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Impact of Entertainment and Family Perception on Children's Cognitive Development

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ABSTRACT

Children's cognitive development is essential in the future of a nation. Strong, solid, well-educated and well equipped children are crucial for a country. Memory, attention, perception and logical problem solving are parts of the development of the cognitive process. The objective of this research study is to explore the entertainment factors and family perception that influencing children's cognitive development. This research will provide parents with much needed and valuable insight into the ways to better protect future generations. The proposed study adopts a quantitative research strategy and obtains data through structured questionnaires. Children are assessed in terms of perception, attention, problems solving, and memory. Data analysis reveals variation in mental skills of children and possible gaps that demand more support and interventions. Results show that parental occupation, screen exposure or toy play justification may have a negative effect on a child's concentration ability and reasoning ability decline. This study also finds gender differences in cognitive skills evaluations.

Keywords— Cognitive development, entertainment, family perception, children, and cognitive skills

I. INTRODUCTION

Children's cognitive development is one of the most important aspects of growth and refinement that occurs simultaneously with other parts of the children's development. Cognitive skills of children comprise of perceiving, thinking, reasoning, remembering and problem solving. Indeed, these skills are essential for education, achievement, social interaction, and living better life. Understanding cognitive skill development is important to create ways for parent, educators, and policymakers to ensure optimum outcomes [5]. Learning, understanding concepts, and carrying out higher order thinking depends on cognitive skills. They allow children to understand their environment, analyse information and thinking differently. Those individuals with good cognitive skills can be learnt on their own, can take initiative, make decisions, function effectively and demonstrate the ability of being flexible in uncommon scenarios. Further, they also help other skills such as language, as well as social emotional learning, and academic success. Unattended or unconsciously supported children's cognitive skills and intellectual development may impact their entire lives. A collection of interrelated abilities contributes to children's cognitive development using cognitive skills such as memory, attention, perception, logical reasoning.

Storage and recalling information are key aspects to memory, which means that children can store and retrieve [4]. The word attention refers to ability to pay attention on stuff relevant and to filter out distractors [2]. Perception is used by children to understand and interpret sensory inputs of their surroundings. Logical problem solving is the ability to analyse and solve problem efficiently. The development of children's cognitive abilities is associated with genetics, environment, parenting, education and socio cultural factors. Children's entertainment medium includes television programs, mobile devices, video games and YouTube channels. Television is among the great source of entertainment as it has got some programs such as cartoons shows, films, and many serials. Children are affected by all these entertainment factors with negative and positive impact [6]. Thus, this research intends to study the role of cognitive skills in children and their attachment developments. The study looks at various components of cognitive skills, their evolution and some of the contributing factors to the improvement of such skills.

II. RELATED WORK

Many studies have been made concerning predicting cognitive and behavioural disorders of different approaches. One study proposed an expert system for predicting human behaviours under social media platforms using CLIPS tool and decision tree algorithms to engender human emotional state according to the subjects' self-perceived information literacy level [10]. A separate investigation constructed a dynamic knowledge base using a 10-fold cross validation to predict Attention Deficit and Hyperactivity Disorder (ADHD) in children. This included the classification model such as Naive Bayes, Neural Networks, J48 decision trees, Support Vector Machines and Radial Basis Functions where they were able to identify accurately ADHD cases [7]. Additionally researcher applied Bayes theorem to determine internet addiction levels by using 30 input variables and grouping the individuals into different levels of addiction severity, with a diagnostic accuracy of 60% [15]. Furthermore a forward chaining inference based system was designed to identify symptoms of game addiction and validated using black box testing [1].

There have been several studies that seek different approaches in the prediction of memory disorder. A rule based system was designed to diagnose diseases related to memory loss such as Alzheimer's disease, Parkinson's and dementia by structuring the expert rules using decision trees and forward chaining [8]. In another study, SPSS was used to determine emotional anxiety and depression in the students with the result of 75% undergoing anxiety and 55% suffering from depression [9]. A prototype model was designed for diagnosing hereditary metabolic diseases related to mental disorders in children that demonstrated 90% efficiency in detecting mucopolysaccharidosis [11]. Furthermore a web based system was developed using PHP, HTML and MySQL for diagnosis and treatment recommendation for mental illness on an interactive web based platform [12].

