HOME LITERACY ENVIRONMENT AND SOCIO-ECONOMIC STATUS AS PREDICTORS OF EXECUTIVE FUNCTIONING AMONG SELECTED 4TH GRADERS: KITWE, ZAMBIA

BY

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This dissertation is submitted to the University of Zambia in partial fulfilment of the requirements of the Degree of Master of Education in Educational Psychology

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DECLARATION

I**, Laston Mutambo**, hereby solemnly declare that, this dissertation represents my work and that the works of others have been duly acknowledged. I further declare that this dissertation has never been submitted for the award of any academic paper at this University or any other University.

Signature ………………………………

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CERTIFICATE OF APPROVAL

This dissertation **by Laston Mutambo** is approved as partial fulfilment of the requirements for the award of the Degree of Master of Education in Educational Psychology of the University of Zambia.

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ABSTRACT

This study assessed Home Literacy Environment and Socioeconomic Status as predictors of Executive Functioning among selected 4th graders in Kitwe District, Zambia. The objectives of the study included: an assessment of executive functioning skills among fourth graders in Kitwe District, Zambia; an assessment of Home Literacy Environment and SES among fourth graders in Kitwe District,; to determine the relationship between Home Literacy, SES and Executive Functions; lastly, to determine a stronger predictor of EF between Home Literacy Environment and SES among fourth graders in government schools in Kitwe, Zambia.

The study was quantitative in nature and employed quasi experimental design. The sample size was 116 fourth graders and an equivalent number of parents and /or guardians. Data was obtained using Behavioral Rating Inventory of Executive Functions (BRIEF 2). Examples of EF tasks under BRIEF are Inhibition, Self-Monitor, Shift, Emotional Control, Initiate and Working Memory. Others are Plan/Organize Task Monitor and Organization of Materials. In addition, the Delis-Kaplan Executive Function System (D. KEFS), Digit Span Test, Pencil Tapping and Pattern Reasoning Test (Kauffman Test Battery) were used to collect data. Biographical Data Form was used to generate information on home possession index. This form was used to collect data on SES and the HLQ was used to collect data on HLE. Data was analyzed quantitatively using STATA Version 14 to perform correlations and linear regressions.

Findings of the study revealed that: all fourth graders 116 (100%) performed better on subjective measures of Executive Function; 80 (69%) learners were coming from homes that were exposed to literacy, while 36 (31%) were coming from homes that were not exposed to literacy. Furthermore, 51 (44%) were coming from medium Socioeconomic Status whereas 39 (34%) were coming from low Socioeconomic Status and 26 (22%) were coming from high Socioeconomic Status. The study further established a positive relationship between Home Literacy Environment, SES and objective measures of Executive Functions ($p < 0.001$). The study results demonstrated that there is no statistically significant relationship between Home Literacy and subjective measures of EF. The study also revealed that SES is a stronger predictor of EF than Home Literacy Environment.

Based on the research findings, the study recommended that colleges of education, schools as well as parents should come up with practices that promote the development of Executive Functions both at home and school. Schools should ensure that they procure stimulating and other enriching objects that are lacking in schools.

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ACRONMYS

EF	Executive Functions
D.KEFS	Delis Kaplan Executive Function System
QAC	Quality Assurance Control.
USA	United States of America
CAPI	Computer Personal Interviewing
HLE	Home Literacy Environment
KCSE	Kenya Certificate of Secondary Education
COTAN	Dutch Test Evaluation Committee
RESUZ	Reading Support for Zambian Children
ART	Author Recognition Test
BCRT	Book Cover Recognition Test
RAKIT	Amsterdam Children's Intelligence Test
NLSY	National Longitudinal Study of Youths
BRIEF	Behavioral Rating Inventory for Executive Functions.
SPSS	Statistical Package for Social Sciences.
SD	Standard Deviation
SES	Socio-Economic Status
LMICS	Lower Middle Income Countries
GUS	Growing Up in Scotland
GECTS	Global Executive Composite T Score
WM	Working Memory

CHAPTER ONE: INTRODUCTION

1.1 Overview

This chapter looks at the background of the study, statement of the problem, purpose of the study, research objectives and hypothesis. The chapter also presents the significance of the study, delimitations, limitations, theoretical framework as well as operational definition of terms.

1.2 Background of the Study

Home environment can affect executive function development either positively or negatively. Available evidence shows that poor Executive Functions can lead to impairments in academic achievement, emotional functioning, and occupational outcome (Alloway & Alloway, 2010; Miller, Nevado- Montenegro & Hinshaw, 2012; Synder, 2013). Executive Function skills are the attention-regulation skills that make it possible to sustain attention, keep goals and information in mind, refrain from responding immediately, resist distraction, tolerate frustration, consider the consequences of different behaviors, reflect on past experiences, and plan for the future (Zelazo, Blair & Willoughby, 2016). Executive Functions consist of the following core competencies: (1) working memory, the ability to hold and manipulate complex information in the mind (Smith & Jonides, 1997; Baddeley, 1998), (2) inhibition (or inhibitory control), the ability to delay a well-learned prepotent response for the purposes of a more appropriate response (Barkley, 2001); and (3) cognitive flexibility, the capacity to adapt behavior quickly and flexibly to changing situations (Davidson, Amso, Anderson, & Diamond, 2006) .

 Studies have also shown that an enriching Home Environment mediates Executive Function development (Dilworth-Bart, Khurshid & Vandell, 2007; Sarsour, Sheridan, Jutte, Nuru-Peter, Hinshaw & Boyce, 2011). This explains why children from different homes perform differently on executive functions tasks. Studies from Lower Middle Income Countries (Zambia and Argentina) also show the mediating effect of early cognitive stimulation in the home (McCoy, Zuilkowski, & Fink, 2015).

Several studies have found that different aspects of the early family environment influence the development of executive function (Hook, Lawson and Farah, 2013; Lawson, Hook and Farah, 2017; John, Kibbe, & Tarullo, 2018). For example, the quality of parent- child interactions,

particularly during infancy, has been found to mediate socioeconomic status effects on executive function at 36 months of age (Rhodes, Greenberg, Lanza, & Blair, 2011).

It has been reported that parents who are engaged, attuned to the child's needs, emotionally supportive, cognitively stimulating, and who foster their child's development in a warm manner are thought to promote the self-regulated thought and behavior that define executive functioning in addition to providing a positive and safe environment for children to practice, and master these skills (Carlson, 2009). For example, Bernier and colleagues (2010) found greater maternal sensitivity, use of mental terms, and support for autonomy at 12 – 15 months (assessed through global observations, a free play, and a puzzle task) predicted better performance on executive functioning tasks 6 to 12 months later. Similarly, Hammond and colleagues (2012) found that greater maternal sensitive and supportive scaffolding during a challenging puzzle with 3 year olds was linked with subsequent increases in executive functioning .In one of the only related studies involving fathers, Bernier and colleagues (2012) found that a global parenting composite that combined the quality of both mothers' and fathers' interactions between 12 and 18 months (assessed through global observations, a free play, and a puzzle task for mothers and a free play task for fathers) predicted children's executive functioning at age 3, with higher quality parenting linked with better performance on executive functioning tasks.

Although the development of the brain is important for the development of executive function especially in periods of rapid growth, this development is highly sensitive to influences from environmental factors such as the home (Anderson, Jacobs and Anderson, 2008). Yet, researchers have only recently began to focus on the impact of children's social environment on Executive Functions development (Hughes, 2011). It is important that effort should be made towards understanding the home factors that are key towards the development of executive functions to promote healthy development of all children. An understanding of their interrelationships may have the potential to inform interventions designed to reduce disparities in executive function development (Hook, Lawson, and Farah, 2013 Hook et al., 2013).

Emerging research highlights the importance of social interactions in the development of executive functions, suggesting relationships with caregivers to provide the opportunities and support needed for these developing skills (Carlson, 2009; Bernier, Carson, Deschenes,Matte-Gagne, 2012).Surprisingly, research on the family factors contributing to individual differences in early

executive functions remains scarce (Bernier et al., 2012).The scarcity of studies on executive functions have equally been indicated in the Zambian context (Mwanza- Kabaghe, 2015).

1.3 Statement of the problem

During the last 150 years, great and critical advancements have been made to understanding how people set goals and follow them through (Goldstein, Naglieri, Princiotta & Otero, 2014). It has now been well documented that to function effectively, the brain requires an executive function system. This EF system controls and manages other systems, abilities and processes (Carlson, 2009).

Although significant and critical advancements have been made on executive functions, empirical evidence on family factors contributing to individual differences in early executive functioning remains scarce (Bernier, et al, 2012). The picture is the same on the Zambian context. Although studies have been done on Executive Functioning (Mwanza- Kabaghe, 2015, Mubanga, 2015; Kalumba, 2017), none of these studies have looked at the role of Home Literacy Environment and Socio-economic Status on Executive Functioning among the 4th graders in Kitwe District, a knowledge gap that this study intends to address.

1.4 Purpose of the study

The purpose of this study was to assess whether Home Literacy Environment and Socio-economic Status predict Executive Functions among fourth graders in selected government primary schools in Kitwe District.

1.5 Objectives

1. To assess Executive Function skills among fourth graders in government schools in Kitwe District, Zambia.
2. To assess Home Literacy Environment and SES among fourth graders in government schools in Kitwe District, Zambia
3. To determine the relationship between Home Literacy Environment, SES and Executive Functions among fourth graders in government schools in Kitwe District, Zambia.
4. To determine a stronger predictor of EF between Home Literacy Environment and SES among fourth graders in government schools in Kitwe District, Zambia.

1.6 Hypotheses

1.6.1 Null Hypotheses

1. There is no relationship between Home Literacy Environment and Executive Functions.
2. There is no relationship between Socioeconomic Status and Executive Functions.
3. SES is a stronger predictor of EF than HLE.

Alternative Hypotheses

1. There is relationship between Home Literacy Environment and Executive Functions.
2. There is relationship between Socioeconomic Status and Executive Functions.
3. SES is a stronger predictor of EF than HLE

1.6.2 Significance of the study

It was hoped that this study may provide understanding on the role of Home Literacy Environment and SES on EF. It was assumed that if this is understood, the home factors that impact negatively on the development of Executive Functions may be mitigated, thus promoting holistic development of a child. In addition, it was also envisaged that the findings of this study may help to inform interventions by policy makers, especially the Ministry of General Education and other stake holders to come up with practices aimed at developing Executive Functions with minimal negative effects emanating from the homes where children come from. Furthermore, the outcome of this study, may stimulate further research on this topic.

1.7 Delimitation of the study

The study involved six government primary schools in Kitwe District, Zambia.

1.8 Limitation of the study

This study was confined to Kitwe District with unique socio-demographic characteristics; therefore, findings of this study may be generalized with caution considering that Kitwe District may not be a representative of all districts on the Copperbelt.

1.9 Operation Definition of Terms

Home: The dwelling place.

Executive Functions: These are mental abilities that help one to regulate one's behavior.

Parents: Father and mother of a child /children.

Caregivers/Guardians: People who look into the welfare of a child at home other than parents.

Family: Father, mother and children.

Extended family: Father, mother, children, grandparents, uncles, aunties, nieces and nephews.

Peers: One's friends.

Neighbors: People living closely together.

1.10 Theoretical Framework

The study was informed by Urie Bronfenbrenner's (1979) ecological system theory which stipulates that a person's immediate environment which includes the home, neighborhood, church, school, work place, culture and government has an influence on the way a child develops. This theory states that for a child to develop holistically, he must undergo five concentric systems closely connected to each other. These are, micro-system, meso- system, exo-system, macro-system and chronosystem (Donald, Lazarus & Lolwana, 2010). The microsystems include any immediate relationships that the children interact with. These may be family members, peers, and other caregivers. The way the parent's/care givers nurture the child in terms of love and care will have an effect on how the child grows. According to this theory, the more encouraging and nurturing these relationships and places are, the better the child will be able to grow (Donald, Lazarus & Lolwana, 2010).The current study therefore, anchors on Bronfenbrenner's microsystem in that it looks at the child's immediate environment and how it can stimulate the development of EF. The variations on what goes on in the home as regards home literacy and socioeconomic status play a key role to the cognitive development of a child (Steensel 2006). The mesosystem involves interconnections between the family and teachers. The exosystem involves the other people and

places that the child may not interact with often but have a large effect on development, such as parents' work place, extended family members and the neighborhood. Macro systems is the one that includes dominant social and economic structures, values, beliefs as well as practices that influence all other social systems. The chronosystem posits that development over time such as divorce affects the interactions between these systems as well as their influences on the academic and intellectual achievement of children. Furthermore, he posits that for cognitive development to take place there should be links between the home environment and school which in turn promotes, creativity, goal setting, cooperation and many other things including cognitive development and executive functions. It is important therefore, to examine how different Home Literacy Environments and SES affects families to influence Executive Functions in children. This theory sits well in this study; hence it was considered for this research.

1.11 Summary

This chapter started by presenting background information of the study. It also brought to light why there is need for more studies to be done. In addition, the chapter discussed the statement of the problem, purpose of the study, objectives, research questions and significance of the study. Furthermore, the chapter looked at Limitation, delimitation and operation definitions. The next chapter reviews literature related to this study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview

This chapter reviews related literature to this study according to sub themes in line with research objectives which are; 1. Home Factors and Executive Functions. 2. Socio-Economic Factors and Executive Functions. The literature review in general tries to establish if Home Literacy Environment and SES are predictors of Executive Functions among fourth graders.

2.2 Home Factors and Executive Functions

It is worth noting that children are affected in diverse ways according to home environmental factors. Home environmental factors are things such as stimulating activities like play and availability of books. These things can affect the development of EF in children. Once the development of EF is affected it becomes difficult for learners to actualize their dreams.

Stammbach, Hawes and Meredith (2014) did a research on Parenting Influences on Executive Function in Early Childhood in Australia. Participants were aged 2 to 6 years old. The findings in this review indicate that researchers need to understand more fully the role of transactional parent-child dynamics in the early emergence of EF. In addition, the influences of parenting on EF do not operate equally across all children. Interactive effects of this kind may reflect differential susceptibility to environment influences on executive function and warrant investigation in relation to the predictions of models in developmental psychopathology. Demonstrating that parenting variables are associated with individual differences in EF is different from demonstrating that change in a specific parenting variable has a causal effect. Finally, researchers need to characterize more effectively the structure of EF in early childhood.

From the study that was done by Stammbach and his colleagues it can be said that the role of parenting in the development of executive functions cannot be overstated, hence parents need to understand more fully the role of transactional parent child dynamics. The study done by Stammbach and his colleagues focused on parenting influences on executive functions and did not look at other factors such as socioeconomic status. In the light of this, the current study looked at Home Literacy Environment and Socio-economic Status as predictors of executive functions in Kitwe District.

Another study was done by Melhuish (2010) on the Impact of the Home Learning Environment on Child Cognitive Development: Secondary Analysis of Data from 'Growing Up in Scotland'. Growing Up in Scotland was a longitudinal study aimed at tracking the lives of a cohort of Scottish children, from the early years through to childhood and beyond. The study involved 5,217 children aged about 10 months at the time of the first interview (the birth cohort) and a cohort of 2,859 children aged approximately 34 months at the time of the first interview. The first wave of fieldwork began in April 2005. Data was collected by a study interviewer in face-to –face interviews with the child's principal care giver using computer personal interviewing (CAPI). To ensure that respondents were interviewed when their children were approximately the same age, each case was assigned a 'target interview date'.

The findings of this study indicate that while other family factors such as parents' education and socio-economic status are equally important, the extent of home learning activities exert a greater and independent influence on children's cognitive development at three years of age. The results in this study also demonstrate that this interview data within GUS is useful for identifying some key variability. The comparison of over, average, and under-achieving groups indicates that at age 34 months the HLE is effective in differentiating both over and underachieving groups from children achieving as expected, i.e. across the ability range for both Naming Vocabulary and picture similarities. In his study, Melhuish looked at the impact of the Home Learning Environment on child Cognitive Development without determining a stronger predictor of EF between home literacy environment and socioeconomic status. In the light of the foregoing, this study bridged the gap, as it aimed to ascertain if Home Literacy Environment and Socioeconomic Status would predict executive functions in Kitwe District.

It is quite possible that the strong relationship between Home Learning Environment (HLE) and cognitive scores is mediated by some intervening, unmeasured factor. Those parents who answer the questions in a way leading to a high HLE score may have other characteristics that lead their children to have higher cognitive scores. Such unmeasured characteristics might include aspects of parents' behavior or possibly genetic factors. Even if this were so, the HLE would still be an efficient proxy measure of such unmeasured factors. This is to alert readers to the possible need for further research in this area, as the question of possible unmeasured confounding variables cannot yet be answered with existing data (Melhuish, 2010). The study by Melhuish is of

significant importance to the current one in that it provides a clear road map as to what must be undertaken in the current study. Hence, the researcher engaged children from different homes with different demographic characteristics to determine cognitive development of learners from diverse backgrounds. Furthermore, it was important that some intervening, unmeasured factors were thoroughly taken into consideration. The researcher did this by taking care of confounding factors that might alter the outcome of the results such as general intelligence.

Chinyoka & Naidu (2014), did a study on home-based factors that influence the academic performance of the girl child from poverty-stricken households in Masvingo Province in Zimbabwe. The methodology used was qualitative phenomenological design. This study revealed that the girl child's academic performance which includes goal setting is affected by multiple contexts including family, home, neighborhood and school. The study found that family income, and parental level of education, gender, home circumstances, and family size influenced goal setting and academic achievement of girls in secondary schools. The home circumstances of girls from poor backgrounds were observed to be not conducive to learning because of lack of lighting, spending much time on domestic chores, having no desk or table to work from, or not having books at home. The girl learners also did not get basic needs met like food, sanitary pads and school fees. The aforementioned study is insightful to the current study as it has brought out pertinent issues on home-based factors influencing academic performance of girls coming from poverty stricken households. However, the current study took a slightly different dimension by focusing on Home Literacy Environment and Socio-economic Status as predictors of EF among 4th graders in government schools without any form of gender biasness in Kitwe District, Zambia.

In two studies (Burgess, Hecht & Lonigan 2002; Wood, 2002) a broader conceptualization of the HLE was applied for explaining differences in cognitive development in children which eventually leads to children's literacy development. The studies done by Burgress et al (2002), and Wood (2002) were considered because they have a common element which is Home Literacy Environment.   Hence this study provided a good background for the current study. Wood investigated the relation between the HLE and literacy scores of 65 children in the first phase of primary education. Using a parent questionnaire, she collected data on the occurrence of four types of joint parent- child activities: story book reading, letter- based activities, singing and playing language games. On the basis of a cluster analysis, three types of families were identified. The

first, labelled the 'typical group', consisted of families in which children were exposed to a variety of literacy activities. The second cluster, the 'singing group' consisted of families in which parents sang with their child almost every day, but did not engage in other activities. In the third cluster, the 'no activity group', parents and children participated in almost none of the activities. Children in the typical group were shown to have significantly higher scores on vocabulary and reading ability. Moreover, Wood focused only on parent-child activities and did not include questions on other aspects of the HLE, such as parent print exposure. Children may nevertheless, say, they learn about literacy through incidental learning, when observing their parents (or other family members) read and write in various contexts. This may affect the current study in similar ways in that children may attain cognitive development by watching their parents read, this may motivate them to read as well or simply develop interest.

This study is critical to the current one in that for a child to develop literacy skills there must be executive functions, of which the core ones include, working memory, inhibition, and cognitive flexibility. The interpretation of any written symbols require cognitive abilities. Burgess and Wood (2002) looked at Home Literacy Environment and literacy. The current study is unique in that in looked at Home Literacy Environment and Socioeconomic Status as predictors of executive functions in Kitwe, Zambia.

According to Yeung, Linver and Brooks- Gunn (2002) as cited in Chinyoka and Naidu (2013) the poverty stricken parents more often do not have the capacity to buy their children games, toys, books, computers, and other materials that stimulate learning, or to provide better childcare. Furthermore, Home Literacy Environment is also thought to be reflected in the amount of books at home, which may be considered an indication of parent's reading attitude and reading behavior. Sometimes children live in environments that are not safe for outdoor play. All of these difficulties in impoverished communities, considered together with the impact of lower levels of parental education, may contribute in the children having little or no assistance with their homework and less motivation to learn. Those children from humble economic backgrounds are not afforded the same luxuries and opportunities as those from wealthy backgrounds. This is one reason why differences in vocabulary and reading ability are associated with family income. Poor families are faced with the direct as well as the indirect consequences of their economic situation, including the lack of resources, and the stress associated with their problems. Living conditions at home

should be endowed with resources and be enabling to promote learning. At the household level, evidence indicates that girl children from poorer households are generally likely to receive less education. The study by Yeung, Liver and Brooks-Gunn creates a good foundation for the current study in that it provided an insight on what exactly to look at in the home set up. The current study therefore focused on home possession index which included things such as electricity, running water and flushable toilet among others to determine whether a family falls under low, medium or high socioeconomic status. This helped to ascertain the performance of children from different homes on EF tasks.

Although there are similarities between the two studies, the study by Yeung et al (2002) is different from the current one in that they focused on poverty stricken parents and how their children are adversely affected because they cannot access stimulating material resources, but the current one is different in that it looked at Home Literacy Environment and Socioeconomic Status as predictors of EF among fourth graders in government schools in Kitwe District, Zambia. The current study went further to determine the stronger predictor of EF between Home Literacy Environment and Socioeconomic Status which Yeung and his colleagues did not look at.

Another research was done in Kenya (Akeri, 2015) on Home Based Factors Influencing pupils' academic Performance in Public Primary Schools in South Gucha Sub- County, Kisii County Kenya. The purpose of the study was to assess home- based factors influencing academic performance of the pupils in public schools in South Gucha Sub-County, Kisii County Kenya. The attainment of academic goals cannot be realized without executive functions which includes goal setting. Therefore, home based factors can either speed up cognitive development resulting in better academic performance or retard cognitive development resulting into poor academic performance. Hence, it is imperative to interrogate Home Based Factors that contribute to EF development which leads to academic performance. These appear to be the commonalities between the two studies. Akeri's study employed descriptive survey design and a population of 107 public primary schools in South Gucha Sub-County with 214 class seven and eight class teachers, in which 64 class teachers and 640 pupils were selected giving a total of 704 respondents. Purposive sampling was used to select class seven and eight pupils from the population. The study was quantitative in nature. The findings indicated that few parents in South Gucha Sub- County (18.28%) with pupils have secondary education while the rest have no formal education at 22.5

percent, primary education at fifty percent and tertiary education at 2.81 percent The current study is unique in that it endeavored to focus on Home Literacy Environment and Socio-Economic Status as predictors of EF among fourth graders in government schools in Kitwe District, Zambia which Akeri did not look at in his study.

Chansa-Kabali (2014) did a study on, The Acquisition of Early Reading Skills: The Influence of the Home Environment in Lusaka, Zambia. This study was a segment of the bigger study called Reading Support for Zambian Children (RESUZ). The goal of the project was to establish the effectiveness of a literate game called Grapho-Game in improving learner performance in early grade reading. The findings of this study indicate that the family plays a significant role in the children's process of learning to read. The research paradigm used was mixed research. This project was conducted in Lusaka, Zambia's capital city. The researcher randomly selected 42 schools in Lusaka Urban District. Schools located in the district's peri-urban and quasi-rural neighborhoods were excluded. Similarly, schools and units that exclusively served children with special needs were also excluded.

This study was planned in such a way that at least ten percent of the overall participants would be recruited in the study that focused on the role of the family in the acquisition of reading skills. The outcome was that 576 child participants were recruited from the 42 RESUZ schools. Eventually, nine schools out of the 42 RESUZ schools were purposefully selected for the study. The aim of purposeful sampling was to get to children in different SES classes. The selection was dependent on the population density of the area which to some extent determines the SES groups of families.

At the beginning 80 parents were informed, but 72 expressed availability to participate and were engaged in the study. Nevertheless, the sampling strategy of targeting families from the three classes was not achieved. It came to light by observation and parental education and occupation that all families were from low income families. Typically, each of the 72 children represented one family. This means that in this sample, no single family had more than one child in grade one.

The sample size comprised 32 boys (45%) and 40 girls (55%) with a mean age of 7.15 years (*SD* = .65). Parent participants sometimes included other close relatives to the child. Parents were aged between 25 and 61 years old (M = 35.67, *SD* =6.65). In this study, the maternal parents were preferred for participation because they were with the child most of the time. Another reason was that most homes were headed by mothers and other female relatives.

