 (54.8%) of the 531 urban pupils attended public schools while 232 (45.2%) attended private schools. Similarly, 220 (62.9%) out of the 350 pupils in the rural areas attended public schools compared with 130 (37.1%) who attended private schools. Thus although attendance in public schools was generally high, it was rural pupils more than urban pupils who attended public schools.

Pupils' Socio-Economic Status

Information on their socio-economic background was available for 673 (77.9%) out of the 863 pupils. Of this 673, 385 (57.2%) came from male-headed households while 288 (42.8%) came from female-headed households. Parental educational level varied: 305 (45.3%) had basic; 118 (17.5%) had secondary; 124 (18.5%) held tertiary or professional qualification. However, 126 (18.7%) said they have not had any formal education. A diverse number of occupations were reported by parents or guardians. Several occupations were stated by parents including farming (25.0%); teaching (9.4%); civil servant (5.1%); artisanship (5.2%); driving (4.6%); technician (4.3%); banking (1.2%); lecturing (0.7%); and self-employment (44.1%) with just a handful being unemployed (0.4%). More than half (about 56%) of the urban parents was self-employed compared with their rural counterparts where a greater percentage (about 55.0%) was farmers. The mean number of children of school age in a household was 3.4 (*SD*=1.50) but there were more school-aged children in the household of the rural pupils (*M*= 3.6; *SD*=1.62) than their urban counterparts (*M*= 3.2; *SD*=1.40) yet slightly more school-aged children in the households of the rural pupils (*M*= 3.1; *SD*=1.40) attended school than their counterparts in the urban centers (*M*= 3.0; *SD*=1.25).

Pupils' Preschool Experience and Intellectual Abilities across School Categories

The Draw-a-Man Test (DMT), which measured pupils' intellectual abilities, uses a mean standard measure of 100 and a fixed standard deviation at 15 points. Theoretically, Harris (1963 p.89) argues that roughly 68 percent of children at each age should score between 85 and 115, and 99.8% should score between 55 and 145. In this study, despite all pupils scoring between the 55 and 145 marks as predicted by Harris (1963), only a little over 58 pupils scored between 82 and 115 (which is quite below the theoretical expectation). Indeed, 180 pupils scored 73 points or lower, 183 pupils scored between 74 and 81 points, 187 pupils scored between 82 and 90 points, 146 pupils scored between 91 and 100 points and 167 pupils scored 101 points and beyond. Generally, the mean score of the pupils on the DMT (*M*=87.4, *SD*=17.03) was below the theoretical average (*M*=100, *SD*=.15). The mean

scores for some key variables were as follows: Regarding sex of pupils, the mean score for boys was 89.60 (*SD*=16.6) and that of girls was 84.9 (*SD*=17.15). Regarding grade of pupils, the mean score for grade 2 was 87.30 (*SD*=17.30); the mean score for grade 3 was 89.50 (*SD*=17.20); and that of grade 4 was 85.3 (*SD*=16.30). The mean scores for category of school were 83.12 (*SD*=15.04) for public schools and 93.3 (*SD*=17.9) for private schools. Across localities, the mean scores were 94.30 (*SD*=16.80) for urban pupils and 77.30 (*SD*=11.43) for the rural pupils. For the regions, the mean scores were 82.90 (*SD*=14.20) for the Central Region and 92.32 (*SD*=18.50) for the Ashanti Region. For preschool experience, the mean scores were 87.71 (*SD*=16.93) for pupils with preschool experience and 81.20 (*SD*=17.82) for pupils without preschool experience.

Given that the mean score of (*M*=87.4, *SD*=17.03) for the pupils in the DMT was below the theoretical average (*M*=100, *SD*=.15), their intellectual maturity across school type (public or private) was examined. In the public schools, only 12% of the pupils scored beyond the theoretical average; over half (50%) of the public school pupils scored below 82 points compared with just about a quarter (25.2%) scoring beyond 90 points. In contrast, more than quarter (about 30%) of the private school pupils scored beyond the theoretical; the bulk of them (over 36%) scored beyond 90 points with just about 30 percent scoring 82 points or below. Thus, although majority of the pupils scored below the theoretical average, the pupils from the private schools showed higher intellectual maturity compared with their counterparts from the public schools. The chi-square (χ^2) test of significance found statistically significant difference in intellectual maturity scores between pupils from the public and private schools (χ^2=74.362, *df*=4 *n*=863, *p*<.001). The strength of the relationship was moderate (30%) (Cramer's V=.294, *p*<.001). This implies that the private school pupils held higher intellectual abilities than their public school counterparts.