Innovative models were proposed for logical reasoning disorder prediction in different studies. In one study, a cognitive model was designed using crypt arithmetic and this helped to understand the students problem solving, reasoning powers, and recommend suitable career paths [13]. Additionally, intelligence in children was analyzed using IQ tester software and the cognitive model was designed to predict their intelligence and suggest their career [14]. A Fuzzy-based system was designed with 25 input, 9 output variables and 81 fuzzy rules to classify the different intelligence levels and help parents and educators to tailor learning approaches [16]. Moreover, the Classification and Prediction Algorithms such as Naive Bayes and Decision Tree are used to predicting child development outcomes which showed higher accuracy and greater efficiency in prediction.

Table 1: Comparative Summary

Cognitive Skills	Study	Disorder Focus	Methods used	Key Findings
Attention and Perception	Social Media Behaviour Prediction	Emotional State Prediction	CLIPS Tool and Decision Tree	Identified emotional states based on self-perceived literacy levels.
	ADHD Prediction in Children	ADHD	Naive Bayes, Neural Networks, J48, SVM, Radial Basis Functions	Achieved high accuracy in ADHD diagnosis.
	Internet Addiction Classification	Internet Addiction	Bayes Theorem, 30 Input Variables	Classified addiction severity with 60% accuracy.
	Game Addiction Diagnosis	Gaming Disorder	Forward-Chaining Inference, Black-Box Testing	Effectively identified game addiction symptoms.
Memory	Memory Disorder Diagnosis	Alzheimer's, Parkinson's, Dementia	Rule-Based System, Decision Trees, Forward Chaining	Applied expert rules to diagnose memory-related diseases.
	Anxiety and Depression Analysis in Students	Emotional Anxiety & Depression	SPSS	Found 75% of students suffered from anxiety and 55% from depression.
	Metabolic Disorder Prediction	Mental Disorders in Children	Prototype Model	Achieved 90% efficiency in detecting mucopolysaccharidosis.
	Web-Based Mental Illness Diagnosis	Mental Health Disorders	PHP, HTML, MySQL	Provided interactive diagnosis and treatment recommendations.
Logical Problem Solving	Logical Reasoning Analysis in Students	Cognitive Abilities	Crypt Arithmetic Model	Assisted in understanding problem-solving and reasoning skills.
	Intelligence Classification for Career Guidance	Child Intelligence	IQ Testing Software, Cognitive Models	Predicted intelligence and recommended career paths.

Findings from these studies point out how different models of prediction may discern cognitive and behavioural disorders. So, Decision Trees, Naive Bayes, Fuzzy Logic and hybrid approaches are used to increase both prediction accuracy and diagnostic capability. But they failed to solve the problem of input data quality and algorithm selection dependency. In manual collection studies, predictive models can be validated and made more robust by using non parametric statistical tests. Future research should either improve the predictive accuracy of the model with real world datasets.

III. METHODOLOGY

This research employed quantitative research to evaluate children's cognitive skills. It presents the collection and statistical analyses of numerical data to detect patterns, trends, and relationships between variables. By following this approach, cognitive capability could be studied systematically using standardized questionnaires and methodological statistics. Inferential data are used to examine the relationships between the variables. This methodology has following steps:

- 1. Data Collection Methods:** For this study, data were collected through a structured questionnaire. The questionnaire was designed based on the literature on cognitive skills in children and psychologist measures. It consisted of sections on entertainment preferences, family perceptions, and cognitive skills such as memory, attention, perception, logical problem-solving, and demographic questions. Memory was evaluated in both remote and recent aspects, while perception, attention, and logical problem-solving were assessed using multiple items.
- 2. Sampling Technique and Participants:** The participants in the study were parents of children in grades 1 through 8. A purposive sampling technique was used to select a sample of 320 parents. To ensure gender representation, the sample comprised 162 male children and 158 female children. Participants were recruited from diverse educational backgrounds to represent a range of experiences and viewpoints.
- 3. Reliability and Validity of Data:** The data was validated by the Cronbach's alpha test that resulted in a value of 0.78, which is satisfactory internal consistency and reliability. Generally a Cronbach's alpha value greater than or equal to 0.7 is acceptable thus the questionnaire items measure the same constructs all the time. In this manner, the data analysis is based on valid and reliable data. The research process was conducted in accordance with ethical guidelines that were followed to protect the wellbeing and confidentiality of the participants.
- 4. Data Analysis:** The data analysis in this study is divided into two sections. The frequency distribution of cognitive skills, such as memory, attention, perception, and logical problem solving among taking part children were measured through descriptive statistics. Subsequently, inferential statistics were applied to harness the associations between several variables, particularly illuminating the link between entertainment, family perception, and cognitive skill of the children. Chi square and Kruskal Wallis tests were used to test the hypotheses.