Although there are some commonalities between Chansa-Kabali's study and the current one in that both focused on the role of the home environment in attaining goals, the difference is that in her study she did not look at Home Literacy Environment and Socioeconomic Status as predictors of Executive Functions, but focused on The Acquisition of Early Reading Skills: The Influence of the Home Environment in Lusaka, Zambia. In addition, Chansa-Kabali's study adopted a mixed research approach, whereas the current one was purely quantitative. Hence, the current study is unique in that it specifically looked at Home Literacy Environment and Socioeconomic Status as predictors of executive functioning among fourth graders in government schools in Kitwe District, Zambia.

Another research was done in Netherlands (Boerma, Mol & Jolles, 2017), on "The Role of Home Literacy Environment, Mentalizing, Expressive Verbal Ability, and Print Exposure in Third and Fourth Graders' Reading Comprehension". The instruments that were used to gather data from parents are author recognition test, and number of (children's) books at home. Author Recognition Test (ART) was used to assess parental print exposure. The ART consisted of 60 names: 40 real author names and 20 foils. Parents were asked to tick those names that they recognized as an author name. To establish number of books at home parents were asked to estimate the number of books they owned, as well as how many children's books they had at home, which are assumed to be indicators of their "physical" Home Literacy Environment. For the children Book Cover Recognition Test (BCRT), a print exposure list was used as a proxy for children's reading frequency or reading behavior. Another one was the strange story test which was also used to assess children's mentalizing skills. Standard reading comprehension test were also used to measure standard reading test scores. These tests are administered annually at almost every school in the Netherlands (in January or February). Children's expressive verbal abilities were measured using a subtest of the RAKIT which is the Amsterdam Children's Intelligence Test. The RAKIT is an intelligence test for children ages 4 to 11, consisting of 12 subtests. It is widely used in the Netherlands, as the Dutch Test Evaluation Committee (COTAN) has rated the reliability and criterion validity as "good" and the construct validity as "sufficient." This was a correlational study with 117 children ages 8 to 11. What came to light was both a direct relation between children's Home Literacy Environment and reading comprehension and 2 indirect relations: through children's print exposure and through mentalizing abilities. The findings showed that enhancing children's mentalizing abilities and encouraging them to read books might contribute to their

reading comprehension. Furthermore, parental participation in children's reading activities can contribute to their reading performance, both directly and indirectly.

The study by Boerma and colleagues is important to the current one in that it looked at Home Literacy Environment and aspects of mental abilities among others, which the current study also looked at. It is clear that Home Literacy Environment plays a key role in helping learners develop cognitive skills which in turn creates a fertile ground for learners to develop all these other skills like reading which have also been indicated in their study. Nevertheless, the current study is different in that it specifically focused on Home Literacy Environment and Socioeconomic Status as predictors of executive functions among fourth graders in government schools in Kitwe, Zambia.

Steensel (2006) did a research on Relations between Socio- cultural Factors, the Home Literacy Environment and Children's Literacy Development in the first years of primary education. The outcome indicated that, for grade 1 vocabulary, older family members' personal literacy involvement makes a difference; children whose parents/ older siblings frequently engage in individual literacy activities have significantly higher scores than children whose parents/older siblings do not do much reading or writing for personal purposes, irrespective of children's participation in high priority literacy activities. At the start of the project 116 children and their parents were recruited from 19 primary schools in Tilburg, a medium-sized city in the southern part of Netherlands. In Netherlands, primary school starts when children are 4 years of age, with a two-year kindergarten period. Later on, children start grade one where formal instruction in reading, writing and mathematics starts. The initial sample comprised approximately equal numbers of boys and girls (53.4% were boys). Their mean age was 6.4 years (5.7-7.4 years). Forty –four percent of the children were first borns.

Home SES was based on mother's educational level and varied considerably: 28 mothers (24.1 %) had taken primary education at most, 43 mothers (37.1%) had taken prevocational training or junior secondary education (middle SES). Most of the low SES mothers were from the ethnic minority groups. The relation between ethnicity and educational level was statistically significant ($x^2(2) =21.75$, $P<.001$). During the second period of data collection, when the children were in first grade, 104 children were left in the sample. During the third period, when children were in second grade, 93 children were left. Children who left the sample either repeated class (18) were

referred to special education (2), moved abroad (2) or jumped class (1). Nevertheless, group characteristics remained overall the same.

It was nevertheless observed that the three main effects of HLE profile: on the vocabulary test in grade 1 and on the first reading comprehension test in grades 1 and 2 Post hoc pairwise comparisons (LSD) for the vocabulary test showed significant differences between profile 1 children on the one hand and profile 2 and 3 children on the other (estimated marginal means are 35.34, 31.71 and 30.28, respectively). The study by Steensel provided a good start for the current study as it laid the foundation. In his study Steensel looked at sociocultural factors, home literacy environment and children's literacy development in the first years of primary school. It is not known whether the home literacy environment which influenced literacy development in his study would equally influence executive functions in the current study. The current study focused on Home Literacy Environment and Socioeconomic Status as predictors of Executive Functioning among fourth graders in government schools in Kitwe District, Zambia.

Mwanza – Kabaghe (2015) did a study on pre-school executive functions and oral language as a predictor of literacy and numeracy in grade one. The study strived to establish the predictive role of preschool, executive functions and oral language in literacy and numeracy in the first grade in Lusaka, Zambia. This study endeavored to establish the extent to which preschool prepares children for learning to read and numeracy in the first grade when SES and intelligence are controlled. Furthermore, the study examined whether preschool is of help for the development of executive function. In addition, the study further assessed if preschool does interfere with learning to read in the first grade when children do not speak Nyanja at home and depend on school for learning to read as well as learning the language of instruction. The researcher utilized quasi-experimental design as children with and without preschool were assessed in their natural setting at school. The target sample was twelve pupils from each of the eighteen schools giving a total of 216 pupils. Of the 216, 45 percent were boys and 55 percent were girls. The study showed that pupils who went to preschool did not outperform pupils who did not go to preschool in first grade. The researcher also found that linguistic diversity may explain delays of children who attend preschool in the first grade. This means that in situations where the primary language spoken at home is different from that which is used as a medium of instruction at school, the results are in some cases delays in children because of language barriers.

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Mwanza- Kabaghe's study looked at preschool and oral language as predictors of executive functions in Lusaka, Zambia to first graders. The current study took a different dimension in that it did not look at preschool rather it endeavored to look at Home Literacy Environment and SES as predictors of EF among fourth graders in government schools in Kitwe District, Zambia.

Mwaura (2014) conducted a study on Home-based Factors Influencing Students' Performance in Kenya Certificate of Secondary Education (KCSE) in Public Day Secondary Schools in Lari District, Kiambu County, Kenya. The purpose of the study was to investigate how home-based factors have influenced KCSE performance in public day secondary schools in Lari District, Kiambu County. The main objectives were to establish the influence of parents' level of education, socio-economic status of parents, parents' professional qualifications and home chores on students KCSE performance in public day secondary schools in the district. The study targeted 36 public day secondary schools with a population of 461 teachers and 288 Parents Teachers Association members. This gave a target population of 749 respondents. The study sampled members of the Parents Teachers Association which included 86 Parents and 138 teachers. The total sampled size was 224 respondents. The study randomly selected the Parents Teachers Association members and the teachers from the 36 public day schools. Questionnaires and interview schedules were used for data collection. Reliability analysis was done through test-retest method. Pearson's product moment's correlation was used to test reliability. Validity was ensured through discussion with the experts including supervisors and colleagues. Primary data were collected and analyzed using mixed research method and presented in tables and graphs. Secondary data were obtained from journals and school data base. Data collected were analyzed using SPSS (Statistical Package for Social Sciences). Descriptive statistics and thematic statistics were used. This assisted in determining the level of   influence the independent variables have on the dependent variable. The study results indicated that educated parents assist their children in doing their work at home. Parents' socio-economic status influences the students KCSE performance. Professional parents participate better in academic performance and understand the importance of academics better. Teachers perceived that parents contribute to student's participation in home chores. More time is spent on home chores than on school work. The study concluded that home-based factors, parents' level of education, socioeconomic status of parent's and professional qualifications   affect students' academic performance in public day secondary schools since this study only focused on these four factors.

The study by Mwaura is insightful to the current one in that it highlights how home-based factors, parental level of education, socioeconomic status and professional qualifications influence the students KCSE performance. In his study Mwaura indicated clearly that for children to realize their goals, home-based factors must be supportive enough to ensure learners perform according to expectations and achieve cognitive development which must have the foundations from the home set up. Nevertheless, his study is different from the current one in that he focused on learners in secondary schools, whereas the current one focused on learners in lower primary, and specifically looked at Home Literacy Environment and SES as predictors of EF among fourth graders in government schools in Kitwe District, Zambia.

Another study done (Mubanga 2015) was on the acquisition of grade – level executive function in early literacy and numeracy skills in the first grade at selected low and high- performing schools in Northern Zambia. The study endeavored to establish the interplay and influence of child-characteristics and environment factors in the context of school quality on literacy and skills. A total of 100 children drawn from five low and five high performing schools constituted the sample. The children were subjected to individual tests to assess their skills in reading, writing and mathematics tasks. The research found that children's performance in literacy and numeracy was generally low. The common element between this study and the current one is that of EF and environmental factors. However, the current study is different in that it endeavored to look at Home Literacy Environment and SES as predictors of EF among fourth graders in government schools in Kitwe, Zambia, which Mubanga did not look at. Furthermore, Mubanga's study was done in Northern Zambia and involved 100 children, whereas the current study involved 116 children and an equivalent number of parents. The significance of a bigger sample size is that it is easier to generalize the findings of the study.

Furthermore, another study (Kalumba, 2017), was carried out on the role of executive functioning in early numeracy attainment in the second grade in selected government primary schools in Lusaka District. The researcher used a quasi-experimental design. The target population was all second-grade learners and their teachers in Lusaka District. A total sample of 252 respondents were randomly selected. The research paradigm used was quantitative.

The study revealed that general performance in numeracy was good implying that there was no difference in performance whether children came from low, medium and high-density schools. In

addition, the study found that learners who came from homes with both parents performed better than those who came from homes with either fathers, mothers, grandparents and brothers/sisters or relatives. This explains the importance of both parents if children are to actualize their goals in life.

Kalumba's study is key to the current one in that she has indicated the importance of EF for learners to achieve their goals in any sphere of their lives. It is in the light of this that the current study endeavored to look at Home Literacy Environment and SES as predictors of EF among fourth graders in government schools in Kitwe District, Zambia. Whereas Kalumba's study was done in Lusaka, Zambia, the current study was conducted in Kitwe, Zambia, among the fourth graders in selected government schools. Whereas Kalumba focused on the role of EF in early literacy in the second grade in Lusaka, Zambia, the current study focused on Home Literacy Environment and Socioeconomic Status as predictors of Executive Functioning among fourth graders in government schools in Kitwe, Zambia.

Abdullahi (2016) carried out a study on The Effects of Home Background Factors on Students' Academic Achievement in Agricultural Sciences in Katsina State, in Nigeria. The principal objective of this study was to determine the effects of home background factors on students' academic achievement in agricultural sciences in Katsina State, Nigeria. The study was conducted using a cross-sectional research design. A multi-stage sampling technique was used to randomly select 300 respondents from six secondary schools. A mixed method approach was used to collect data using structured questionnaire, students' academic scores, Focus Group Discussions and interviews with key informants. Descriptive statistics, cross-tabulations using Cramer's V, multiple and stepwise repressions were performed to achieve the objectives of the study. Content analysis was used to analyze the qualitative data. The study findings revealed that, overall students' academic achievement was generally good. The findings equally indicated that respondents had different perceptions of their family roles as sources of motivation to succeed in their academic pursuits. Furthermore, the study findings showed that socioeconomic characteristics of parents correlate significantly to students' academic achievement. In addition, the results showed that there is significant difference in students' academic achievement among family structure composition. The research results on stepwise regression (at $p < 0.05$) revealed that measures of parent visits to schools, provision of resource materials, provision of pocket money, parents' occupation, parents'

education and family feeding as well as residential type positively accounted for most of the variation in students' academic achievement. Family type and age category of parents inversely affected students' academic achievement in the study area. The null hypotheses tested were rejected.

The study conducted by Abdullah is significant to the current one as it brings to the fore the importance of family factors which in the long-term help learners to achieve their academic goals which include goal setting in order to actualize the desired dreams. The current study, however is different in that it endeavored to establish if at all Home Literacy Environment and SES do predict EF among fourth graders in government schools in Kitwe District, Zambia.

2.3 Socio-Economic Status and Executive Functions

Some studies have shown a relationship between socio-economic status and executive functions and have gone further to bring to light some causal factors.

John, Kibbe and Tarullo (2018) did a study on lower socio-economic status (SES). The findings consistently relate to poorer executive function (EF). The study that he conducted used a systematic and nuanced approach to understand how SES is related to children's EF at a process level. Children aged between 4.5-5.5 years were assessed. This is a key developmental period because executive function is no longer a unitary construct but rather EF components statistically load on separate factors and index distinct aspects of EF. Children did complete a working memory task that involved a cognitive load component and a go/ no-go task to assess inhibitory control and guidance and vigilance. What was assessed was accuracy and reaction time, and each task involved four blocks to assess performance over time. Lower SES was linked to lower accuracy for working memory, inhibitory control, and vigilance as well as slower reaction time for working memory. SES did not relate to go/no-go reaction time. For working memory, lower SES related to poorer accuracy on lower cognitive load trials, but there were no SES differences on higher cognitive load trials. SES did not relate to maintenance of performance over time. Findings indicate that for this age group the majority of domains showed SES differences. However, there were no SES related to poorer EF performance, there were no SES effects for skills that are still emerging for all children, namely, maintaining task performance across time and remembering two items at once. Results highlight the importance of assessing EF as a multidimensional construct and may help to identify targets for intervention.

This study is important for the current one as it provides direction the current study should undertake. In their study John and his colleagues focused on children from lower socioeconomic status but the current study looked at Home Literacy Environment and Socioeconomic Status as predictors of EF among fourth graders in government schools in Kitwe District, Zambia involving children from low, middle and high socioeconomic status.

Hook, Lawson and Farah (2013) carried out a study on Socioeconomic Status and Development of Executive Function in the United States of America. The research reviewed a relationship between socio economic status in children and the way they plan to achieve a desired goal. Furthermore, the study also highlighted that the association appears to be affected by many things such as the family environment, specifically the quality of the parent-child relationship and its ability to buffer stress.

The study by Hook and his colleagues is of significance importance to this study because like the current one, they also looked at socioeconomic status, though the current study went further to look at Home Literacy Environment and Socioeconomic Status as predictors of Executive Functions among fourth graders in government schools in Kitwe, Zambia.

Haft and Hoeft, (2017) did a research on "Poverty's Impact on Children's Executive Functions". The target population was mostly from Western, high- income countries, although it is children from low – and middle-income countries who comprise a significant proportion of the world's population and are at additional risk for poor EF as a result of a more disadvantaged context. The findings of this study indicate a global association between poverty and EF and point to cognitive stimulation and environmental enrichment as common mediating variables that may also be moderators and targets for intervention. In addition, the study underscores the need to consider the sociocultural context of countries when examining impacts of parenting, schooling, and other metrics. These too have the potential to influence EF. It is clear that because of poverty, families have fewer financial resources to invest in enriching materials for their children, resulting in inequalities in EF development across SES. Many children from high income families tend to perform better when it comes to EF tasks than those from low income families who normally underperform when it comes to executive functions. Many research studies document the relationship of socio-economic status (SES) to cognitive development and academic achievement. In their study, Haft and Hoeft looked at the impact of poverty on children's EF, similar to

socioeconomic status which the current study also looked at. However, their study focused on western, high-income countries, but the current one focused on, low, medium and high socioeconomic status areas, in Kitwe, Zambia.

Stimulating activities may help children with specific skills (like linking letters to sounds) but also, and perhaps most importantly, developing the child's ability and motivation concerned with learning generally. This partly explains links between SES and developmental outcomes, in that higher SES parents use more developmentally enhancing activities. The strong interrelationships between parenting activities and socio- demographic factors – for example parents' willingness to read to their children and their own education background – means that any analysis that attempts to explore the impact of activities needs to take account of these wider influences.

Another study was done by Mwanza-Kabaghe, Mubanga, Matafwali, Kasonde Ng'andu & Bus (2015), on whether and how Zambian preschool education stimulates learning to read. The study employed a quasi –experimental design. The researchers compared children who had attended preschool and those who had not attended preschool. Children from 18 schools within Lusaka District were tested at the start of grade 1. The same children were tested again after eight months. A total of 216 children (98 without preschool and 118 with preschool) took part in the study. Only 197 children from the original sample took part in the second measurement due to attrition ($n=19$). Some children had changed schools or moved to other places, therefore they could not be located. The results of the study revealed that children with preschool background were on average younger ($d= -29)$ and had higher scores on home possessions ($d=44),$ indicating that children who started school late did not attend preschool and that children attending preschool were from affluent families. Children with preschool background outperformed their peers in basic cognitive skills. The results also showed that Bimodal correlations revealed that executive functions and basic literacy skills at the start of grade 1 that predicted reading and writing skills at the end of first grade were related to nonverbal intelligence or age. Furthermore, the findings revealed that both executive functions and basic literacy skills at the start of grade 1 were predictors for the children's reading and writing proficiency. The study by Mwanza-Kabaghe et al (2015) have some commonalities with the current study in that in their study they also looked at home possession index to determine socioeconomic status and some components of EF which the current study also looked at. However, the current study is unique in that it looked at Home Literacy

Environment and Executive Functions as predictors of executive functioning among fourth graders in government schools in Kitwe, Zambia. In addition, the current study is different from the previous one in that in their study, Mwanza-Kabaghe and colleagues focused on how and whether Zambian preschool education stimulates learning to read in selected schools in Lusaka, Zambia and the sample size was 216, while the current one focused on home literacy environment and socioeconomic status as predictors of EF in Kitwe, Zambia and the sample size was 116.

Sarsour, Sheridan, Jutte, Nuru-Peter, Hinshaw and Boyce (2011), did a research on the independent and interactive association between family SES and single parenthood to predict child executive functions of inhibitory control, cognitive flexibility, and working memory and examined child expressive language abilities and family home environment as potential mediators of these associations. Sixty families from diverse SES backgrounds with a school-age target child (mean [SD] age = 9.9[0.96] years) were evaluated. Child executive function was measured using a BRIEF battery. The quality of the home environment was evaluated using the Home Observation for the Measurement of the environment inventory. Family SES predicted the three child executive functions under study. Single parent and family SES were interactively associated with children's inhibitory control and cognitive flexibility; such that children from low SES families who were living with one parent performed less well on executive function tests than children from similarly low SES who were living with two parents. Parental responsivity, enrichment activities and family companionship mediated the association between family SES and child inhibitory control and working memory. The research used quantitative paradigm to collect data. This study revealed that family SES inequalities are associated with inequalities in home environments and with inequalities in child executive functions.

This study by Sarsour and colleagues has raised important issues worthy to be considered in this study. In their study they looked at the interactive association between family SES and single parenting as predictors of child executive functions. It is not clear whether children who are brought up by single parents but socioeconomically stable would be affected in similar ways. The current study is different in that it specifically looked at Home Literacy Environment and Socioeconomic Status as predictors of executive functions among fourth graders in government schools in Kitwe, Zambia. From the foregoing it can be said that poverty is one of those reasons why there are inequalities in executive functions although this can be mitigated by other home

environment factors such as a caring environment, warmth parental level of education and home literacy.

2.4 Summary

This chapter presented literature in line with the research topic. This has informed and helped shape the study because the researcher has been able to interact with different literature written by different scholars. On the global scene studies have found an association between Home Literacy Environment and EF, while on the Zambian scene little is known on this topic. The current study would like to investigate if findings obtained elsewhere on the role of Home Literacy Environment and SES as predictors of EF would be similar if done in Kitwe, Zambia. Available literature indicates further research needs to be carried out on this topic on an African setting like Zambia (Mwanza- Kabaghe, 2015; Mubanga, 2015; & Kalumba, 2017).

CHAPTER THREE: METHODOLOGY

3.1 Overview

Chapter two reviewed literature related to the topic and research objectives. This chapter looks at the methodology that was used to collect data in the course of the study. The breakdown is as follows: research paradigm, research design, study sites, target population, sample size, sampling techniques, research instruments and quality assurance control (QAC). Others are, data collection procedure, data analysis and ethical consideration**.**

3.2 Research Paradigm

Research paradigms guide scientific discoveries through their assumptions and principles. Understanding paradigm specific assumptions helps illuminate the quality of findings that support scientific studies and identify gaps in generating sound evidence. (Kombo & Tromp, 2006). Positivism is aligned with the hypothetical-deductive model of science that builds on verifying a priori hypotheses and experimentation by operationalizing variables and measures; results from hypothesis testing are used to inform and advance science. Positivism generally focus on identifying explanatory associations or causal relationships through quantitative approaches that ultimately lead to prediction and control of the phenomena in question (Cresswell, 2009). The positivist paradigm is based on the assumption that a single tangible reality exists and one that can be understood, identified and measured. The applicability of this paradigm to the current study was based on the fact that Home Literacy Environment and Socio-Economic Status as Predictors of Executive Functioning among Selected 4th Graders can only be fully understood if Positivism philosophical view is employed in the study.

3.3 Research Design

This study was quantitative in nature and employed a quasi-experimental design with a view to rating learners from different home environments on their executive function abilities. The researcher preferred quasi experimental design to other designs because it was able to provide numerical data in terms of quantification of the variables which in turn helped to determine how the learners were performing in terms of executive functions. Furthermore, this design helped the researcher to determine the relationship between variables.

It was anticipated that this research design would help the researcher to determine if Home Literacy Environment and Socioeconomic Status predict EF among fourth graders in government schools in Kitwe, Zambia.

3.4 Study Sites

The study was conducted in Kitwe District at six government primary schools. Kitwe District was chosen because of its centrality on the Copperbelt Province. The researcher felt this presented a fertile ground to determine whether Home Literacy Environment and Socioeconomic Status predict EF.

3.5 Target Population

The target population were fourth graders from six public primary schools together with their parents.

3.6 Sample Size

The researcher targetted a population of sixty girls and sixty boys (120 learners) and an equivalent number of parents/guardians. The average age of learners was 10. However, because of the Covid-19 situation only 116 learners and an equivalent number of parents participated. Twenty learners were drawn from five schools and sixteen were from the sixth school. In the sixth school, ten were girls and six were boys because four boys could not continue with the research because of Covid 19. The schools were located in low, medium and high density areas. Parents were engaged to rate their children on Executive Functions using the BRIEF Form 2. Parents of the participating children were equally asked to fill in a question form to help the researcher ascertain the kind of home environment their children came from.

3.7 Sampling Techniques

Low, medium and high residential areas were identified. This was to make sure participants were not drawn from the same areas considering that residential areas are in three categories. To make sure that all schools stood an equal chance of participation, probability sampling was used (Cresswell, 2009). To do this, names of all public primary schools in Kitwe District were put in three boxes. One box was for primary schools in high residential areas, one for primary schools in medium and another for low residential areas. Names of primary schools were written on pieces

of paper. On the front of the paper the name of the school was written and behind the same paper the letter "P" was written meaning "Picked" in accordance with the number of schools the researcher wanted. As for the rest of the papers what was written was "NP" meaning "Not picked".

Similarly, since every learner in grade four was eligible, probability sampling was equally used in the selection of learners. To ensure equity in terms of gender, girls picked from their own box and boys from their own box. This guaranteed that the sample included specific characteristics that the researcher wanted to be included in the sample (Creswell, 2009).Considering that the researcher was targeting twenty participant pupils from each school, the number of papers written "P" meaning "picked" in each box was ten for boys and an equal number for girls. The rest were written "NP" meaning "Not Picked". Using this procedure twenty participant pupils were picked from each school and a total of 120 participant pupils were picked from six schools although four boys discontinued.

3.8 Research Instruments

3.8.1 Behavioral Rating Inventory for Executive Functions (BRIEF2)

Behavioral Rating Inventory for Executive Functions second edition (BRIEF2) were used to get information about everyday behavior associated with specific domains of executive function of fourth graders in this study. The assessor administered BRIEF2 to parent/ guardians or care-givers and they filled them in the presence of the assessor so that they could be guided where clarity was needed. BRIEF2 has 63 statements in line with specific domains of executive functions and parents/guardian/care-givers were required to show whether their children had the problems described by the 63 statement over the past six months. Parents / guardian /care-givers were required to circle letters against each statement as follows: **N**, if the behavior is Never a problem, **S,** if the behavior is **S**ometimes a problem and **O**, if the behavior is Often a problem. It took approximately 15 to 20 minutes to complete the form.