Intellectual Maturity across Localities

Comparing locality and pupils' scores in the DMT revealed interesting differences with more than 30 percent of the urban pupils scored beyond the theoretical average (see Table 2). Over half (52.6%) of the pupils in urban schools scoring 90 points or beyond compared with those who scored 82 points and below (about 23%). In contrast, the majority of the pupils in the rural areas (over 70%) scored below 82 points compared with just a handful (about 13%) scoring 90 points or beyond. Thus the urban pupils, on average, held higher intellectual maturity than rural pupils.

Table 2. Pupils' intellectual maturity by type of locality (*n*=863)

	Type of Locality		
DMT Score (%)	Urban (%)	Rural (%)	Total (%)
<73	40 (7.8)	140 (40.0)	180 (20.9)
74-81	77 (15.0)	106 (30.3)	183 (21.2)
82-90	126 (24.6)	61 (17.4)	187 (21.7)
91-100	109 (21.2)	37 (10.6)	146 (16.9)
101+	161 (31.4)	6 (1.6)	167 (19.4)
Total	513 (100)	350 (100)	863 (100)

The differences were statistically significant from the chi-square (χ^2) test exploring the relationship between intellectual abilities of urban and rural pupils (χ^2=239.885, *df*=4 *n*=863, *p*<.001). The strength of the relationship was strong (53%) (Cramer's V=.527, *p*<.001). This implies that the urban pupils tend to possess higher intellectual maturity than the rural pupils.

From a regional perspective, however, only a handful of the pupils in the Central Region scored beyond the theoretical average. Again, whereas over half (about 52%) of the pupils scored below 82 points, only about a quarter (25%) scored 90 points or beyond. Conversely, more than a quarter (30.3%) of the pupils in the Ashanti Region scored beyond the theoretical mean. Furthermore, although a little over a quarter (about 32%) of the pupils scored below 82 points, almost half (about 49%) scored 91 points or beyond. The impression that the pupils from the Ashanti Region possess higher intellectual abilities than their colleagues from the Central Region reached statistical significance with the chi-square (χ^2) test of the intellectual ability of pupils from the Central Region and Ashanti Regions (χ^2=72.052, *df*=4 *n*=863, *p*<.001). The strength of the relationship was moderate (30%) (Cramer's V=.289, *p*<.001).

Preschool Experience and Pupils' Intellectual Maturity

Interesting to this study is the relationship between preschool experience and intellectual maturity of pupils given the stimulating environment provided by preschool programmes. It was not very surprising that the intellectual maturity of pupils with preschool experience was high.

Table 3. Preschool experience and pupils' intellectual maturity (*n*=863)

	Preschool Experience		
DMT Score (%)	Yes (%)	No (%)	Total (%)
<73	166 (20.3)	14 (31.8)	180 (20.9)
74-81	167 (20.4)	16 (36.4)	183 (21.2)
82-90	182 (22.2)	5 (11.4)	187 (21.7)
91-100	143 (17.5)	3 (6.8)	146 (16.9)
101+	161 (19.7)	6 (13.6)	167 (19.4)
Total	819 (100)	44 (100)	863 (100)

As shown in Table 3, about a fifth (almost 20%) of the pupils with preschool experience, scored beyond the theoretical average of (*M*=100, *SD*=.15). Two-fifth (41%) scored below 82 points while over a quarter (about 38%) scored beyond 91 points. In contrast, only few (about 14%) of the pupils with no preschool experience scored beyond the theoretical average. Majority of them (over 68%) scored below 82 points while a fifth of them (20.4%) scored 91 points or beyond. The chi-square (χ^2) test found a statistically significant relationship between the intellectual ability of pupils with preschool experience and without it (χ^2=13.545, *df*=4 *n*=863, *p*<.01). The strength of the relationship was though small (13%) (Cramer's V=.125, *p*<.01). Thus pupils with preschool experience had a little more intellectual maturity compared with those without preschool experience.

Category of Preschool attended and Intellectual Maturity of Pupils

Given the differences in intellectual abilities even for pupils with preschool experience, the different types of preschool experience (public and private) were analyzed with the DMT scores (see Table 4). Of the 367 pupils who attended private preschool, just a handful (11%) scored beyond the theoretical mean of 100 (*SD*=.15). The majority (over 55%) scored 82 points or below, while a little over a quarter (25.4%) scored 91 points or beyond. In contrast, of the 452 pupils who attended public preschools, over a quarter (26.3%) scored beyond the theoretical average. Again, about half (47%) of the pupils scored 91 points and beyond although over a quarter (about 30%) scored below 81 points. It is thus observed that pupils who experienced private preschool education held somewhat higher intellectual abilities than their counterparts with public preschool experience. The chi-square (χ^2) test of significance found a statistically significant difference between the category of preschool pupils attended and their intellectual ability (χ^2=69.34, *df*=4 *n*=819, *p*<.001). The strength of the relationship was moderate (30%) (Cramer's V=.291, *p*<.001) and thus implying that pupils with private preschool experience have slightly higher intellectual abilities than pupils with public preschool experience.

Table 4. Type of preschool attended and pupils' intellectual maturity (*n*=863)

	Type of Preschool Attended		
DMT Score (%)	Private (%)	Public (%)	Total (%)
<73	110 (30.0)	56 (12.4)	166 (20.3)
74-81	93 (25.3)	74 (16.4)	167 (20.4)
82-90	72 (19.6)	110 (24.3)	182 (22.1)
91-100	50 (13.6)	93 (20.6)	143 (17.5)
101+	42 (11.4)	119 (26.3)	161 (19.7)
Total	367 (100)	452 (100)	819 (100)

Socio-Economic Status and Intellectual Maturity of Pupils

Against the backdrop of differences in intellectual maturity between pupils with public and private preschool experiences, the relationship between socio-economic status (parental income levels) and intellectual maturity was explored (see Table 5). Of the 485 pupils in the low income category, less than one-fifth (about 16%) scored beyond the theoretical expectation (*M*=100, *SD*=.15). Almost half (about 47%) of the pupils scored below 82 points while a third (about 33%) scored 91 points or beyond.

Table 5. Parental income level and pupils' intellectual maturity (*n*=863)

	Mean Annual Income (GH¢)			
DMT Score (%)	1-1,097 (%)	1,098-1,262 (%)	1,263-1,544 (%)	Total (%)
<73	124 (25.6)	22 (17.2)	3 (5.0)	149 (22.1)
74-81	105 (21.6)	15 (11.7)	17 (28.3)	137 (20.4)
82-90	99 (20.4)	27 (21.1)	12 (20.0)	138 (20.5)
91 -100	81 (16.7)	19 (14.8)	11 (18.4)	111 (16.5)
101+	76 (15.7)	45 (35.2)	17 (28.3)	138 (20.5)
Total	485 (100)	128 (100)	60 (100)	673 (100)

Note: 2010 exchange rate; US$ 1= GH¢ 1.45

In contrast, out of the 128 in the middle income category, more than a third (35%) scored beyond the theoretical average. Over half (50%) scored 91 points or beyond with just over a quarter (about 30%) scoring 82 points or below. Of the 60 pupils in the high income category, over a quarter (about 28%) scored beyond the theoretical mean. Again, more than a third (about 33%) scored 82 points or below and almost half (about 47%) scored 91 points or beyond. On the whole therefore, about one-fifth (about 21%) scored beyond the theoretical average in the DMT but there were more pupils in the middle and high income categories with higher scores than those from the low income categories. The chi-square (χ^2) testing the relationship between annual income of parents and pupils' intellectual maturity was statistically significant (χ^2=40.018, *df*=8 *n*=673, *p*<.001) although the strength of the relationship was small (24%) (Cramer's V=.244, *p*<.001). It suggests that pupils from affluent backgrounds tend to have slightly more intellectual abilities than their colleagues from less affluent backgrounds.

A robust technique using the two-way between-groups analysis of variance exploring the impact of pupil's preschool experience and grade on their intellectual maturity (using the DMT standard scores) found pupils with preschool experience have higher intellectual abilities than those without it irrespective of the pupils' grade:

Pupils were divided into three groups according to their grades (Group1: Grade 2; Group 2: Grade 3; and Group 3: Grade 4). There was a statistically significant main effect for preschool experience (*M*=87.71, *SD*=16.92) and no preschool experience [(*M*=81.20, *SD*=17.82) *f*(1, 857)=4.23, *p*<.05]: However, the effect size was small (partial eta squared=.005). The main effect for Grade of pupil (*f* (2, 857) =1.99, *p*=.137) and interaction effect (2, 857) =.899, *p*=.407) did not reach any statistical significance.