3.8.2 Delis- Kaplan Executive Function System (D. KEFS)

The Delis –Kaplan Executive Function system (D. KEFS) was used to measure non-verbal executive function tasks that should be available from childhood to adulthood. Inhibitory control was measured by the Letter Number Interference tasks. This test was also used for measuring fine motor speed. Children were asked to complete various connections like sequencing letters or

numbers, or between letters and numbers. Furthermore, they were also asked to trace a line between given points in order to measure motor speed on different conditions which ranges from 1 to 5

3.8.3 Digit Span Test (Forward, Backward and Sequencing)

These instruments were used to test remembering which improves working memory and cognitive flexibility. The respondent was expected to listen attentively to the assessor (researcher) and repeat numbers which were mentioned accordingly e.g. Forward, Backward and Sequencing. For the Forward Digit Span Test, the assessor was mentioning digits and the respondent was expected to recite them exactly the way the assessor mentioned the digits, for example, if the assessor says 9351, the respondent was expected to say 9351.

3.8.4 Pencil Tapping Test

This test was used to measure inhibition. The assessor and the respondent both had a pencil each. When the assessor tapped on the table once, the respondent tapped twice. When the assessor tapped on the table twice the respondent tapped once. Lastly when the assessor tapped on the table three times the respondent was not expected to tap at all. This task, like any other was first practiced to ensure maximum compliance. At the end of the exercise correct scores were recorded. The exercise was measuring working memory.

3.8.5 Pattern Reasoning Test

The Pattern Reasoning Test was used to measure general intelligence abilities. To measure these non- verbal cognitive skills, the children were given a number of stimuli forming a logical pattern with one stimulus missing. The respondent was asked to identify the missing stimulus from the given options provided.

3.8.6 Biographical Data Form

To generate biographical data for each respondent such as name, age, and gender this form was used. The instrument also included the home possession index, which helped the researcher to determine the SES of the family. On the form were questions that elicited responses from participants.

3.9 Quality Assurance Control (QAC)

To ensure quality was assured the researcher took care of issues of reliability and validity of the instruments.

3.9.1 Reliability

A Cronbach alpha reliability test was done to ensure reliability. Apart from that, a pilot study was undertaken to ensure the instruments were consistent with what they were measuring. In addition, the instruments that were used have proved to be reliable because they have been consistent in the findings and have been used before here in Zambia (Matafwali, 2010; Mubanga 2015; Kabaghe 2015; Kalumba, 2017).

Cronbach Alpha Scales

Cronbach Alpha	Internal Consistency
$\alpha \geq .9$	Excellent
$\alpha \geq .8$	Good
$\alpha \geq .7$	Acceptable
$\alpha \geq .6$	Questionable
$\alpha \geq .5$	Poor

Reliability level of the BRIEF, D.KEFS, Digit Span and pencil tapping instruments in the study were at $.90 \geq .7$ (Acceptable to excellent).

3.9.2 Validity

A pilot study was undertaken at school level in Kitwe among twenty respondents (ten girls and ten boys) to ensure that the study measured what it was supposed to measure.

The instruments have proved to measure what they intend to measure because they have been used before both in Zambia and in other countries (Taylor, 2004; Matafwali, 2010; Mubanga, 2015; Kabaghe, 2015; Kalumba, 2017)

3.10 Data Collection Procedure

The first step was to get permission from the office of the District Education Board Secretary and after that make an appointment with each of the school administrators of the six selected primary schools in Kitwe District. At classroom level instructions were thoroughly explained to ensure conformity by all participants. In a quiet place where there were no disturbances, the second step was to introduce the instruments to the learners who were tested one at a time. The instruments that were used are; Trail- Making tests which are from 1 to 5, Digit Span (Forward, Back ward and Sequencing), Pencil Tapping tests. Pattern Reasoning Tests as well as Biographical Data Form. The third step was to explain to each of the learners when his/her turn came the instructions in a very elaborate manner, making sure the learner had understood.

On each of the assessment instruments, the learner was given 150 seconds only to finish the task except on Trail- Making test number four (Number Letter Switching) which goes up to 240 seconds. The Digit Span and Pencil Tapping tests have no time allocation.

Trail -Making tests 1 to 5 mainly measures speed except test 4 which also measures number-letter switching. The Digit Span is done by asking learners to mention numbers after the examiner. Since it is in three categories, learners were asked to mention numbers, in three categories thus backward, forward and sequencing. The third test was Pencil Tapping which measures attention of the learners.

At the beginning of the test the examiner would set a stop watch and would make sure it only began to tick once the learner started the test. Apart from being time conscious, the examiner would also make sure instructions were being followed and would constantly remind the learner to say that there was an error for condition 1 to 5 each time it was made so that the learner could start afresh.

3.11 Data Analysis

The researcher analyzed data using Stata version 14 as it is a purely quantitative study. The first step was to enter the scores for each of the learners according to the variables. The researcher also scrutinized the data to show the Mean (M), Standard Deviation (SD) Minimum (Min.) and Maximum (Max). After this was done, the researcher was able to identify outliers and determine the role of home environment on executive functions after comparing the scores of the variables.

To analyze data correlations, hierarchical linear regression and descriptive statistics were performed. In order to determine the relationship between SES and Executive functions among fourth graders correlations were done using specific measures of executive functions as well as the socio-economic status index which was generated after data collection. In order to determine a stronger predictor of EF between Home Literacy and SES hierarchical linear regression was performed.

3.12 Ethical Consideration

The study was explained fully to the participants (parents) in order to obtain consent for their participation in the study and their children. When consent was obtained, the researcher made sure that the learners were protected from any kind of harm or injury. Furthermore, participants were assured that should there be other unforeseen risks, the researcher would take full responsibility. Confidentiality was equally guaranteed as numbers and pseudo names were used instead of actual names of learners and schools. In the light of this, nothing was associated to participants or schools by their real names. Besides, all participants had the right and academic freedom to discontinue from the study as participation was on voluntary basis. In addition, Ethical Clearance from the University of Zambia Ethical Committee was obtained in accordance with the laid down procedure.

3.13 Summary

This chapter presented the methodology used in this study. The researcher used quasi-experimental design considering the nature of the topic. This is because certain ingredients which are found in true experiments are not found in quasi-experimental design such as randomization, control groups and treatment groups. The researcher decided to use this design in order to give numerical data in terms of the extent in which home environmental factors are able to contribute to EF abilities. In addition, quasi-experimental design can be perfect to determine what is best for the population. The next chapter presents the findings.

CHAPTER FOUR: PRESENTATION OF FINDINGS

4.1 Overview

This chapter presents research findings. It begins by showing the demographic characteristics of the participants. It also shows EF skills among fourth graders. Furthermore, it looks at Home Literacy and Socioeconomic Status among fourth graders. In addition, the chapter looks at the relationship between Home Literacy Environment, Socioeconomic Status and EF.

Table 1: Demographic characteristics of participants

Variables	Frequency (%)
Age: (Mean) (S.D)	(9.9) (1.2)
Gender: (Boys)	56 (48 %)
(Girls)	60 (52 %)
Ses (Mean) (S.D)	(1.9) (0.7)
Home literacy: (Exposure to Literacy)	80 (69 %)
(Non- Exposure to Literacy)	36 (31 %)
Pupils' literacy levels: (Able to read)	40 (34 %)
(Attempt to read)	48 (41 %)
(Not able to read)	28 (24 %)
Primary language: (Bemba)	111 (96 %)
(Chinyanja)	0 (0 %)
(English)	2 (2 %)
(Others)	3 (3 %)
Residence: (High cost)	26 (22 %)
(Medium cost)	44 (38 %)
(low cost)	46 (40 %)
General intelligence (mean) S.D)	10.2 (3.7)

Table 1 shows that the mean age of the participants was 10. There were more girls (60) than boys (56) in the study. Social Economic Status mean of participants was 1.9 out of 9 items. In terms of Home Literacy education, 80 (69%) participants came from homes that are exposed to Literacy while 36 (31%) of participants came from non-exposed homes to Literacy. In terms of pupils' literacy levels, 48 (41%) could attempt to read while 40 (34%) pupils were able to read and 28 (24%) pupils were not able to read. Regarding the language used at home, the majority 111(96%) used Bemba, followed by other languages at 3 (3%) and the least was English at 2 (2%) and Chinyanja at 0 (0%). Participants' residence indicated that 46 (40%) learners were from low cost residential areas, followed by 44 (38%) learners from medium cost and 26 (22%) learners from high cost residential areas. The average general intelligence for the participants was 10 out of 19 test items.

Table 2: Associations between demographic characteristics and Parental Education {Home Literacy}.

Variables	Exposed to Literacy	Non-Exposure to Literature	P-value
Age: (Mean) (S.D)	9.7 (1.0)	10.4 (1.3)	<0.001
Gender: (Boys)	37 (46 %)	19 (53 %)	0.42
(Girls)	43 (54 %)	17 (47 %)	
Ses: (Mean) (S.D)	2.3 (0.5)	1 (0)	<0.001
Pupils' literacy levels: (Able to read)	13 (38 %)	27 (68 %)	<0.001
(Attempt to read)	39 (81 %)	9 (19 %)	
(Not able to read)	28 (100 %)	0 (0 %)	
Primary language: (Bemba)	76 (68 %)	35 (32 %)	0.61
(Chinyanja)	0 (0 %)	0 (0 %)	
(English)	2 (100 %)	0 (0 %)	
(Others)	2 (67 %)	1 (33 %)	
Residence: (High cost)	26 (100 %)	0 (0 %)	<0.001
(Medium cost)	43 (98 %)	1 (2 %)	
(low cost)	11 (24 %)	35 (76 %)	
General intelligence: (Mean) (S.D)	10.4 (3.5)	10.0 (4.1)	0.54

Table 2 shows that there is statistically significant difference (p<0.001) in terms of EF between children from homes that are exposed to literacy and those from homes that are not exposed. In

terms of literacy skills there was no statistically significant difference between girls and boys (p= 0.42). In terms of pupils' literacy levels there is a statistically significant difference between pupils who came from homes that are exposed to literacy and those who came from homes not exposed to literacy (p<0.001) in favor of those who are exposed. There is no statistically significant difference between children who came from homes that are exposed to literacy and those from non-exposed homes (p=0.61) in terms of primary language. There is a statistically significant difference between children who came from low cost, medium cost and high cost in terms of literacy skills (p<0.001).This means that children who came from high cost areas performed better. There was no statistically significant difference in terms of general intelligence for children from homes exposed to literacy and homes not exposed to literacy (p =0.54). This means that general intelligence was the same for those who came from homes exposed to literacy and homes not exposed to literacy.

4.2 Assessing Executive Function Skills among Fourth Graders

Table 3: Subjective Measures based on BRIEF

Measures	Better executive function	Poor executive function
Inhibit	*98 (84 %)*	*18 (16 %)*
Self-Monitor	*110 (95 %)*	*6 (5 %)*
Shift	*63 (54 %)*	*53 (46 %)*
Emotional-Control	*86 (74 %)*	*30 (26 %)*
Initiate	*78 (67 %)*	*38 (33 %)*
Working Memory	*71 (61 %)*	*45 (39 %)*
Plan/Organize	*85 (73 %)*	*31 (27 %)*
Task-Monitor	*65 (56 %)*	*51 (44 %)*
Organization of Materials	*82 (71 %)*	*34 (29 %)*

Key: Low score = better EF

High score= poor EF

Rating Scale

N=Never   S=Sometimes   O=Often

N=1   S=2   O=3

Parents were asked to rate the intelligence of their children using (BRIEF) to measure various Executive Function tasks. In this regard, Table 3 shows that 98 (84%) parents' ratings reported that children performed better on a task of inhibit and 18 (16%) performed poorly on the same task. The same applies to self-monitor, 110 (95%) parents reported that their children performed better on self- monitor and only 6 (5%) performed poorly. On shift 63 (54%) were reported to have performed better and 53 (46) performed poorly. In terms of emotional control 86 (74%) parents reported that their children have better EF on emotional control while 30 (26%) reported that their children have poor EF on emotional control. In terms of initiate 78 (67%) were reported to have better EF on initiate as opposed to 38 (33%) who were reported to have poor EF on initiate. On the working memory task 71 (61%) were reported to have better EF on working memory while 45 (39%) were reported to have poor EF on working memory. As regards to plan/organize 85 (73%) were reported to have better EF on plan/organize skills while 31 (27%) were reported to have poor EF on plan/organize skills. In terms of task monitor 65 (56%) were reported to have better EF on task monitor skills whereas 51(44%) were reported to have poor EF on task monitor. On the organization of material task 82 (71%) were reported to have performed better while 34 (29%) were reported to have performed poorly.

Table 4: Objective Measure of Executive Function.

Measures	Number of participants with Average performance	Number of participants with Below Average performance
Tmtc1	*31 (27 %)*	*85 (73 %)*
Tmtc2	*32 (28 %)*	*84 (72 %)*
Tmtc3	*27 (23 %)*	*89 (77 %)*
Tmtc4	*8 (7 %)*	*108 (93 %)*
Tmtc5	*46 (40 %)*	*70 (60 %)*
Digitspanforward	*44 (38 %)*	*72 (62 %)*
Digitspanbackward	*21 (18 %)*	*95 (82 %)*
Digitspansequencing	*26 (22 %)*	*90 (78 %)*
Pencil tapping	*56 (48 %)*	*60 (62 %)*

Key: a) The higher the score obtained the better the EF.

b) The lower the score obtained the poor the EF.

Table 4 shows that the performance of 31 (27%) participants was average on Trail Making Test Condition 1 while 85 (73%) performed below average. Similarly, on Trail Making Test Condition 2, 32(28%) participants performed average while 84 (72%) performed below average. Trail Making Test Condition 3 shows that 27 (23%) performed average whereas 89 (77%) performed below average. On Trail Making Test Condition 4 shows that the performance of 8 (7%) participants was average while 108 (93%) performed below average. The poor performance on Trail Making Test Condition 4, could be attributed to either poor cognitive shift development or lack of exposure to stimulating activities. In terms of Trail Making Test Condition 5, the performance of 46 (40%) participants was average whereas 70 (60%) performed below average. On Digit Span Forward the performance of 44 (38%) participants was average while 72 (62%) performed below average. In terms of Digit Span Backward the performance of 21 (18%) participants was average while 95 (82%) performed below average. Results from Digit Span Sequencing showed that the performance of 26 (22%) participants was average while 90 (78%) performed below average. On Pencil Tapping exercise the performance of 56 (48%) participants was average whereas 60 (62 %) performed below average.

4.3 Determining home and socioeconomic factors that affect EF among fourth graders in selected government primary schools in Kitwe District.

Table 5: Home Literacy and Socioeconomic Status among Fourth Graders.

Variable			Total
Home Literacy	Exposure to Literacy	Non-Exposure to Literacy	-
	80 (69%)	36 (31%)	116

Variable				Total
	High (%)	Middle (%)	Low (%)	-
Socioeconomic Status (Ses)	26 (22)	51 (44)	39 (34)	116

Table 5 shows that 80 (69%) learners came from homes that were exposed to literacy while 36 (31%) came from homes that were not exposed to literacy. In terms of socioeconomic status 51

(44%) came from middle socioeconomic status whereas 39 (34%) came from low socioeconomic status and 26 (22%) came from high socioeconomic status.

Table 6: Determining the relationship between Home Literacy and E.F using BRIEF.

	Variables	Correlation Co-efficient	p- value
Home Literacy	*Inhibit*	0.1606	0.09
	Self-monitor	0.1692	0.07
	Shift	0.1401	0.13
	Emotional control	0.0493	0.60
	Initiate	0.1873	0.04
	Working Memory	0.1322	0.16
	Plan/Organize	0.2058	0.03
	Task Monitor	0.0882	0.35
	Organization of Materials	0.1857	0.05

Table 6 shows that there is no statistically significant relationship between Home Literacy Environment and Inhibit (p= 0.09). Similarly, there is no significant relationship between Home Literacy Environment and Self Monitor (p=0.07), no significant relationship between Home Literacy Environment and Shift (p=0.13), no significant relationship between Home Literacy Environment and Emotional Control (p =0.60).There is a statistically significant relationship between Home Literacy Environment and Initiate (p=0.04).There is no significant relationship between Home Literacy Environment and Working Memory (p=0.16). A statistically significant relationship was noticed between Home Literacy Environment and Plan and Organize (p= 0.03). There is no statistically significant relationship between Home Literacy Environment and Task Monitor (p=0.35). There is a statistically significant relationship between Home Literacy Environment and Organization of Materials (p=0.05).This means that when taken in isolation most of the subtests of EF are not influenced by HLE environment except initiate and organization of material.

Table 7: Determining the relationship between Home Literacy and EF using objective measures

	Variables	Correlation co-efficient	P- value
Home Literacy	D. Kefs (tmt 1)	-0.6637	<0.001
	D. Kefs (tmt 2)	-0.7271	<0.001
	D. Kefs (tmt 3)	-0.5036	<0.001
	D. Kefs (tmt 4)	-0.3133	<0.001
	D. Kefs (tmt5)	-0.6442	<0.001
	Pencil Tapping	-0.7623	<0.001
	Digit Span Forward	-0.7569	<0.001
	Digit Span Backward	-0.4760	<0.001
	Digit Span Sequencing	-0.4971	<0.001

Table 7 shows that there is a statistically significant relationship between Home Literacy Environment and the objective measures of EF (p<0.001).

Table 8: Determining the relationship between Socioeconomic Status and EF using BRIEF.

	Variables	Correlation co-efficient	P- Value
Socioeconomic Status(SES)	Inhibit	-0.1737	0.06
	Self-monitor	-0.1148	0.22
	Shift	-0.1210	0.20
	Emotional control	-0.0538	0.57
	Initiate	-0.1205	0.20
	Working Memory	-0.1373	0.14
	Plan/Organize	-0.1593	0.09
	Task Monitor	-0.2140	0.02
	Organization of Materials	-0.1445	0.12

Table 8 shows that there is no statistically significant relationship between Socioeconomic Status and Inhibit (P=0.06), There is no significant relationship between Socioeconomic Status and Self-

Monitor (p=0.22), There is no statistically significant relationship between Socioeconomic Status and Shift (p=0.20), no significant relationship between Socioeconomic Status and Emotional Control (p=0.57). There is also no statistically significant relationship between Socioeconomic Status and Initiate (p=0.20), no significant relationship between Socioeconomic Status and Working Memory (p=0.14).There is no statistically significant relationship between Socioeconomic Status and Plan and Organize (p=0.09). A statistically significant relationship was noticed between Socioeconomic Status and Task Monitor (p=0.02). There is no statistically significant relationship between Socioeconomic Status and Organization of Materials (p=0.12).

Table 9: Determining the relationship between Socioeconomic Status and E.F using objective measures

	Variable	*Correlation co-efficient*	*P- Value*
Socioeconomic Status (SES)	*D. Kefs (tmt 1)*	0.7134	<0.001
	D. Kefs (tmt 2	0.7625	<0.001
	D . Kefs (tmt 3)	0.5935	<0.001
	D. Kefs (tmt 4)	0.4436	<0.001
	D. Kefs (tmt5)	0.6846	<0.001
	Pencil Tapping	0.6844	<0.001
	Digit Span Forward	0.6741	<0.001
	Digit Span Backward	0.4953	<0.001
	Digit Span Sequencing	0.4547	<0.001

Table 9 shows that there is a statistically significant relationship between Socioeconomic Status and all the objective measures (p<0.001).

In order to determine a stronger predictor variable between Home Literacy Environment and SES on subjective measure of executive function using BRIEF, a hierarchical linear regression was performed as demonstrated in table 10 below:

Table 10: Determining a stronger predictor variable between Home Literacy Environment and SES on subjective measures of EF using BRIEF.

```
------------------------------------------------------------------------------------------------
GECTS |     Coef       Std. Err.        t       P>|t|      [95% Conf. Interval]
-------------+----------------------------------------------------------------------------------
ses |      -.9140145    1.400021       -0.65     0.515     -3.687709   1.85968
homeliteracy |   1.66904      2.239761        0.75     0.458      2.76833    6.106409
_cons |       48.65927     5.335142        9.12     0.000      38.08939   59.22915
```

From the table, results demonstrated that even after controlling for SES, Home Literacy Environment's effect size is 1.67 of EF while controlling for Home Literacy, SES's effect size is -.91, demonstrating a negative relationship with EF. This entails that both SES (p=0.52) and home literacy (p=0.46) have no statistical significant relationship with EF based on BRIEF.

In order to determine a stronger predictor variable between Home Literacy Environment and SES on objective measure of executive function (D.KEFS), a hierarchical linear regression was performed as demonstrated in the table 11 below:

Table 11: Determining a stronger predictor variable between Home Literacy Environment and SES on objective measures of EF (D.KEFS).

Tmt1-5	Coef	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ses	1.292016	.3365734	3.84	0.000	.6252031	1.958828
homeliteracy	.4718035	.5384516	0.88	0.383	-.5949664	1.538573
_cons	-.9022892	1.2826	-0.70	0.483	-3.44335	1.638772

From the table, results demonstrate that even after controlling for Home Literacy Environment, SES's effect size is 1.29 on EF while controlling for SES, Home Literacy effect size is .47 on EF. This implies that SES (p<0.001) is a strong predictor of executive function based on D. KEFS as opposed to home literacy (p=0.38).

4.4 Summary

This chapter presented findings of the study according to research objectives. When EF skills were assessed the study found that all fourth graders performed better on subjective measures of Executive Function. The majority of the learners were coming from homes that were exposed to literacy, while a small number was coming from homes that are not exposed to literacy. Furthermore, assessment of Home Literacy and socioeconomic status of the children results showed that the majority came from low and medium socioeconomic status, while a small number came from high Socioeconomic Status. The null hypotheses was rejected at (p<0.001) and the alternative was accepted which states that there is relationship between Home Literacy and EF as well as Socioeconomic Status and EF. There was also statistically significant relationship between Home Literacy and EF using BRIEF on Initiate, Plan/Organize and Organization of Materials.

Furthermore, there was a statistically significant relationship between Socioeconomic Status and EF using BRIEF on Task Monitor. Socioeconomic Status was found to be a stronger predictor of executive function than Home Literacy.

CHAPTER FIVE: DISCUSSION OF FINDINGS

5.1 Overview

The previous chapter presented the findings in line with research objectives. This chapter discusses the findings of the study in line with the research objectives as well. The first objective was to assess executive function skills among fourth graders in Kitwe District, Zambia. The second objective was to assess Home Literacy Environment and Socioeconomic Status among fourth graders in Kitwe District, Zambia. The third objective was to determine the relationship between Home Literacy Environment, Socioeconomic Status and Executive Functions among fourth graders in Kitwe District, Zambia. The fourth objective was to determine a stronger predictor of EF between Home Literacy Environment and SES among fourth graders in government schools in Kitwe District, Zambia.

5.2. Executive Function Skills among Learner

In the current study, Executive Function was measured both objectively and subjectively. The performance of all fourth graders 116 (100%) was better on subjective measures of executive functions than objective measures. The better performance in subjective measure could be attributed to the fact that ratings were done by parents and caregivers who might have been bias while objective measure of executive function was based on actual performance of children in Executive Function assessments which is more reliable. It is not surprising as most parents want to say positive things about their children hence the need to always combine subjective and objective measures of EF. When objective tests were done on the children a striking difference was observed. For example, majority of fourth graders performed poorly 90 (78%) on objective measures of executive function skills. In this study it was important also to focus on the three core EF skills. Working memory which is the ability to actively hold information in mind was assessed. According to the findings of this study only 71% performed above average on working memory. This is good because WM is crucial for the children when learning to read. If a child is not able to hold information from the previous lesson in mind, reading would be difficult (Mwanza-Kabaghe et al., 2015). In terms of inhibitory control which is the ability to control one's behavior by inhibiting, acting on one's immediate desires in favor of more adaptive and socially acceptable behaviors was 98% .This is good because it means more children were able to inhibit. If inhibition

is good it entails that more children were able to concentrate in school. Cognitive flexibility is one of the most crucial components of EF. It involves being able to change perspectives, that is see something from someone else's point of view and engage in flexible problem by seeing multiple ways to approach problem solving and change priorities if the situation demands. In the current study Cognitive Flexibility was at 63%. This means that in this study quite a good number were able to see multiple ways of solving a problem. The above findings are in agreement with (Hook et al., (2013) who found good general performance of executive function using BRIEF.