Discussion

This study has explored the factors influencing access to preschool education and has attempted to explain the factors accounting for the differences in intellectual abilities of pupils with preschool experience and those without it. It was observed that access to preschool education is generally high and that an overwhelming majority of the pupils in basic schools have had preschool experience. Again, the findings revealed that the nature of locality (whether urban or rural) does not inhibit

pupils' access to preschool programmes. An overwhelming majority of the pupils in both rural areas and urban centers had experienced preschool education. It is worth noting that Government policy in 2002 that incorporated preschool education into the mainstream primary education might have mainly accounted for the increased enrolment at the preschool level. It was interesting to observe that while pupils from all socio-economic levels attended preschool irrespective of parental income and educational levels, those from affluent socio-economic backgrounds mostly attended private preschools compared with those from less affluent socio-economic backgrounds who mostly attended public preschools. The results again suggested that although with preschool experience showed superior intellectual maturity than those without preschool experience, pupils who attended private preschools show higher intellectual maturity than those who attended public preschools.

Conclusion

The findings in this study generally support the arguments that preschool programmes could potentially unlock the multiple intelligences and talents in children (Sternberg, 1999; Feuerstein, 2000). Indeed, the study has shown that children who experienced preschool education have well-improved intellectual abilities to use at the basic school level. The results therefore bear out the following conclusions:

- There is no relationship between locality and access to preschool. Children in all locations (urban or rural) could equally access preschool education.
- There is no relationship between socio-economic status and access to preschool education. Children of all socio-economic levels in the study areas have equal access to preschool education.
- There is a positive relationship between socio-economic status and the type of preschool experience a child receives. The type of preschool education (private or public) is contingent on a child's socio-economic background in the study areas.
- There is a positive relationship between preschool experience and intellectual maturity. Children with preschool experience show intellectual maturity than those without preschool experience.

Recommendations

Based on the findings, the following recommendations are made. First, preschool intervention programmes by the education ministry and other agencies should target pupils from less affluent socio-economic backgrounds and rural preschoolers who lag behind their more affluent urban counterparts in intellectual abilities. In particular, they should improve upon preschool facilities where they are in decrepit conditions and to provide adequate teaching and learning materials in preschools where they are lacking. Second, findings from this study show that pupils from more affluent backgrounds held higher intellectual abilities than their less affluent counterparts. It is suggested therefore that preschool intervention programmes and training of caregivers should prioritize supportive family strategies especially for the less affluent pupils in terms of family routines and financial support throughout the preschool period and beyond. Third, for the purposes of generalizing the findings of this study in future, a more extensive study that examines the

preschool systems in other regions would be required. A study of this nature should attempt to explain why some pupils from less affluent homes access private preschools where financial demands are rather high. Again, such a study should delve more into the relationship between preschool education and academic performance. Fourth, the DMT measured only the intellectual maturity of children i.e. their development of conceptual abilities to engage in abstract thinking. In future, other measures of intelligence should be incorporated to check for local-specific factors and other outcomes from pupils' preschool experiences.

References

Agyeman, D.K. (1986). *Sociology of education for African students.* Accra: Blackmask Press.

Barnett, W. S. (1992). Benefits of compensatory preschool education. *Journal of Human Resource, 27* (2), 279-312. http://dx.doi.org/10.2307/145736

Bredekamp, S., & Copple, C. (Eds.) (1997). *Developmentally appropriate practice in early childhood programmes*. Washington, DC: National Association for the Education of Young Children.

Ceci, S. J. & Williams, W.M. (1997). Schooling, intelligence and income. *American Psychologist, 52*, 1051-1058. http://dx.doi.org/10.1037/0003-066X.52.10.1051

Cleghorn, A., & Prochner, L. (2003). Contrasting views of early childhood education: Examples from rural and urban settings in Zimbabwe and India. *Journal of Early Childhood Research, 1* (2), 131-153. http://dx.doi.org/10.1177/1476718X030012001

Cornell, S. & Hartmann, D. (1998). *Ethnicity and race: Making identities in a changing world*. Thousand Oaks, CA: Pine Forge Press.

Feuerstein, R. (1980). *Instrumental enrichment*. Baltimore, MD: University Park Press.

Feuerstein, R. (2000). Mediated learning experience, instrumental enrichment and the learning propensity assessment device. In ICDL (Ed.), *Clinical practice guidelines: Redefining the standards of care for infants, children and families with special needs* (pp. 557-578). Washington, DC: Interdisciplinary Council on Developmental and Learning Disorders Press.

Feuerstein, R., Rand, Y. & Rynders, J. E. (1988). *Don't accept me as I am: Helping "retarded" people to excel*. New York: Plenum Press.

Forojalla, S. B. (1993). *Educational planning for development*. London: Macmillan Press Ltd.

Gardner, H. (1999, February 1). Who owns intelligence? *Atlantic Monthly*, pp. 67-76.

Ghana Statistical Service (GSS) (2002). *2000 population and housing census: Summary reports*. Accra: Ghana Statistical Services.

Ghana Statistical Service (GSS) (2003). *2003 Core welfare indicators questionnaire survey, Ghana.* Accra: Ghana Statistical Services.

Ghana Statistical Service (GSS) (2008). *Ghana living standards survey: Report of the fifth round (GLSS 5).* Accra: Ghana Statistical Services.

Government of Ghana (GoG). (2002). *Meeting the challenges of education in the 21st century*. Review Report. Accra: Government of Ghana.

Grantham-McGregor, S. (1983). Development of intervention strategies for young children in Jamaica. In IDRC (Ed.), *Preventing school failure: The relationship between preschool and primary education* (pp .13-207). Ottawa: International Development Research Center.

Harris, D. (1963). *Children's drawings as a measure of intellectual maturity*. New York: Harcourt Brace.

Hunt, M. (1982). *The universe*. New York: Simon & Schuster.

King, K. (1983). Conceptual issues and early primary education. In IDRC (Ed.), *Preventing school failure: The relationship between preschool and primary education* (pp. 136-140.). Ottawa: International Development Research Center.

Lee, J. S. (2006). Preschool teachers' shared beliefs about appropriate pedagogy for 4-year Olds. *Early Childhood Education Journal, 33* (6), 434-441. http://dx.doi.org/10.1007/s10643-006-0059-1

Ministry of Education (MoE) (2010). *Education sector performance report*. Accra: Ministry of Education. http://www.idpfoundation.org/Ghana%20MoE%20Ed%20Performance%20Report%202010.pdf Accessed 19 December 2014.

Myers, R. (1992). *The twelve who survive: Strengthening programmes of early childhood development in the Third World*. London: Routledge.

Ofosu-Appiah, B. (2008, February 20). *Refocusing the aims and objectives of preschool (nursery and kindergarten) education in Ghana.* http://www.modernghana.com/news/158139/1/refocusing-the-aims-and-objectives-of-pre-school-n.html Accessed 10 October 2010.

Pozner, P. (1983). Relationship between preschool education and first-grade in Argentina. In IDRC (Ed.), *Preventing school failure: The relationship between preschool and primary education* (pp. 74-85). Ottawa, Canada: International Development Research Center.

Reynolds, A.J., Temple, J. A., Robertson, D. L., & Manri, E. A. (2001). Long term effects of an early childhood intervention on educational achievement and juvenile arrest. *Journal of the American Medical Association, 285,* 2339-2345. http://dx.doi.org/10.1001/jama.285.18.2339

Scar, S. (1984). What's a parent to do? A conversation with E. Hall. *Psychology Today*, 58-63.

Sternberg, R. (1999). The theory of successful intelligence. *Review of General Psychology, 3*, 292-316. http://dx.doi.org/10.1037/1089-2680.3.4.292

Tashkkori, A., Haghighat, S., & Yousefi, F. (1988). Effects of preschool education on intelligence and achievement of a group of Iranian elementary school children. *International Review of Education, 34* (4), 499-508.

Tonah, S. (2009). The unending cycle of education reforms in Ghana. *Journal of Education Research in Africa, 1*, 45-52.

UNESCO (2000). *Education for all: Year 2000 assessment*. Paris: UNESCO.

UNESCO (2002). *Education for all: Is the world on track?* (EFA Global Monitoring Report 2002). Paris: UNESCO

UNESCO (2006). *Strong foundations: Early childhood care and education (ECCE) programmes* (Country profile commissioned for EFA global monitoring report 2007*)*. Geneva: UNESCO International Bureau of Education (IBE).

UNESCO Institute for statistics (2008). Data Center, http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx,January2008 Accessed 20 September 2010.

UNICEF (2008). *Education statistics: Ghana*. New York: UNICEF: Division of Policy and Practice, Statistics and Monitoring Section. Retrieved from http://www.childinfo.org/files/WCAR_Ghana.pdf Accessed 20 September 2010.

Zigler, E. & Styfco, S. J. (2001). Extended childhood intervention prepared for schools and beyond. *Journal of the American Medical Association, 285*, 2378-2380. http://dx.doi.org/10.1001/jama.285.18.2378