5.2.1 Home Literacy and Socio-Economic Status of the Learners

In the current study 80 (69%) learners came from homes that were exposed to literacy implying the majority of fourth graders came from homes where parents and guardians were exposed to literacy and spent time reading books, while 36 (31%) came from homes that are not exposed to literacy implying that their parents were not educated and attested to the fact that they do not have literacy books in the home and do not engage in reading. Although not directly tested in his study, poor HLE affects children's reading as observed by Steensel (2006) whose findings indicate that older family members' involvement in literacy activities makes a difference in the development of EF. Children whose parents/ older siblings frequently engage in individual literacy activities have significantly higher scores than children whose parents/older siblings do not do much reading or writing for personal purposes, irrespective of children's participation in high priority literacy activities. In the current study, home literacy exposure levels were generally good. This affirms that home literacy exposure and parental involvement is important for learners to achieve goals because in this study learners who were coming from stimulating homes performed better on many EF tasks.

The findings in the current study are also in agreement with Boerma et al (2017) who found that enhancing children's mentalizing abilities and encouraging them to read books might contribute to their cognitive development which eventually leads to better reading comprehension. Furthermore, parental participation in children's activities can contribute to development of mental abilities which can also result in reading performance, both directly and indirectly. This, therefore, indicates the need for parents to play an active role in stimulating their children if they are to actualize their goals in life.

In terms of socioeconomic status the current study has shown that 51 (44%) children came from middle socioeconomic status whereas 39 (34%) came from low socioeconomic status and 26 (22%) came from high socioeconomic status. In this study children who came from homes that were better in terms of SES performed better on all the EF tasks with a statistically significant correlation (P<0.001). This finding affirms the role of SES in the development of EF in children. Sarsour et al (2011) also found that family SES inequalities are associated with inequalities in child executive functions.

The importance of Home Literacy Environment and Socioeconomic Status towards cognitive development cannot be understated as this helps in setting and attaining goals. In the light of this, it was important to determine home literacy and socioeconomic status of the learners from homes that were exposed to literacy and homes that were not exposed to literacy. Chinyoka & Naidu (2014) in their study equally observed that family income, and parental level of education, gender, home circumstances, and family size influenced cognitive development which ultimately leads into better academic outcomes. In view of this evidence, effort should be directed towards creating stimulating homes to foster the development of executive functions. Available research generally emphasizes the importance of favorable home factors and socioeconomic factors as being key towards cognitive development. Notable among some of them are provision of resource materials, provision of pocket money, parents' occupation, parent's education and family feeding as well as residential type (Wood 2002, Mehhuish 2010, Abdullahi, 2016).

In the current study the majority of participants were from low and middle SES. This might mean that most of them might have had challenges to buy their children stimulating objects such as toys and other manipulative objects which are known to enhance cognitive development. This may also explain why the performance on objective measures was poor. From the current study, it can be concluded that the higher the SES the more conducive the HLE. This is because parents from high SES are more like likely to buy their children books for literacy activities in the home. Furthermore, because of availability of finances most parents from high SES have better education attainments which make it easier for them to be involved in the literacy activities of their children. This affirms the findings of John et al (2018) who found relationship between low socioeconomic status and poor EF which the current study also found.

5.2.2 The Relationship between Home Factors and Executive Function among Learners

The current study established negative correlation between Home Literacy, and objective measures of Executive Functions (p<0.001). Similarly, the study established positive correlation between Socioeconomic Status and Executive Functions (p<0.001). These findings could be attributed to home factors of the children. The better the HLE the better the EF. Children who were coming from homes that were exposed to literacy and stimulating activities performed better than those who were coming from less stimulating homes. This finding is in agreement with other previous studies (Melhuish 2010; Hook et al, 2013; Akeri, 2015; Abdullahi, 2016) which showed that socioeconomic status characteristics of parents correlate significantly to students' academic achievement. No academic success can be recorded without cognitive development, hence family factors play a significant role towards the development of EF which also leads to success. Notably, most of the learners who came from homes that had educated parents performed better on many executive function tasks. Similarly, those learners that came from either high or middle Socioeconomic Status performed better in terms of executive functions as opposed to those who came from low socioeconomic status.

The findings in this study show that there is statistically significant relationship between Home Literacy Environment and EF (p<0.001). This means that if Home literacy is poor then even EF will be affected negatively. This confirms the findings of Stammbach, Hawes & Meredith (2014) whose study indicate that the influences of parenting on executive function is correlational. Like in the current study this means that children who come from stimulating homes are likely to perform better when it comes to EF.

The findings in the current study have also been confirmed by those of Chansa-Kabali (2014), whose study revealed that the family plays a significant role in the children's process of reading. The process of reading can never be attained without cognitive development, hence the family plays a key role in the attainment of EF in the sense that those that have access to stimulating activities perform better on EF tasks. It can be said therefore, that there is correlation between Home Literacy and EF.

In the present study the results showed that there was a significant relationship between SES and EF skills (p<0.001). This means that socioeconomic status had an influence on the development of EF of children. These findings are also in tandem with those of Hook et al., (2013) which

revealed that there is a relationship between socioeconomic status in children and the way they plan to achieve a desired goal. It is now evident from the current study and the one done by Hook and colleagues that SES plays a key role to the development of EF as children who are exposed to stimulating activities such as books and toys tend to have enhanced cognitive development. This goes to remind stakeholders in the provision of education to revisit the practices that happen at home in order to enhance the cognitive development of children.

Similarly, the study by Sarsour et al (2011) found overwhelming evidence that shows that there is association between Socioeconomic Status and Executive Functions and point to cognitive stimulation and environmental enrichment as common mediating variables that may also be moderators and targets of intervention. From the available evidence it is clear that the role of SES in the development of EF cannot be overstated as research has shown that children who have access to cognitive stimulation and environment enrichment such as books tend to have better EF.

5.2.3 Home Literacy and Socioeconomic Status as predictors of EF.

When a hierarchical linear regression was performed on objective measure of EF, home literacy and socioeconomic status the results showed that SES was a stronger predictor of executive function (Effect size =1.29) than Home Literacy (Effect size =.47). This means that EF is largely determined by Socioeconomic Status and not Home Literacy. This finding is in agreement with Sarsour et al (2011) who found that family socioeconomic status predicted EF. The study further revealed that family SES inequalities are associated with inequalities in home environments and inequalities in EF. This is further supported by Haft & Hoeft (2017) who also found that SES is a stronger predictor of EF and point to cognitive stimulation and environmental enrichment as common mediating variables that may also be moderators and targets for intervention. This implies that SES is a stronger predictor of EF than Home Literacy and therefore, there is need to promote and empower families with the necessary ingredients that are imbedded in SES to enhance EF among school going children.

5.2.4 Hypotheses

5.2.4.1 Null Hypotheses

1   There is no relationship between Home Literacy and Executive Functions.

2   There is no relationship between Socioeconomic Status and Executive Functions.

3   SES is a stronger predictor of EF than HLE.

5.2.4.2 Alternative Hypotheses

1. There is relationship between Home Literacy Environment and Executive Functions.

2. There is relationship between Socioeconomic Status and Executive Functions.

3. SES is a stronger predictor of EF than HLE

The results of the current study have shown that there was a statistically significant relationship on all the objective measures on both Home Literacy and Executive Functions as well as Socioeconomic Status and Executive Function (P<0.001). The results also showed statistically significant relationship on subjective measures between Home Literacy and Executive Functions on, Initiate (p=0.04) Plan and Organize (p= 0.03) as well as Organization of Materials (p= 0.05). Furthermore, there was statistically significant relationship between Socioeconomic Status and Executive Functions on Task Monitor only (p=0.02). In the light of the findings, testing at an alpha of (p< 0.001) there is sufficient evidence to reject the null hypotheses based on objective measures of EF and four subjective measures of EF which state that there is no relationship between Home Literacy and EF, as well as Socioeconomic Status and EF and accept the alternative hypotheses which settles for a relationship between Home literacy and EF as well as socioeconomic status and EF. On the other hand, there is sufficient evidence to fail to reject the null hypotheses which states that there is no relationship between Home Literacy and EF on the following subjective measures Inhibit (p=0.09), Self-Monitor (p=0.07), Shift (p=0.13), Emotional Control (p=0.60) and Task Monitor (p=0.35). For Socioeconomic Status and EF, the following were subjective measures Inhibit (p=0.06), Self-Monitor (0.22), Shift (0.20), Emotional Control (p=0.57), Initiate (p=0.20), Working Memory (p=0.14), Plan and Organize (0.09) and Organization of Materials (p=0.12). There is also sufficient evidence to say SES is a stronger predictor of EF (Effect size 1.29) than HLE (Effect size .47).

5.3 Summary

The findings in this study indicate that there is a relationship between Home Literacy, Socioeconomic Status and executive functions. Furthermore, the results show that Socioeconomic Status is a stronger predictor of EF than Home Literacy Environment. This is in agreement with many other studies which came up with similar findings. The findings in this study stress the importance of upholding those factors that support the development of executive functions in the home setting.

CHAPTER SIX: CONLUSION AND RECOMMENDATIONS

6.1 Overview

The principal objective of this study was to determine a stronger predictor of EF between Home Literacy Environment and SES among fourth graders in government schools in Kitwe District Zambia. Others were to assess executive functioning skills among fourth graders in government schools in Kitwe District, Zambia; to assess Home Literacy Environment and SES among fourth graders in government schools in Kitwe District, Zambia; to determine the relationship between Home Literacy, SES and Executive Functions among fourth graders in government primary schools in Kitwe District, Zambia. This chapter provides the conclusion and recommendations, in line with the research findings.

6.2. Conclusion

In the current study, all fourth graders 116 (100%) performed better on subjective measures of Executive Function than objective measures; 80 (69%) learners were coming from homes that were exposed to literacy, while 36 (31%) were coming from homes that were not exposed to literacy. Furthermore, 51 (44%) were coming from medium Socioeconomic Status whereas 39 (34%) were coming from low Socioeconomic Status and 26 (22%) were coming from high Socioeconomic Status. The study further established a positive relationship between Home Literacy Environment, SES and objective measures of Executive Functions ($p< 0.001$). The study results demonstrated that there is no statistically significant relationship between Home Literacy and subjective measures of EF. The study also revealed that SES is a stronger predictor of EF than Home Literacy Environment.

6.2.1 Recommendations

Based on the findings of the study and the conclusion, the researcher has come up with the following recommendations:

1. Curriculum Development Centre should endeavor to design a curriculum which incorporates activities which target early stimulation of Executive Function.
2. Parents should buy executive function stimulative objects and material for their children in order to facilitate early development of EF.

3. Schools should design assessments that target detecting poor EF to enable early recommendation for intervention.

6.2.2 Implications for future research

1. There is need to undertake a mixed method study on home literacy, socio economic status and development of executive function as the current study was purely quantitative.

2. There is need for a similar study to be undertaken at senior secondary school level to check claims by scholars on development of EF and how it is affected by SES and Home literacy.

3. There is a need for a longitudinal study of EF, SES and development of EF since the current study was a cross sectional study.

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APPENDICES

Appendix A: Ethical Clearance

THE UNIVERSITY OF ZAMBIA

DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

Great East Road | P.O. Box 32379 | Lusaka 10101 | **Tel:** +260-211-290 258/291 777
Fax: +260-1-290 258/253 952 | **Email:** director@drgs.unza.zm | **Website:** www.unza.zm

APPROVAL OF STUDY

28th January, 2020.

REF NO.HSSREC-2019-DEC-002

Mr Laston Mutambo
KITWE

Dear Laston

RE: **"HOME LITERACY ENVIRONMENT AND SOCIO-ECONOMIC STATUS AS PREDICTORS OF EXECUTIVE FUNCTIONING AMONG SELECTED 4TH GRADERS: KITWE ZAMBIA"**

Reference is made to your protocol dated 5th December, 2019. HSSREC resolved to approve this study and your participation as Principal Investigator for a period of one year.

Review Type	Ordinary Review	Approval No. HSSREC-2019-DEC-002
Approval and Expiry Date	Approval Date: 28th January, 2020	Expiry Date: 27th January, 2021
Protocol Version and Date	Version - Nil.	27th January, 2021
Information Sheet, Consent Forms and Dates	• English.	To be provided
Consent form ID and Date	Version - Nil	To be provided
Recruitment Materials	Nil	Nil
Other Study Documents	Questionnaire.	27th January, 2021
Number of Participants Approved for Study		27th January, 2021

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered

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to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.

- All unanticipated or Serious Adverse Events (SAEs) must be reported to HSSREC within 5 days.

- All protocol modifications must be approved by HSSRECprior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.

- All protocol deviations must be reported to HSSRECwithin 5 working days.

- All recruitment materials must be approved by HSSRECprior to being used.

- Principal investigators are responsible for initiating Continuing Review proceedings. HSSRECwill only approve a study for a period of 12 months.

- It is the responsibility of the PI to renew his/her ethics approval through a renewal application to HSSREC.

- Where the PI desires to extend the study after expiry of the study period, documents for study extension must be received by HSSRECat least 30 days before the expiry date. This is for the purpose of facilitating the review process. Documents received within 30 days after expiry will be labelled "late submissions" and will incur a penaltyfee of K500.00. No study shall be renewed whose documents are submitted for renewal 30 days after expiry of the certificate.

- Every 6 (six) months a progress report form supplied by The University of Zambia Humanities and Social Sciences Research Ethics Committee as an IRB must be filled in and submitted to us. There is a penalty of K500.00 for failure to submit the report.

- When closing a project, the PI is responsible for notifying, in writing or using the Research Ethics and Management Online (REMO),both HSSRECand the National Health Research Authority (NHRA) when ethics certification is no longer required for a project.

- In order to close an approved study, a Closing Report must be submitted in writing or through the REMO system. A Closing Report should be filed when data collection has ended and the study team will no longer be using human participants or animals or secondary data or have any direct or indirect contact with the research participants or animals for the study.

- Filing a closing report (rather than just letting your approval lapse) is important as it assists HSSRECin efficiently tracking and reporting on projects. Note that some

funding agencies and sponsors require a notice of closure from the IRB which had approved the study and can only be generated after the Closing Report has been filed.

- A reprint of this letter shall be done at a fee.

- All protocol modifications must be approved by HSSREC by way of an application for an amendment prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address or methodology and methods. Many modifications entail minimal risk adjustments to a protocol and/or consent form and can be made on an Expedited basis (via the IRB Chair). Some examples are: format changes, correcting spelling errors, adding key personnel, minor changes to questionnaires, recruiting and changes, and so forth. Other, more substantive changes, especially those that may alter the risk-benefit ratio, may require Full Board review. In all cases, except where noted above regarding subject safety, any changes to any protocol document or procedure must first be approved by HSSREC before they can be implemented.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of HSSREC, we would like to wish you all the success as you carry out your study.

Yours faithfully,

Dr. J.L.I. Ziwa

VICE CHAIRPERSON
THE UNIVERSITY OF ZAMBIA HUMANITIES AND
SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE - IRB

cc: Director, Directorate of Research and Graduate Studies
    Assistant Director (Research), Directorate of Research and Graduate Studies
    Assistant Registrar (Research), Directorate of Research and Graduate Studies

Appendix B: Biographical data

BIOGRAPHICAL DATA
DISTRICT:…………………………………………**SCHOOL**: _____

NAME:_____   **ID:**_____

AGE:_____   **SEX:** _____

CLASS:_____

This instrument will be completed by the researcher who will interview one pupil at a time while other pupils will be kept away from the interview room. English language will be used to get information from the pupils, but where necessary, Bemba will be used in order to get the most desired information.

SECTION 1: LANGUAGE BACKGROUND

	LANGUAGE	**ENGLISH (1)**	**BEMBA (2)**	**OTHERS-SPECIFY (3)**
Q.1	Which language does your mother/caregiver speak best?			
Q.2	Which language does your father/caregiver speak best?			
Q.3	Which language(s) are spoken in your home? Which language is used most frequently?			
Q.4	Which language(s) do you use when playing with others? Which language do you mostly use?			
Q.5	Which language do you mainly use in class?			

Note: More than one option can be chosen from above

SECTION 2: EXPOSURE TO LITERACY ACTIVITIES AT HOME

Q.1 Do you read at home?

            1.Yes [ ]   2.No [ ]

Q.2 Note: if the answer the above is, No go to section 3

Q.3 If the response to the question above is yes, ask the child to list titles of books/journals/other reading materials he/she has read.

    a) _____

    b) Does someone help you when you are reading at home?

            1. Yes [ ]   2.No [ ]

Q.4 If so, who?

        [Mother] [Father] [Siblings] [Other], please specify_____

SECTION 3: SOCIO-ECONOMIC STATUS

Q.1 What is your Father's/ caregiver's occupation? -------------------------

Q.2 What is your Mother's occupation? _____

Q.3 Did you attend pre-school/nursery school before coming to this school?
1. Yes [ ]   2.No [ ]

Q.4 If the answer to the above is yes, ask the child to state the name of the school he/she went to_____

SECTION 4: HOME POSSESSIONS

Q.1 Do you have a television in your home? 1. Yes [ ] 2. No [ ]

Q.2 Do you have a radio in your home? 1. Yes [ ] 2. No [ ]

Q.3 Do you have a stove at home? 1. Yes [ ] 2. No [ ]

Q.4 Do you have electricity at home? 1. Yes [ ]   2.No [ ]

Q.5 Do you have running water at home? 1. Yes [ ]   2.No [ ]

Q.6 Do you have a flushable toilet? 1. Yes [ ]   2.No [

Q.7 Do you have a car at home? 1. Yes [ ]   2.No [ ]

Q.8 Do you have at least two pairs of clothes? 1. Yes [ ]   2.No [ ]

Q.9 Do you have at least one pair of shoes? 1. Yes [ ]   2.No [ ]

CONSENT FORM

Dear Parent/Guardian,

My name is **LASTON MUTAMBO**, a Masters student from the University of Zambia currently doing research.

You are being invited to participate in this study on **Home Literacy Environment and Socio-Economic Status as predictors of Executive Functioning among selected 4th Graders: Kitwe, Zambia** in which your child/dependent who is in Grade 4 at …………………………School has been selected as a participant. This study is for academic purposes only. Therefore, the information being gathered will not be availed to other people or institutions other than those concerned with this study. As a matter of priority, high confidentiality will be upheld throughout this research process and names of participants will remain anonymous. For this reason, you do not need to write your name(s) on this form.

I thank you in advance,

LASTON MUTAMBO

(Researcher)

Signature of participant……………Date: ……………………….

HOME LITERACY ENVIRONMENT QUESTIONNAIRE

Respondent's Demographic Data

Age of respondent: ………… Gender: …………………………………..

Relationship to the child: …………………………………………………

Child ID #: ………………………….

Respond to questions which apply to your situation by ticking or writing in the spaces provided. Understand each item carefully before to respond to it.

1. **How many children of school going age are in your home? ………………..**

   Of these, how many are in the

    (a) First grade? …………………………………….
    (b) Second grade? ………………………………
    (c) Other grades? ……………………………….

2. What is your highest level of education? (Tick only one)

       Never been to school   [   ]

       Primary: grade 1 to7   [   ]

       Junior secondary: grade 8 to 9   [   ]

       Senior secondary: grade10 to 12,   [   ]

       Post secondary 2-3 years training   [   ]

       Bachelor's degree   [   ]

       Masters degree and above   [   ]

3. What do you do mainly to earn your living?

    Formal employment   [   ] specify: …………………………………….

    Non formal employment [   ] specify: …………………………………….

    Other things   [   ] specify: ……………………………….

    Nothing   [   ]

4. Are you able to read and write?

Very well [   ]   Fairly well [   ]   A bit [   ]   Not all [   ]

5. Do you have a general family library in your home? (Tick only one)

Yes [   ]   No [   ]

If no, justify your answer:

………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………

6. Do you have a specific library for young children in your home? (Tick only one)

Yes [   ]   No [   ]

If no, justify your answer:

……
……
………………………………………………………………………………………………………

7. If there is a children's library in your home, approximately how many story books for children are there in stock?   (Tick only one)

    Less than 10   [   ]

    Between 10 and 20 [   ]

    Between 21 and 30 [   ]

    More than 31   [   ]

8. If there is a children's library, where do you get the books from?

    Schools [   ]   Shops [   ]   Other library [   ]   Any other sources [   ]

9. If there is a children's library, how are the books are selected or chosen? (Tick as many as possible)

By myself [   ]   By experts e.g. teachers [   ]   By children [   ]   By other people [   ]

No specific system is followed [   ]

10. If there is a children's library, can you remember some of the book-titles found in this library?

    Yes [   ] No [   ] **(Tick only one)**

Examples   of   book-titles   remembered:
……
……
………………………………………………………………………………………………………
……..

11. Do you read to your child/Children in your home? (Tick only one)

Usually [   ]   Sometimes [   ] Never [   ]

12. If you do read to your child/Children, how many times did you last read to him/her/them in the last seven days?

Once [   ]   Twice [   ]   three times [   ]   More than three times [   ]

13. Do you have a schedule/timetable to guide your reading sessions with your child/ren?
Yes [   ]   No   [   ]

14. What type of reading activities do you engage your child/Children in? (tick as many as possible)
Letters of the alphabet [   ]   syllables [   ] words [   ] sentences [   ] short stories [   ]

15. Do you experience any challenges when reading to your child/Children? (tick only one)

Usually [   ]   Sometimes [   ] Never [   ]

Give examples of challenges you experience with reading ……………………………………
……
……

What type of writing activities do you engage your child/Children in? (Tick as many as possible)

Letters of the alphabet [   ]   syllables [   ]   words [   ] sentences [   ] short stories

16. Do you experience any challenges as you engage your child in writing activities?
(Tick only one)

Usually [   ]   Sometimes [   ] Never [   ]

Give   examples   of   challenges   you   experience   with   writing
……
……
……

17. What type of Maths activities do you engage your child/ren in?

Counting with sticks/stones/etc [   ]   Counting orally [   ]   Counting with songs [   ]
Writing numbers [   ]   Solving sums [   ]   Math games [   ]   Puzzles [   ]

(Tick as many as possible)

18. Do you experience any challenges in Maths with your Child/Children?

(Tick only one)

Usually [   ]   Sometimes [   ] Never [   ]

Give examples of challenges you experience with Maths

………

………

……………………………………………………………………………………………………

19. Who <u>mostly</u> assists the child with school work at home?
Mother [   ] father   [   ] siblings [   ]   Neighbours [   ]   Hired trained teacher [   ]
Hired un-trained teacher [   ]   No one [   ] **(tick only one)**

20. If the assistance is rendered, where is the child usually assisted/taught from?

Library/study room [   ]   Sitting room [   ] Dining room [   ] Bedroom [   ]   Kitchen
[   ]   Outside [   ]   School [   ]

21. Do have a chalk board or white board at home for teaching your child/ren?
(tick only one)

Yes [   ]   No [   ]

22. Do you give academic incentives to your child? (tick only one)

Usually [   ]   Sometimes [   ] Never [   ]

**23. What sorts of academic incentives are <u>mostly</u> provided to child/ren? (tick only one) (tick
only one)**
Verbal praises [   ]   Tokens [   ]   Written comments [   ]   Stickers [   ] Family
outings [   ]   other [   ]

24. **Do you share your observations regarding your child's performance at home with your
child's class teacher**? **(tick only one)**

Usually [   ]   Sometimes [   ] Never [   ]

26. **Who assists you to educate and take care of your child/children?**

Husband [   ]   Wife [   ]   others specify …………………………………………………

27. **How much is your income per month? [Tick only one]**
Below K2 000 [   ]   About K6 000 [   ]   Above K6 000 [   ]

28. **Where do you reside? [Tick only one]**
High cost area [   ]   Medium cost area [   ]   Low cost area [   ].

END: *Thank you very much for taking your time to answer this questionnaire.*

Appendix C: Kaufman Pattern Reasoning Test

NAME: _____ AGE: ____ SEX: _____ ID: _____

SCHOOL: _____ RATER'S ID: _____

1	A	B	C	D		
2	A	B	C	D		
3	A	B	C	D		
4	A	B	C	D		
5	A	B	C	D		
6	A	B	C	D	E	F
7	A	B	C	D	E	F
8	A	B	C	D	E	F
9	A	B	C	D	E	F
10	A	B	C	D	E	F
11	A	B	C	D	E	F
12	A	B	C	D	E	F
13	A	B	C	D	E	F
14	A	B	C	D	E	F
15	A	B	C	D	E	F
16	A	B	C	D	E	F
17	A	B	C	D	E	F
18	A	B	C	D	E	F
19	A	B	C	D	E	F

Appendix D: Executive Function Instruments

Practice

DELIS · KAPLAN
D·KEFS
Executive Function System

Trail Making Test

Name _____ Age _____
ID _____ Date _____
Examiner _____
Notes _____
_____
_____

Condition 1
Visual Scanning
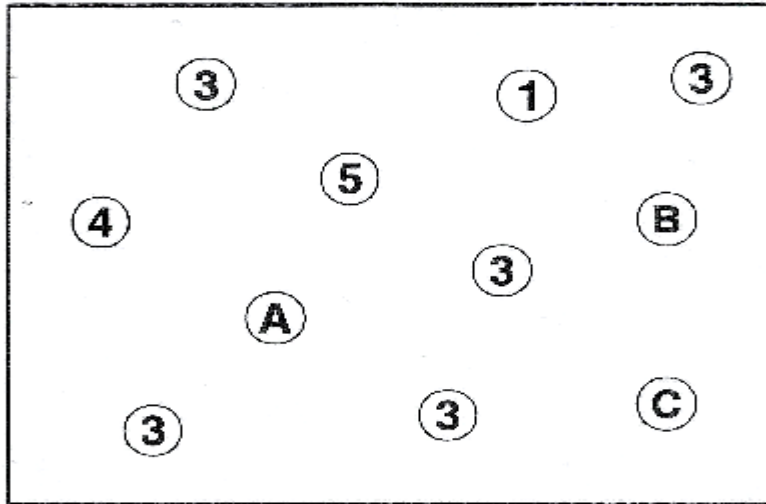
③ ③ ⓒ ③

Ⓗ ⑤

④ ③

Ⓔ ③ ⑧

③

⑫ ③

Ⓟ Ⓖ

⑥

③ ③

⑭ Ⓝ

Ⓑ ③

⑦ Ⓕ

③

③ ③

DELIS · KAPLAN

D·K

Executive Function System™

Trail Making Test

Name _____ Age _____

ID _____ Date _____

Examiner _____

Notes _____

_____

_____
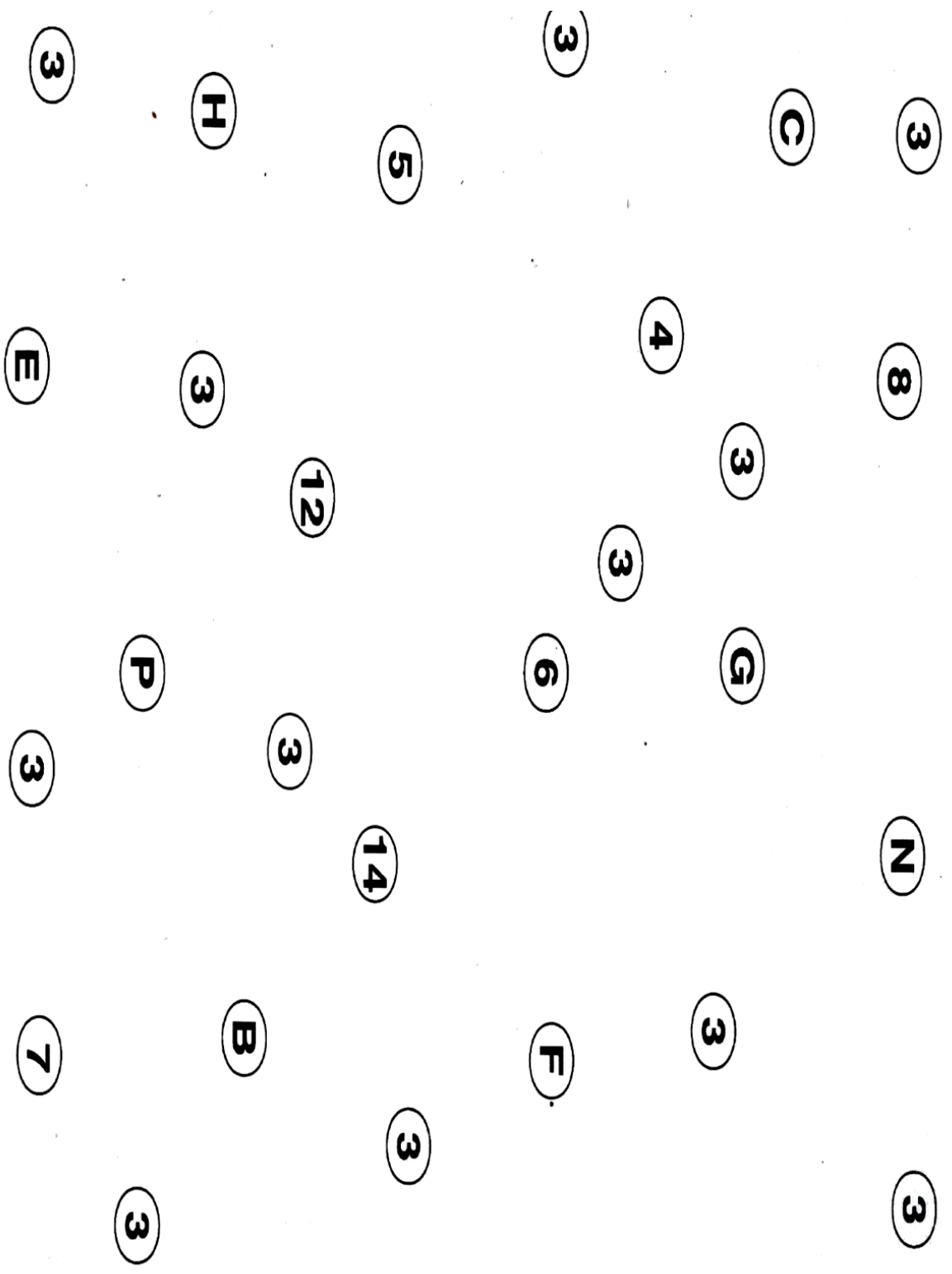
Condition 2
Number Sequencing

Practice
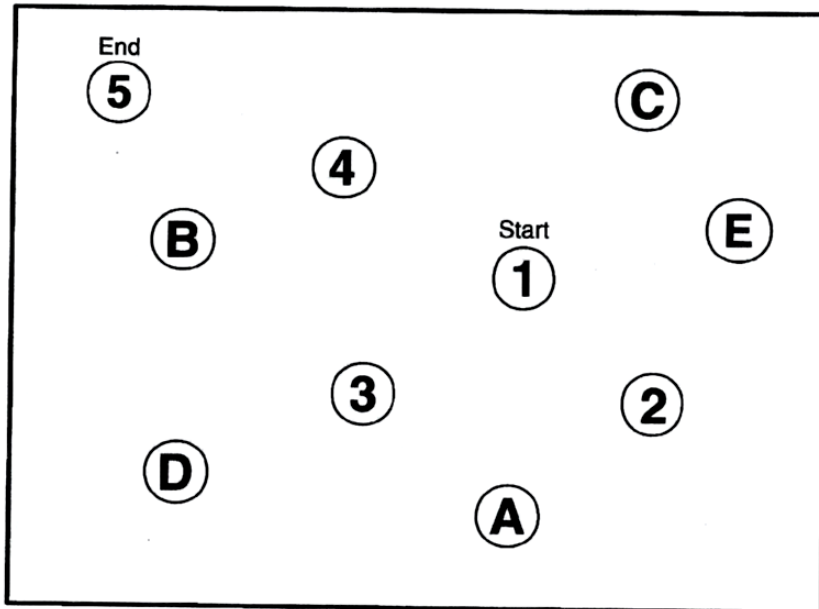
PEARSON

Ψ *PsychCorp*

DELIS · KAPLAN
D·K
Executive Function System™

Trail Making Test

Name _____ Age _____

ID _____ Date _____

Examiner _____

Notes _____

_____

_____

Condition 3
Letteer Sequencing

Practice

Trail Making Test

Name _____   Age _____

ID _____   Date _____

Examiner _____

Notes _____

_____

_____
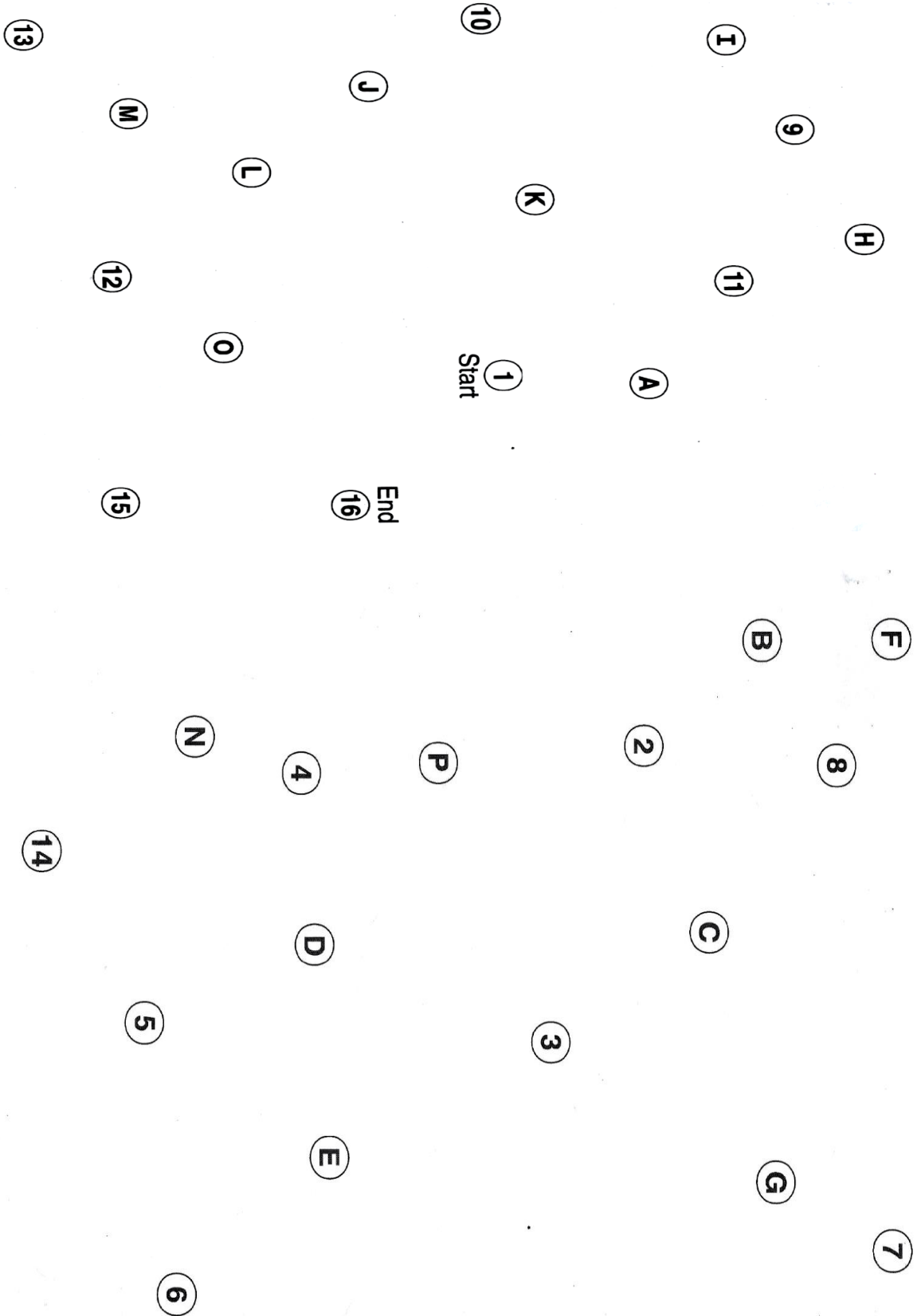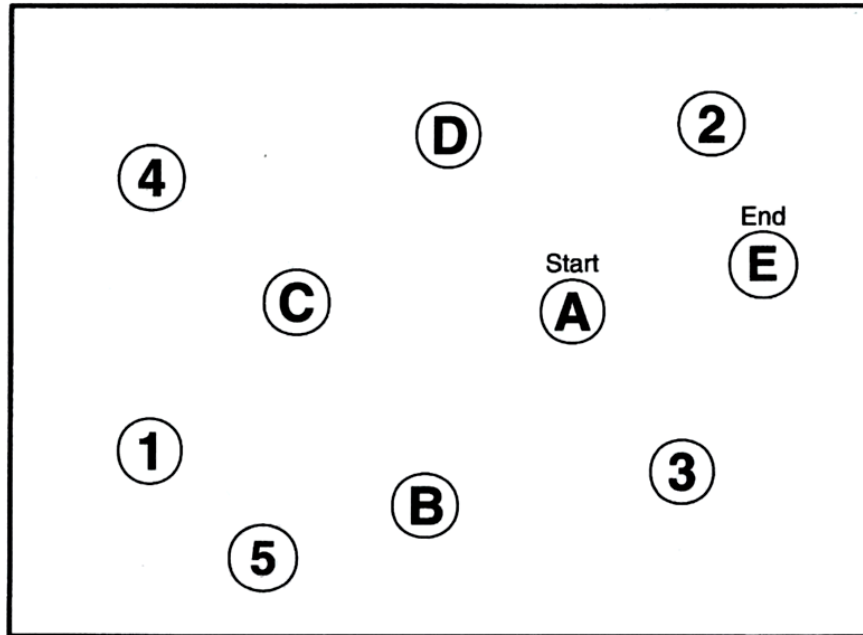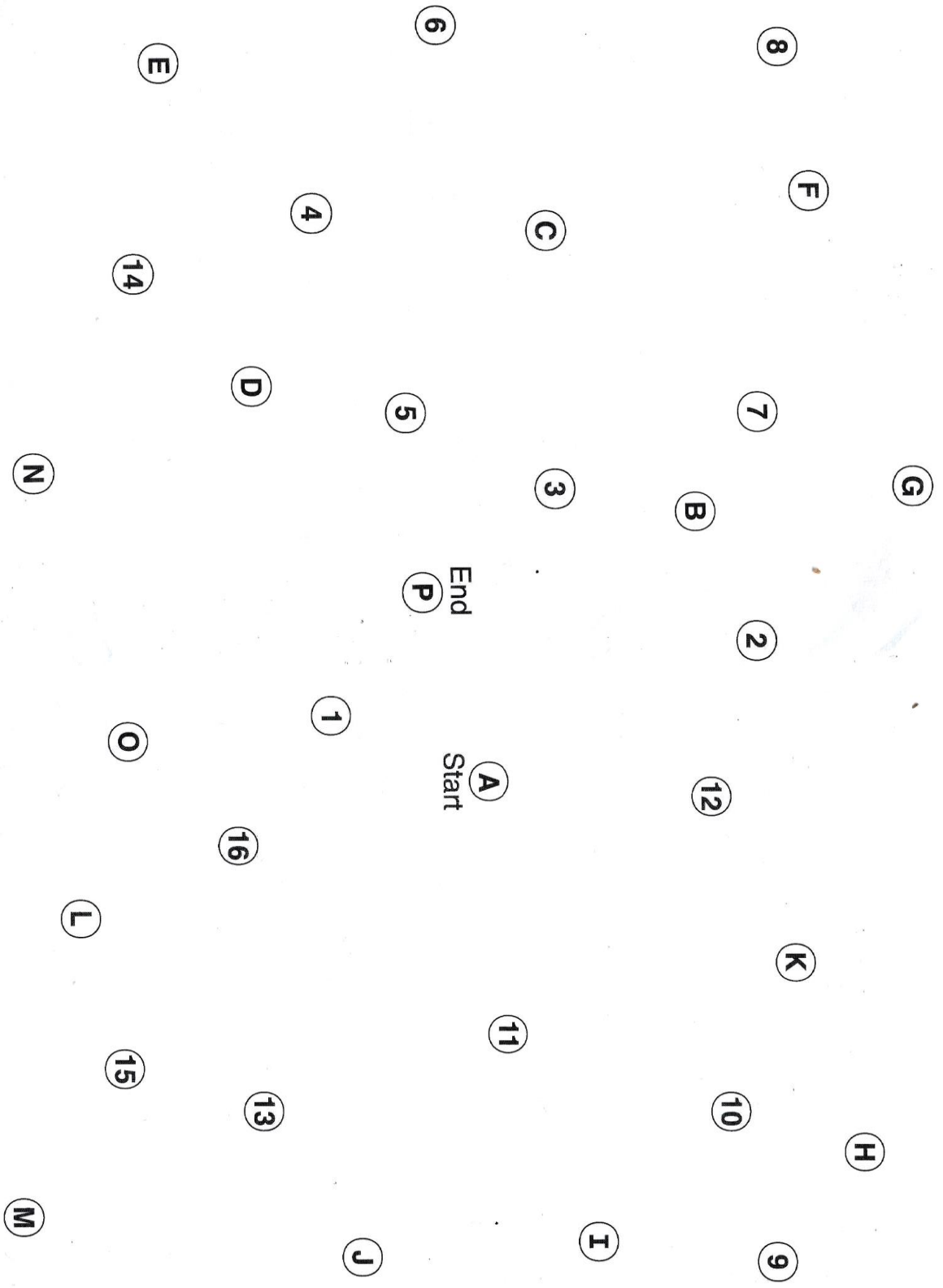
Condition 4
Number - Letter Switching

Practice
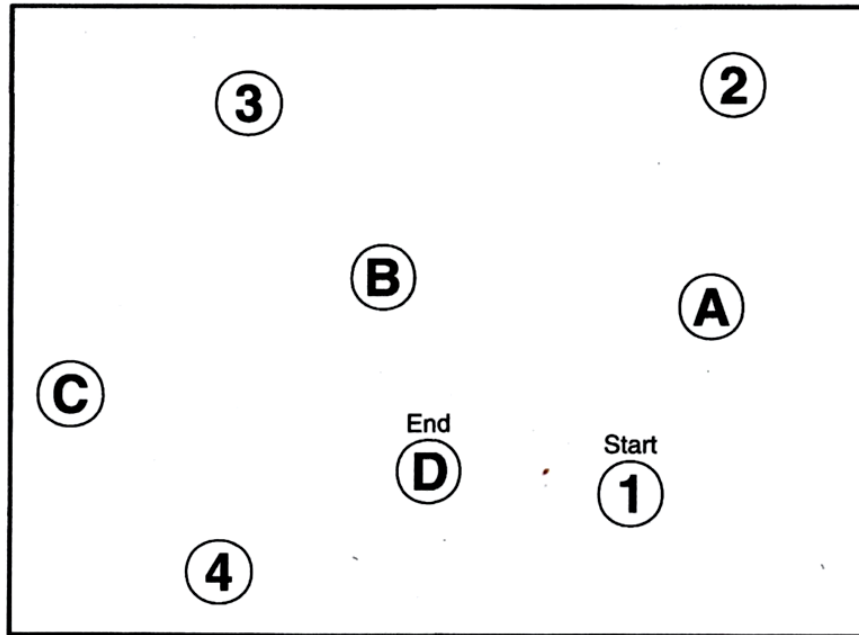
Start

End

1
2
3
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A
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75

DELIS • KAPLAN

D·K

Executive Function System™
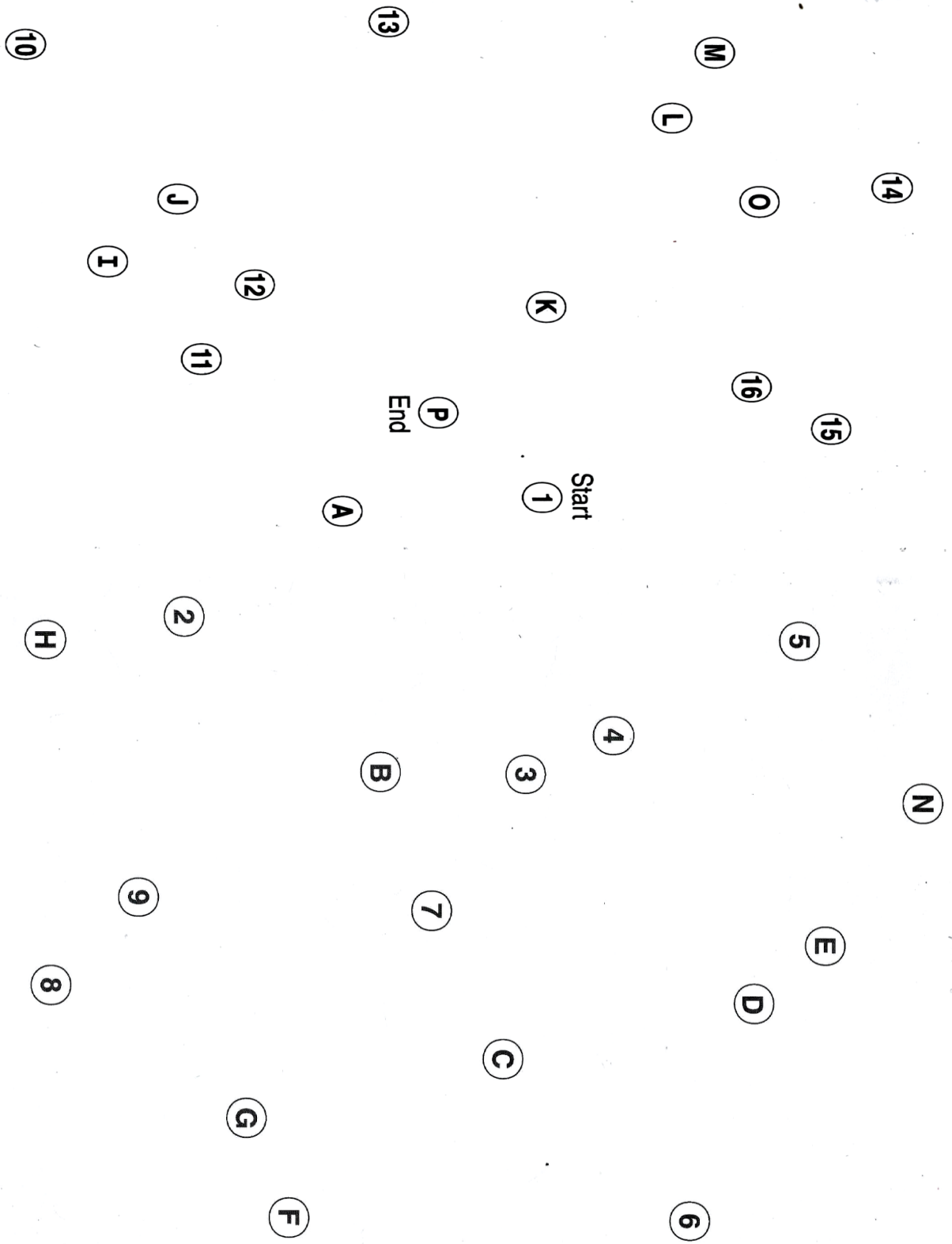
Trail Making Test

Name _____ Age _____

ID _____ Date _____

Examiner _____

Notes _____
_____
_____

**Condition 5
Motor Speed**

Practice
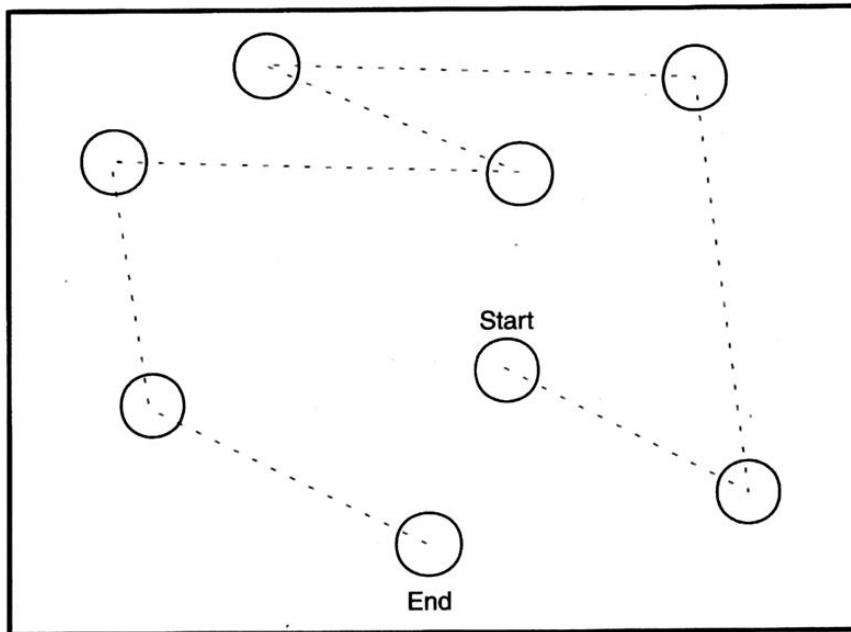
Start

End

35 36 37 38 39 40 A B C D E

Start

End

77
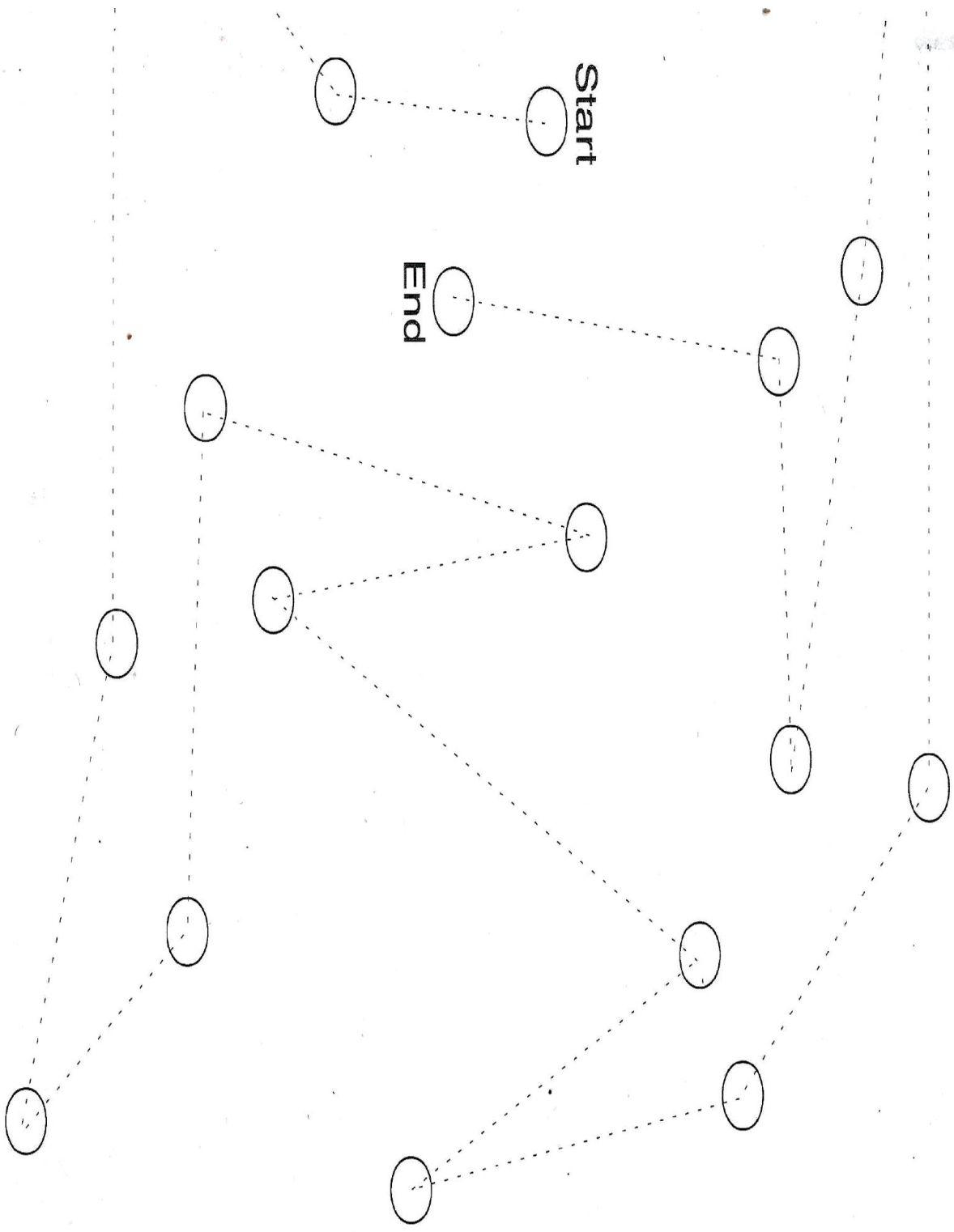
BRIEF®2

Behavior Rating Inventory of
Executive Function® Second Edition

PARENT FORM

Gerard A. Gioia, PhD, Peter K. Isquith, PhD,
Steven C. Guy, PhD, and Lauren Kenworthy, PhD

Instructions

On the following pages is a list of statements that describe children. We would like to know if
your child has had <u>problems</u> with these behaviors <u>over the past 6 months</u>. Please <u>answer all the
items</u> the best that you can. Please DO NOT SKIP ANY ITEMS. Think about your child as
you read each statement and circle:

> **N** if the behavior is **Never** a problem
>
> **S** if the behavior is **Sometimes** a problem
>
> **O** if the behavior is **Often** a problem

For example, if your child **never** has trouble completing homework on time, you would circle **N**
for this item:

Has trouble completing homework on time   Ⓝ   S   O

If you make a mistake or want to change your answer, DO NOT ERASE. Draw an "X"
through the answer you want to change and then circle the correct answer:

Has trouble completing homework on time   ☒   Ⓢ   O

Before you begin answering the items, please fill in your child's name, gender, age, grade, your
relationship to the child, today's date, and child's date of birth in the spaces provided at the top of
the next page.

BRIEF®2 PARENT FORM

Date of birth _____

Child's name _____ Gender _____ Age _____ Grade _____

Rater's name _____ Relationship to child _____ Today's date _____

	Inhibit	Self-Monitor	Shift	Emotional Control	Initiate	Working Memory	Plan/Organize	Task-Monitor	Organization of Materials	1	2	3	
1.	☐									1	2	3	
2.			☐							1	2	3	
3.						☐				1	2	3	
4.		☐								1	2	3	
5.								☐		1	2	3	Ⓘ
6.				☐						1	2	3	
7.							☐			1	2	3	
8.									☐	1	2	3	
9.					☐					1	2	3	Ⓘ
10.	☐									1	2	3	Ⓘ
11.			☐							1	2	3	
12.						☐				1	2	3	
13.		☐								1	2	3	
14.				☐						1	2	3	N
15.							☐			1	2	3	
16.	☐									1	2	3	
17.			☐							1	2	3	Ⓘ
18.										1	2	3	F
19.						☐				1	2	3	
20.		☐								1	2	3	Ⓘ
21.								☐		1	2	3	Ⓘ
22.				☐						1	2	3	Ⓘ
23.							☐			1	2	3	
24.	☐									1	2	3	
25.						☐				1	2	3	Ⓘ
26.		☐								1	2	3	Ⓘ
27.				☐						1	2	3	
28.						☐				1	2	3	N
29.								☐		1	2	3	
30.	☐									1	2	3	N
31.			☐							1	2	3	
32.						☐				1	2	3	

Subtotals (Items 1-32) —

Inhibit	Self-Monitor	Shift	Emotional Control	Initiate	Working Memory	Plan/Organize	Task-Monitor	Organization of Materials

	Inhibit	Self-Monitor	Shift	Emotional Control	Initiate	Working Memory	Plan/Organize	Task-Monitor	Organization of Materials				
33.								☐		1	2	3	
34.				☐						1	2	**3**	N
35.							☐			1	2	3	
36.										1	**2**	**3**	F
37.									☐	1	2	3	Ⓘ
38.					☐					1	2	3	
39.	☐									1	2	**3**	N
40.			☐							1	2	3	Ⓘ
41.						☐				1	2	**3**	N
42.								☐		1	2	3	
43.				☐						1	2	3	
44.							☐			1	2	3	
45.									☐	1	2	3	
46.						☐				1	2	3	
47.									☐	1	2	3	
48.	☐									1	2	3	Ⓘ
49.			☐							1	2	3	
50.					☐					1	2	3	Ⓘ
51.				☐						1	2	3	
52.							☐			1	2	3	
53.									☐	1	2	3	
54.										1	**2**	**3**	F
55.					☐					1	2	3	Ⓘ
56.				☐						1	2	3	Ⓘ
57.							☐			1	2	3	
58.		☐								1	2	**3**	N
59.							☐			1	2	3	
60.		☐								1	2	**3**	N
61.					☐					1	2	3	
62.	☐									1	2	3	
63.									☐	1	2	3	Ⓘ

	Inhibit	Self-Monitor	Shift	Emotional Control	Initiate	Working Memory	Plan/Organize	Task-Monitor	Organization of Materials	
		✕								**Subtotals (Items 33-63)**
										Subtotals (Items 1-32)
										Total raw scale scores

80

BRIEF®2 PARENT FORM

Date of birth _____

Child's name _____ Gender _____ Age _____ Grade _____

Rater's name _____ Relationship to child _____ Today's date _____

	N = Never S = Sometimes O = Often	N	S	O
1.	Is fidgety	N	S	O
2.	Resists or has trouble accepting a different way to solve a problem with schoolwork, friends, tasks, etc.	N	S	O
3.	When given three things to do, remembers only the first or last	N	S	O
4.	Is unaware of how his/her behavior affects or bothers others	N	S	O
5.	Work is sloppy	N	S	O
6.	Has explosive, angry outbursts	N	S	O
7.	Does not plan ahead for school assignments	N	S	O
8.	Cannot find things in room or school desk	N	S	O
9.	Is not a self-starter	N	S	O
10.	Does not think before doing (is impulsive)	N	S	O
11.	Has trouble getting used to new situations (classes, groups, friends, etc.)	N	S	O
12.	Has a short attention span	N	S	O
13.	Has poor understanding of own strengths and weaknesses	N	S	O
14.	Has outbursts for little reason	N	S	O
15.	Gets caught up in details and misses the big picture	N	S	O
16.	Gets out of control more than friends	N	S	O
17.	Gets stuck on one topic or activity	N	S	O
18.	Forgets his/her name	N	S	O
19.	Has trouble with chores or tasks that have more than one step	N	S	O
20.	Does not realize that certain actions bother others	N	S	O
21.	Written work is poorly organized	N	S	O
22.	Small events trigger big reactions	N	S	O
23.	Has good ideas but does not get job done (lacks follow-through)	N	S	O
24.	Talks at the wrong time	N	S	O
25.	Has trouble finishing tasks (chores, homework, etc.)	N	S	O
26.	Does not notice when his/her behavior causes negative reactions	N	S	O
27.	Reacts more strongly to situations than other children	N	S	O
28.	Has trouble remembering things, even for a few minutes	N	S	O
29.	Makes careless errors	N	S	O
30.	Gets out of seat at the wrong times	N	S	O
31.	Becomes upset with new situations	N	S	O
32.	Has trouble concentrating on tasks, schoolwork, etc.	N	S	O

		N = Never	S = Sometimes	O = Often
33.	Has poor handwriting	N	S	O
34.	Mood changes frequently	N	S	O
35.	Has good ideas but cannot get them on paper	N	S	O
36.	Has trouble counting to three	N	S	O
37.	Leaves messes that others have to clean up	N	S	O
38.	Needs to be told to begin a task even when willing	N	S	O
39.	Acts too wild or "out of control"	N	S	O
40.	Thinks too much about the same topic	N	S	O
41.	Forgets what he/she was doing	N	S	O
42.	Does not check work for mistakes	N	S	O
43.	Angry or tearful outbursts are intense but end suddenly	N	S	O
44.	Becomes overwhelmed by large assignments	N	S	O
45.	Loses lunch box, lunch money, permission slips, homework, etc.	N	S	O
46.	Needs help from an adult to stay on task	N	S	O
47.	Forgets to hand in homework, even when completed	N	S	O
48.	Has trouble putting the brakes on his/her actions	N	S	O
49.	Resists change of routine, foods, places, etc.	N	S	O
50.	Has trouble getting started on homework or tasks	N	S	O
51.	Mood is easily influenced by the situation	N	S	O
52.	Underestimates time needed to finish tasks	N	S	O
53.	Does not bring home homework, assignment sheets, materials, etc.	N	S	O
54.	Cannot find the front door of home	N	S	O
55.	Does not take initiative	N	S	O
56.	Becomes upset too easily	N	S	O
57.	Starts assignments or tasks at the last minute	N	S	O
58.	Has trouble moving from one activity to another	N	S	O
59.	Has trouble carrying out the actions needed to reach goals (saving money for special item, studying to get a good grade, etc.)	N	S	O
60.	Is disturbed by change of teacher or class	N	S	O
61.	Has trouble organizing activities with friends	N	S	O
62.	Becomes too silly	N	S	O
63.	Leaves a trail of belongings wherever he/she goes	N	S	O

Item Administration

Forward

▶ Items 1–9

Say, **I'm going to say some numbers. Listen carefully, I can only say them one time. When I stop, you say them back to me in the same order. Just say what I say.** Proceed to Item 1.

Administer Trial 1 and Trial 2 of each item. Proceed to the next item if the discontinue criterion has not been met.

Administer Backward and Sequencing regardless of the child's performance on Forward.

Correct Responses (Forward)

Item	Trial
1.	2 – 9
	5 – 4
2.	3 – 9 – 6
	6 – 5 – 2
3.	5 – 4 – 1 – 7
	9 – 1 – 6 – 8
4.	8 – 2 – 1 – 9 – 6
	7 – 2 – 3 – 4 – 9
5.	5 – 7 – 3 – 6 – 4 – 8
	3 – 8 – 4 – 1 – 7 – 5
6.	2 – 1 – 8 – 9 – 4 – 3 – 7
	7 – 8 – 5 – 2 – 1 – 6 – 3
7.	1 – 8 – 4 – 2 – 7 – 5 – 3 – 6
	2 – 7 – 9 – 6 – 3 – 1 – 4 – 8
8.	7 – 2 – 6 – 1 – 9 – 4 – 8 – 3 – 5
	4 – 3 – 8 – 9 – 1 – 7 – 5 – 6 – 2
9.	6 – 2 – 5 – 3 – 1 – 9 – 8 – 5 – 4 – 7
	9 – 4 – 3 – 8 – 7 – 5 – 2 – 9 – 6 – 1

Correct Responses (*Backward*)

Item	Trial	Correct Response
S.	9 – 4	4 – 9
	5 – 6	6 – 5
1.	2 – 1	1 – 2
	1 – 3	3 – 1
2.	3 – 9	9 – 3
	8 – 5	5 – 8
3.	2 – 3 – 6	6 – 3 – 2
	5 – 4 – 1	1 – 4 – 5
4.	4 – 5 – 8	8 – 5 – 4
	2 – 7 – 5	5 – 7 – 2
5.	7 – 4 – 5 – 2	2 – 5 – 4 – 7
	9 – 3 – 8 – 6	6 – 8 – 3 – 9
6.	2 – 1 – 7 – 9 – 4	4 – 9 – 7 – 1 – 2
	5 – 6 – 3 – 8 – 7	7 – 8 – 3 – 6 – 5
7.	1 – 6 – 4 – 7 – 5 – 8	8 – 5 – 7 – 4 – 6 – 1
	6 – 3 – 7 – 2 – 9 – 1	1 – 9 – 2 – 7 – 3 – 6
8.	8 – 1 – 5 – 2 – 4 – 3 – 6	6 – 3 – 4 – 2 – 5 – 1 – 8
	4 – 3 – 7 – 9 – 2 – 8 – 1	1 – 8 – 2 – 9 – 7 – 3 – 4
9.	3 – 1 – 7 – 9 – 4 – 6 – 8 – 2	2 – 8 – 6 – 4 – 9 – 7 – 1 – 3
	9 – 8 – 1 – 6 – 3 – 2 – 4 – 7	7 – 4 – 2 – 3 – 6 – 1 – 8 – 9

Sequencing

◼◼▶ Qualifying Item

Say, **Count to five out loud so I can hear you.**

If it appears that the child does not understand, say, **Count, like this, 1...2...** (pause between each number). **Now you try.** Allow the child to respond.

Correct response [correctly counts to at least **3**]: Proceed to Sample Item A.

Incorrect response: Discontinue the subtest.

Correct Responses (*Sequencing*)

Item	Trial	Correct Response
SA.	3 – 1	1 – 3
	8 – 6	6 – 8
SB.	5 – 2 – 4	2 – 4 – 5
	4 – 3 – 3	3 – 3 – 4
1.	4 – 1	1 – 4
	3 – 2	2 – 3
2.	5 – 2 – 7	2 – 5 – 7
	1 – 8 – 6	1 – 6 – 8
3.	7 – 5 – 8 – 1	1 – 5 – 7 – 8
	4 – 2 – 9 – 3	2 – 3 – 4 – 9
4.	1 – 5 – 6 – 2 – 8	1 – 2 – 5 – 6 – 8
	2 – 8 – 4 – 7 – 9	2 – 4 – 7 – 8 – 9
5.	3 – 3 – 6 – 1 – 5	1 – 3 – 3 – 5 – 6
	4 – 9 – 4 – 6 – 9	4 – 4 – 6 – 9 – 9
6.	8 – 5 – 2 – 5 – 3 – 7	2 – 3 – 5 – 5 – 7 – 8
	6 – 1 – 4 – 7 – 9 – 3	1 – 3 – 4 – 6 – 7 – 9
7.	9 – 7 – 9 – 6 – 2 – 6 – 8	2 – 6 – 6 – 7 – 8 – 9 – 9
	3 – 1 – 7 – 5 – 1 – 8 – 5	1 – 1 – 3 – 5 – 5 – 7 – 8
8.	6 – 9 – 6 – 2 – 1 – 3 – 7 – 9	1 – 2 – 3 – 6 – 6 – 7 – 9 – 9
	1 – 4 – 8 – 5 – 4 – 8 – 7 – 4	1 – 4 – 4 – 4 – 5 – 7 – 8 – 8
9.	2 – 5 – 7 – 7 – 4 – 8 – 7 – 5 – 2	2 – 2 – 4 – 5 – 5 – 7 – 7 – 7 – 8
	9 – 1 – 8 – 3 – 6 – 3 – 9 – 2 – 6	1 – 2 – 3 – 3 – 6 – 6 – 8 – 9 – 9

Subject ID: Date:

Pencil Tapping Test

Give one pencil to the child, and keep one pencil for yourself

Say, "We are going to play a new game now. When I tap my pencil on the table once (demonstrate), I want you to tap your pencil twice. Can you do that?"

Allow child to practice until they tap correctly.
"When I tap my pencil twice, I want you to tap your pencil once. Can you do that?"

Allow child to practice until they tap correctly.
"When I tap my pencil three times, don't tap your pencil at all. Now let's try it."

Tap once, then twice, then three times, then repeat. Allow the child to practice until they are able to do three sequences in a row correctly.
"Great, now we are ready to play the game. When I tap one time, I want you to tap two times. When I tap two times, I want you to tap one time. When I tap three times, don't tap at all. Are you ready?" If child expresses that they are ready, begin.

Examiner Taps	Incorrect?		Incorrect?
1		1	
2		2	
2		1	
2		2	
1		3	
1		1	
1		1	
3		2	
2		2	
1		1	
2		3	
3		1	
1		1	
1		1	
2		3	
1		2	
2		1	
2		1	
2		1	
1		3	
Total Errors=		Total Score (40-total errors):	

86

KAUFMAN PATTERN REASONING

A   B   C   D

88

A   B   C   D

A   B   C   D

A   B   C   D   E   F

A   B   C   D

A   B   C   D

A   B   C   D   E   F

A   B   C   D   E   F

A   B   C   D   E   F

A   B   C   D   E   F

◇ | ? | ✚ | ◇ | ○ | ✚

◇ | ● | ✚ | ✚ | ◆ | ○
A | B | C | D | E | F

?
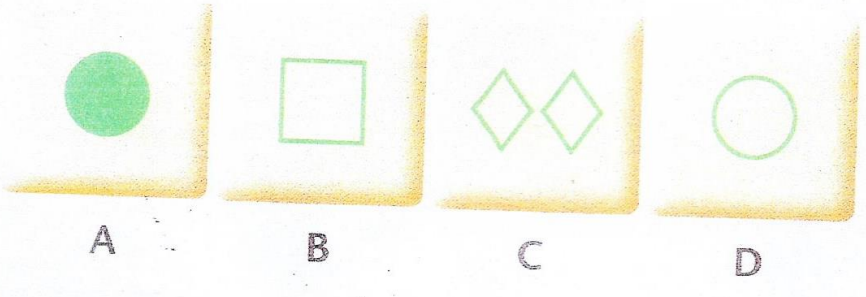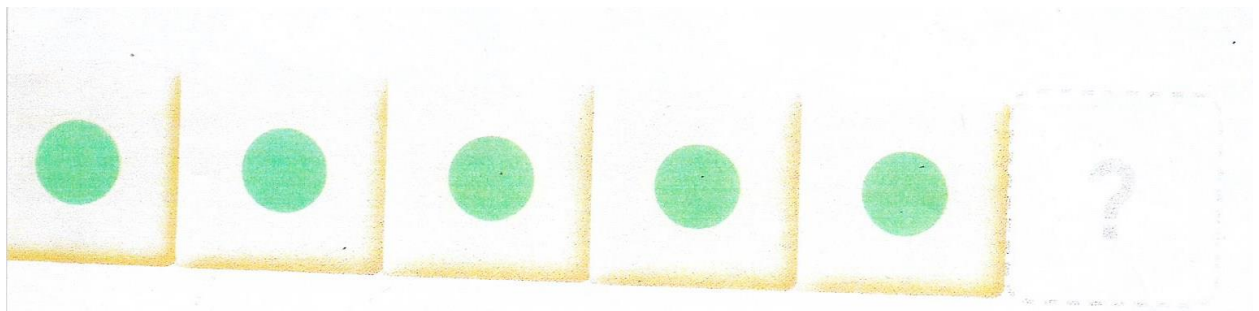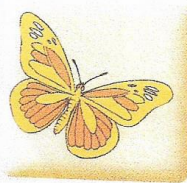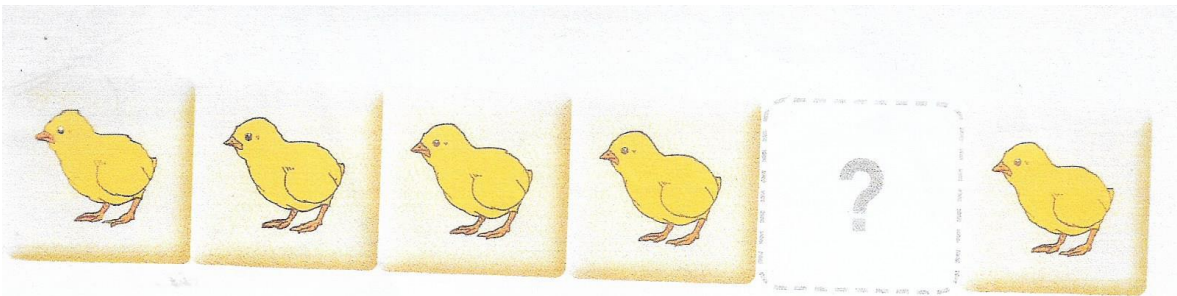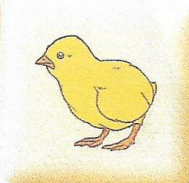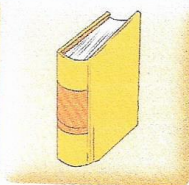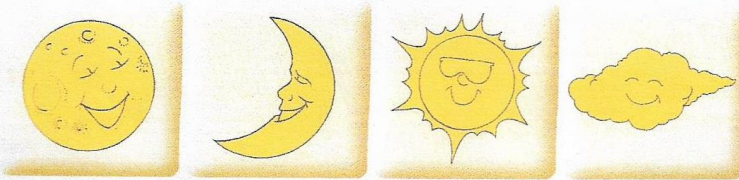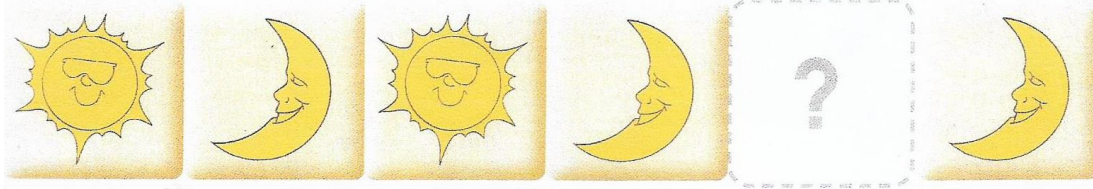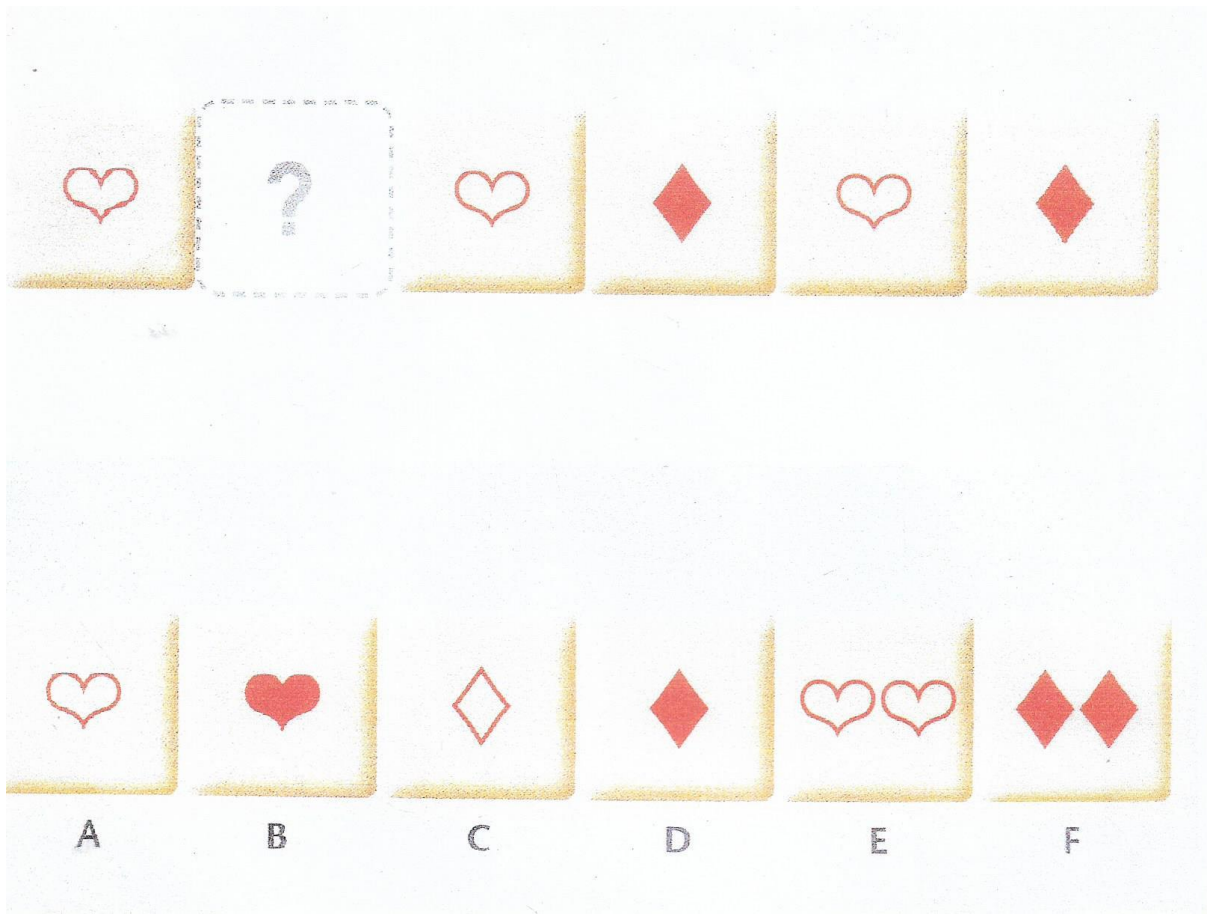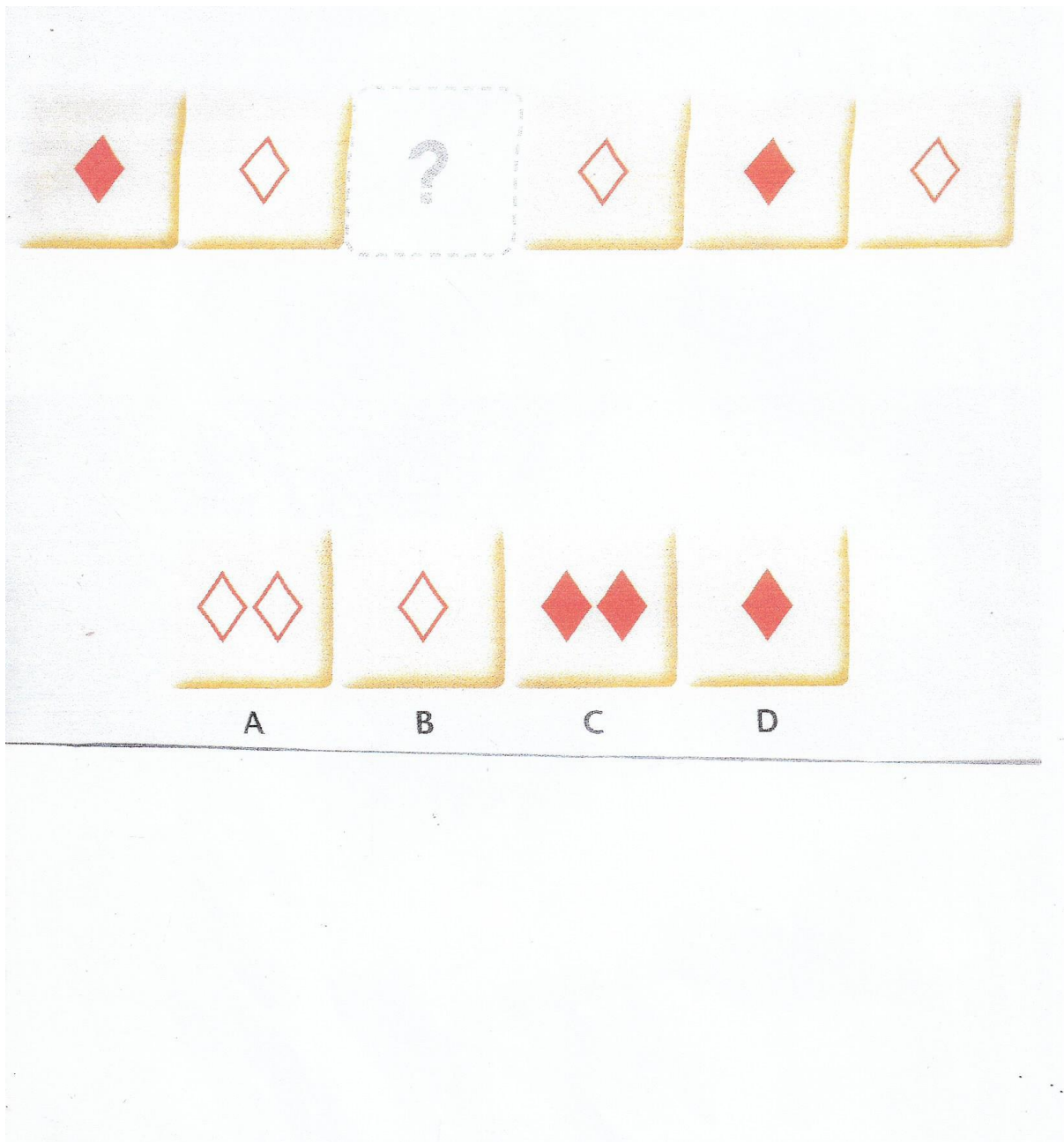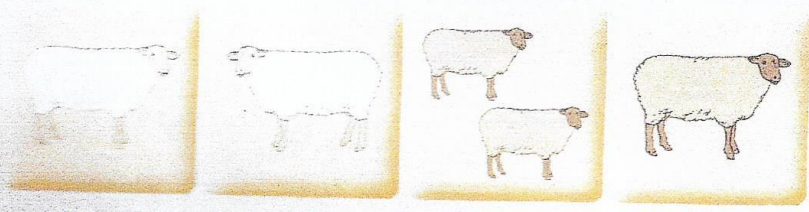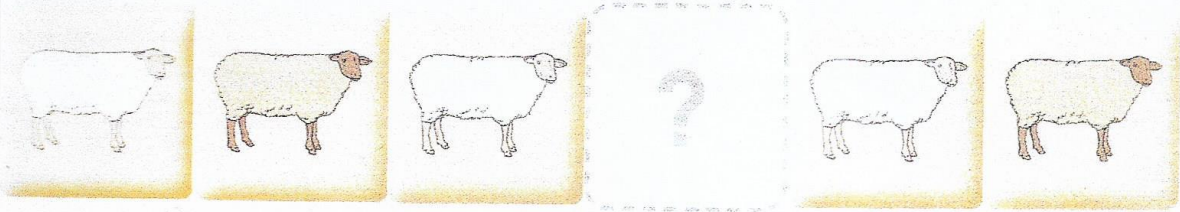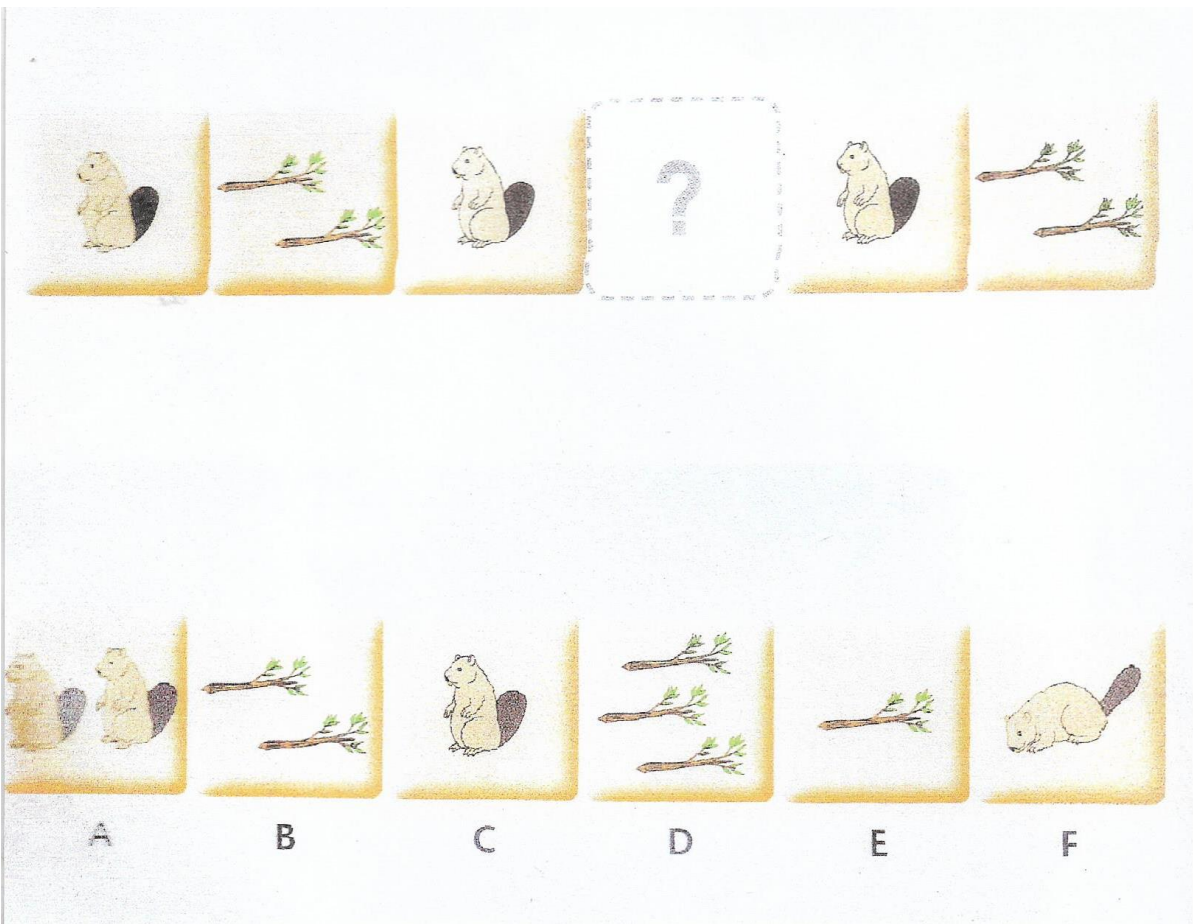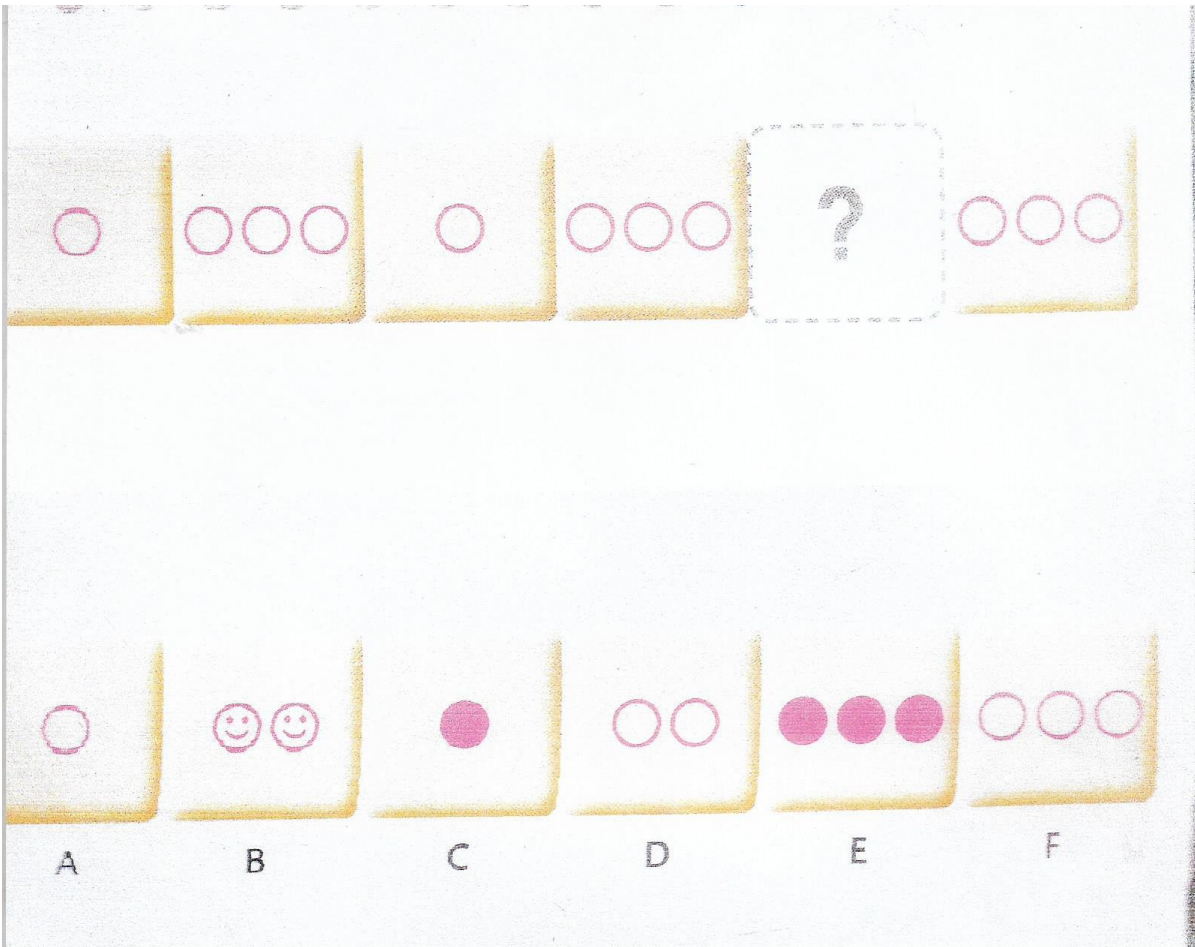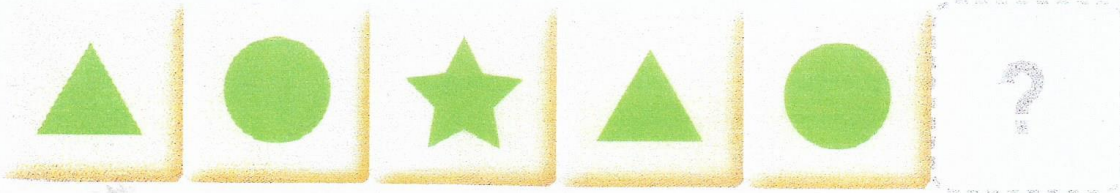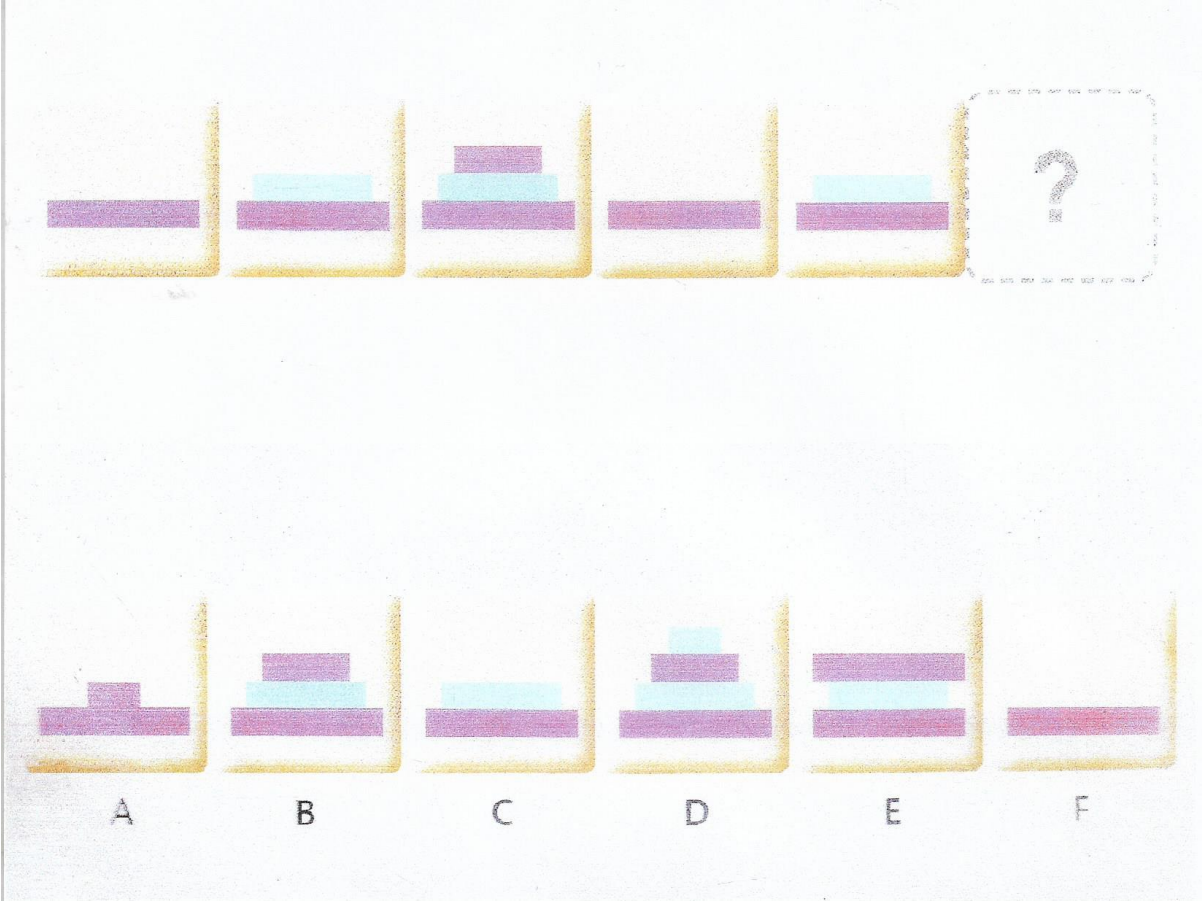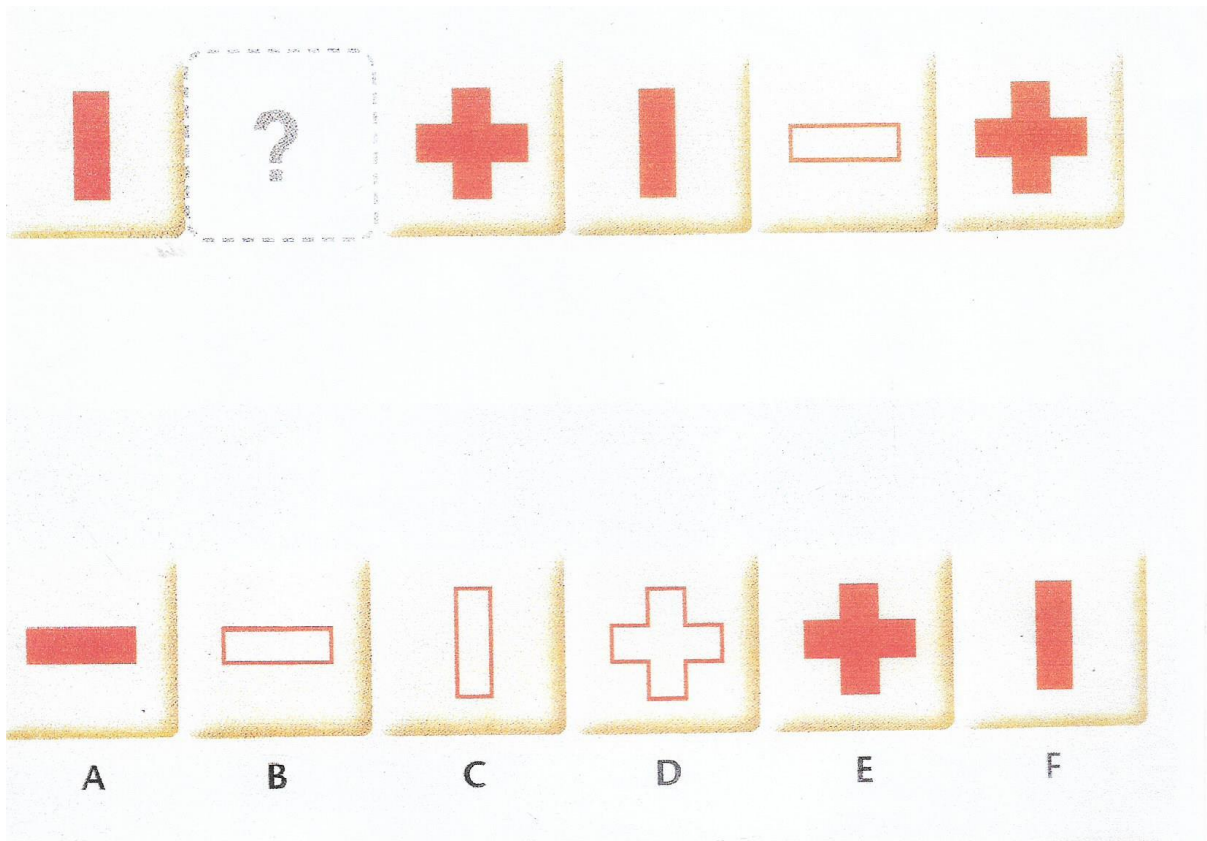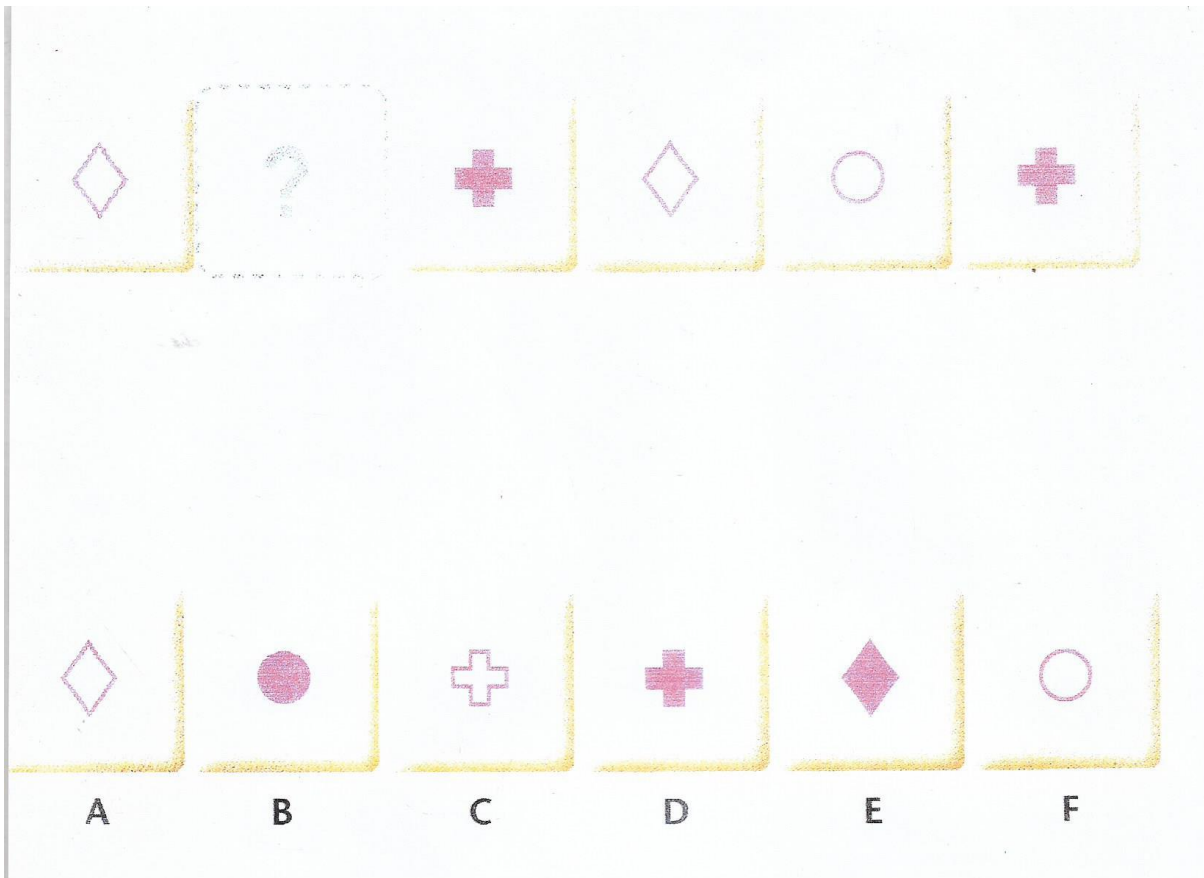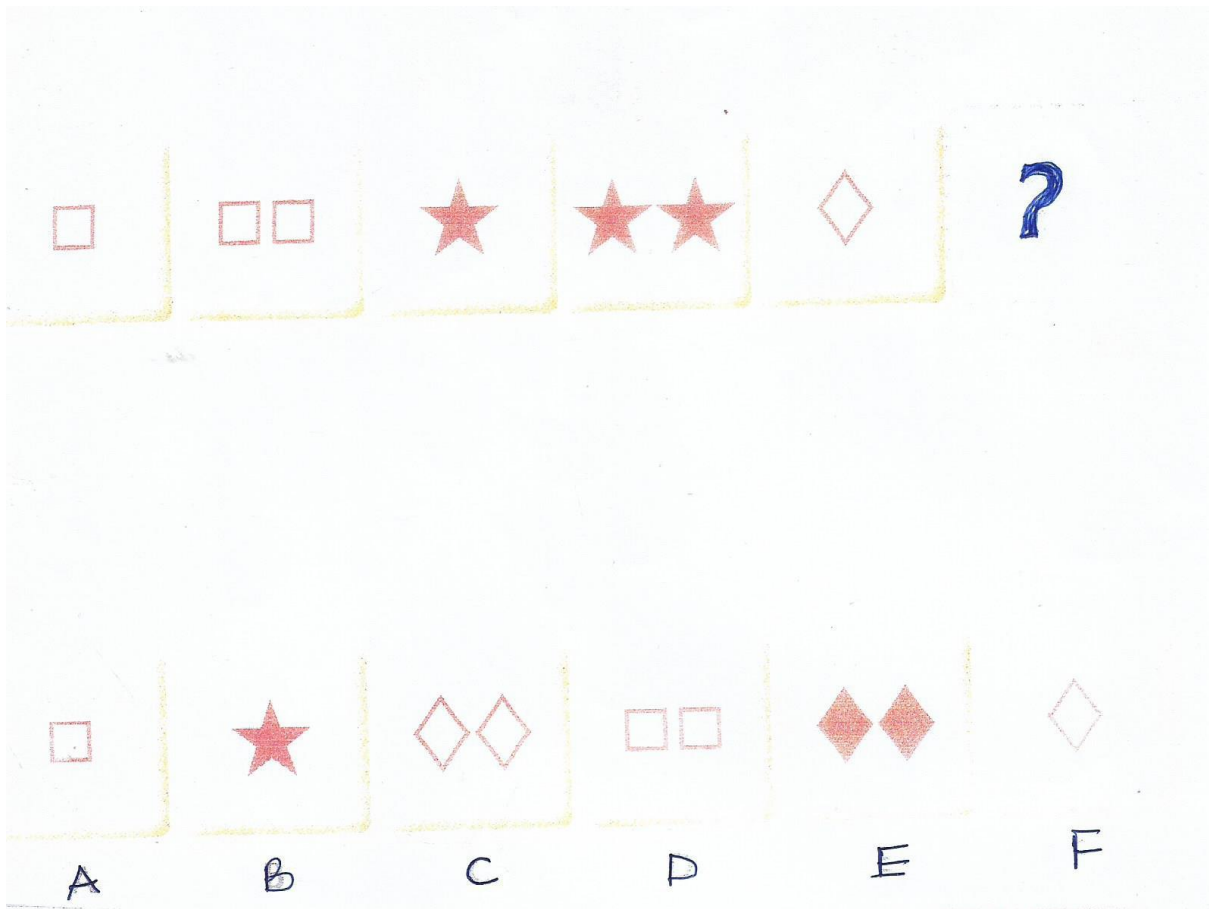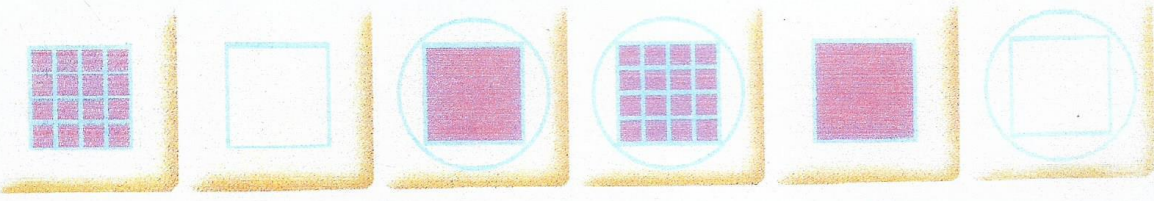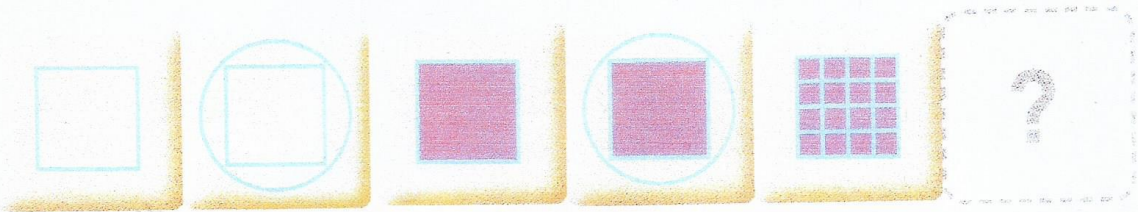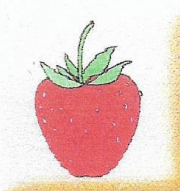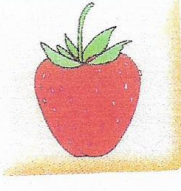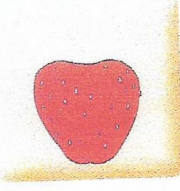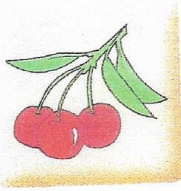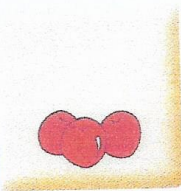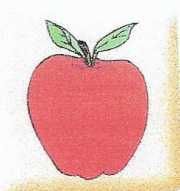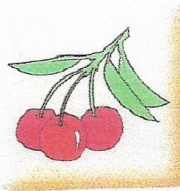
A   B   C   D   E   F

A B C D E F

A   B   C   D   E   F

A   B   C   D   E   F

A   B   C   D   E   F

A　　B　　C　　D　　E　　F
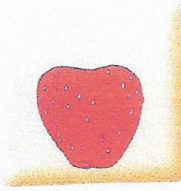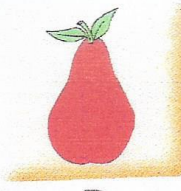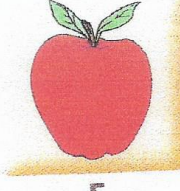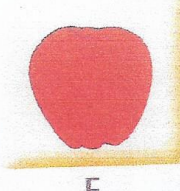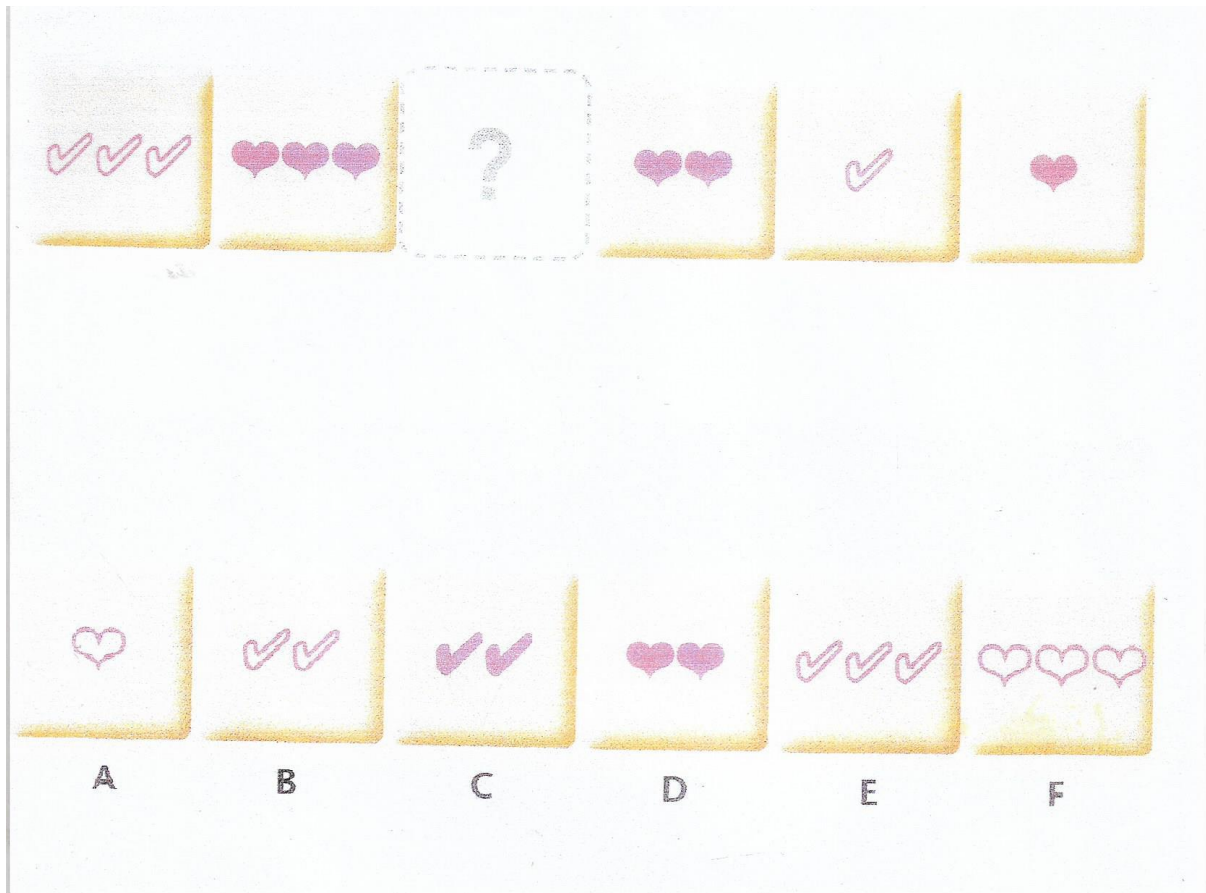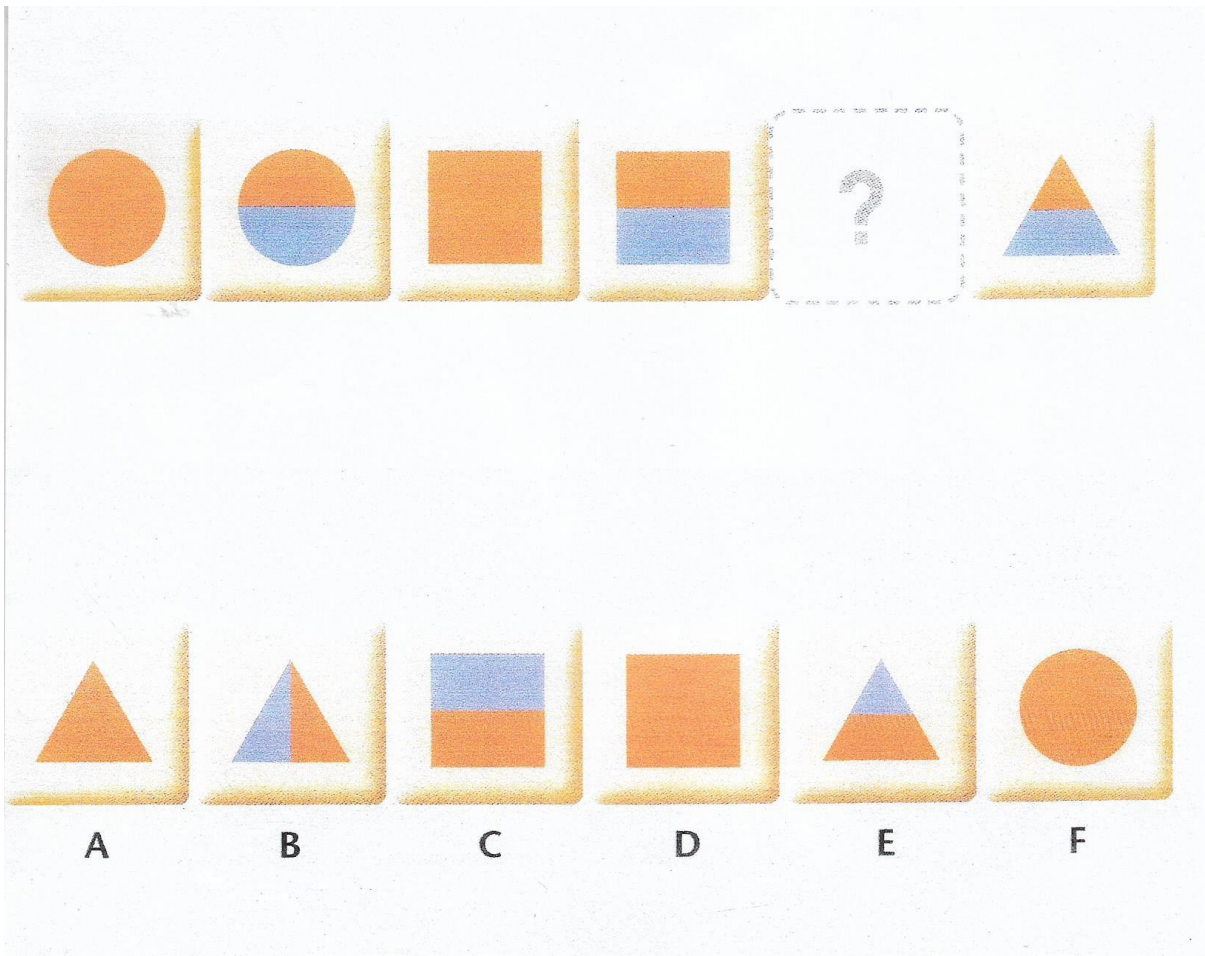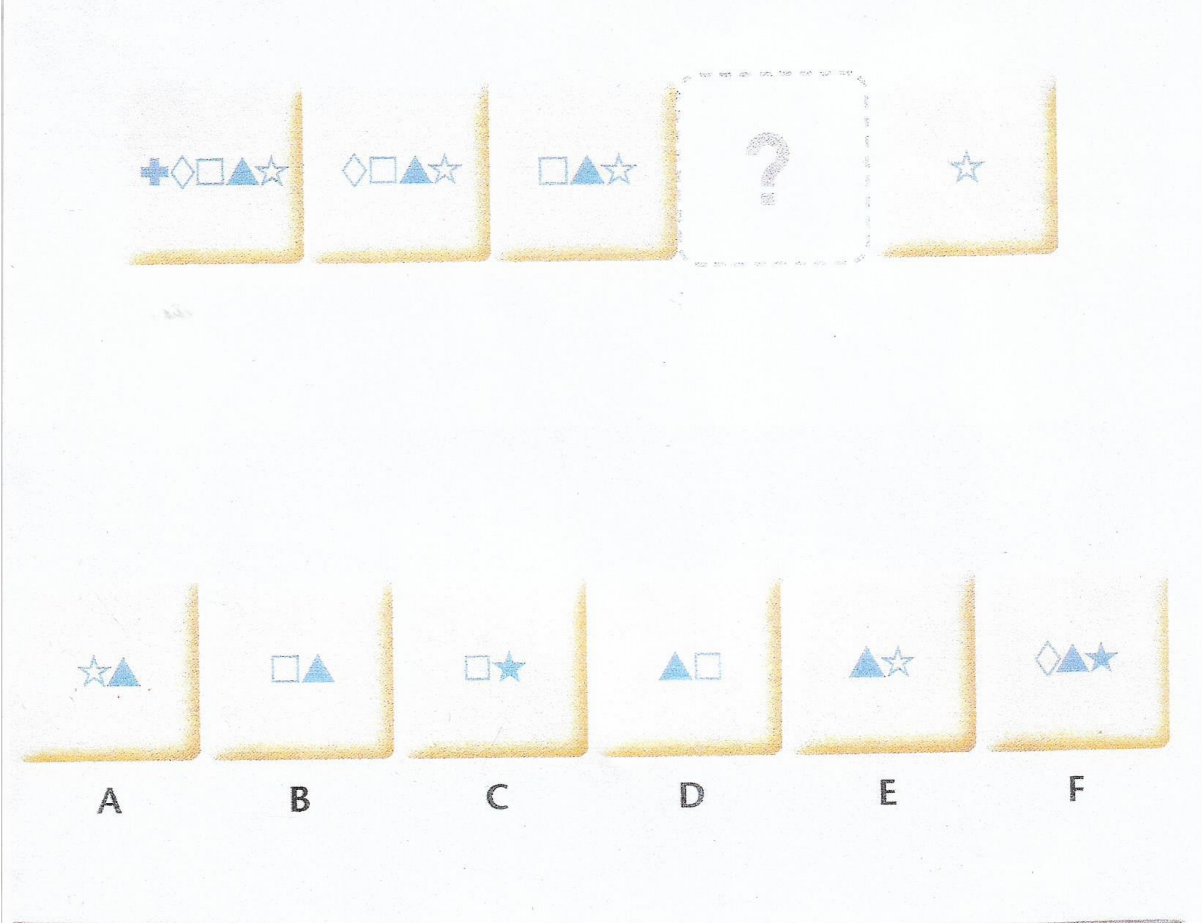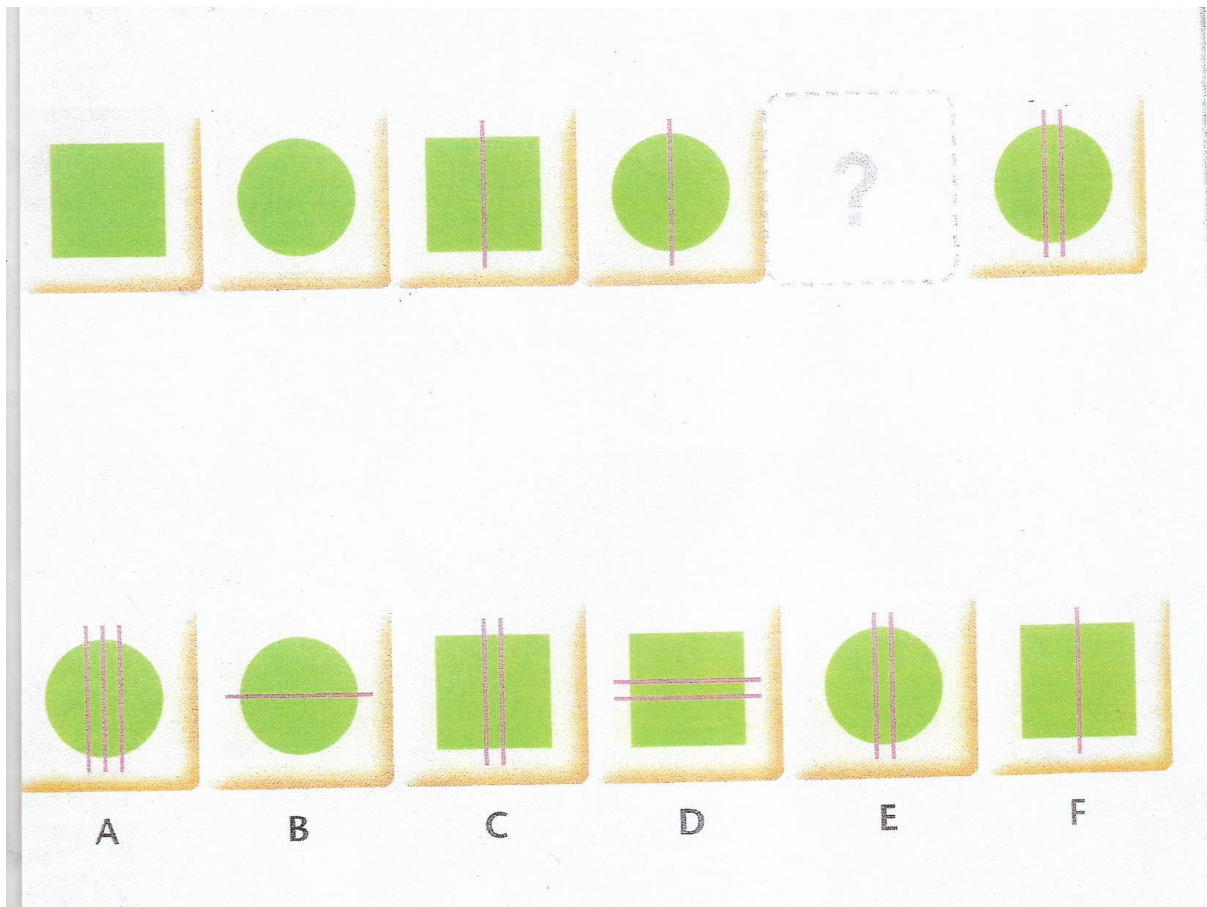
KITWE DISTRICT COMMON ASSESSMENT

LITERACY (READING) IN ICIBEMBA

GRADE FOUR (4) TERM ONE (1) WEEK TEN (10) – 2020

Belenga ifiunda na ifilundwa.

1. Ndw   [1]   2. Mp   [1]   3. C   [1]

Belenga ifilundwa upelwe

4. pa   [1]   6. Mbwa   [1]

5. nso   [1]   7. Lya   [1]

Belenga amashiwi upeelwe

8. ing'wena   [2]   9. umunankwe   [2]

10. ubowa   [2]   11. ukusunga   [2]

Belenga imisela upeelwe

12. Bankosha nabakwata inkasu ishakuliminako.   [2]

13. Mwape angala na Zila.   [2]

14. Bataata balitemwa ukutamba umupila   [2]

15. Indyabuluba yalikwata umukoshi uutali.   [2]

16. Tatufwile ukunwa ameenshi ayalamba   [2]

17. Belenga uyu umulandu   [5 marks]

Bashi Chileshe bantu bamo abaiposa mukutwala icaalo pantashi mubulimi. Uyu mwaka wapwile balimine imbalala na ifyumbu. Balisombwele bwino na ukukwata ifyakulya ifingi. Fimbi nafyo balishitishe.

[TOTAL MARKS 30]