IV. RESULT AND DISCUSSION

The result is described into two sections:

- 1) Basic Descriptive tables
- 2) Testing of hypothesis

Basic Descriptive Tables:

I) Perception: Child perception is a cognitive skill that involves capturing, processing, and making sense of sensory information. This includes interpreting visual content, recognizing voices, understanding and following instructions, and successfully completing tasks.

Table 2: Frequency of Perception aspects

Perception Behaviour	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Overall Response
Does your child interpret the content of television?	5 (1.5%)	33 (10.3%)	38 (11.8%)	171 (53.4%)	73 (22.8%)	Agree
Does your child recognize voice of serial character or any music?	8 (2.5%)	29 (9%)	32 (10%)	171 (53.4%)	80 (25%)	Agree
Does your child understand the parental instruction?	3 (0.9%)	33 (10.3%)	46 (14.3%)	159 (49.6%)	79 (24.6%)	Agree
Does your child perform any task efficiently?	6 (1.8%)	39 (12.1%)	69 (21.5%)	125 (39%)	81 (25.3%)	Agree
Does your child having any difficulty to learn new game or solve puzzle?	43 (13.4%)	92 (28.7%)	62 (19.3%)	92 (28.7%)	31 (9.6%)	Neither agree nor disagree

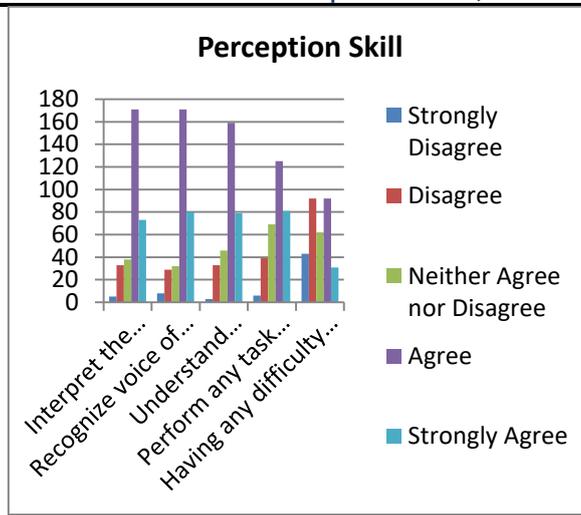


Figure 1: Frequency of Perception aspects

Table 2 shows variations in a child's skills of interpretation, auditory perception, comprehension of instructions, task efficiency, ability to learn new games or solve puzzles and motor skills. This should indicate that some children may need further help and interventions to improve their perception abilities.

II) Attention: The attention skills of a child refer to their ability to focus, sustain concentration, listen, avoid distractions, remember information, and stay organized.

Table 3: Frequency of Attention aspects

Attention Behaviour	Not at all	Just little	Often	Very often	Overall response
Does your child make careless mistake while playing game or solving puzzle?	40(12%)	176(55%)	89(27.8%)	15(4.6%)	just Little
Does your child is facing difficulty to sustain attention while watching TV/playing game?	56(17.5%)	186(58%)	68(21%)	10(3.1%)	just Little
Does your child facing difficulties in concentration?	52(16.2%)	161(50%)	100(31.2%)	7(2.1%)	just Little
Does your child do not listen anything?	58(18%)	185(57.8%)	68(21.2%)	9(2.8%)	just Little
Does your child easily get distracted?	54(16.8%)	154(48%)	86(26.8%)	26(8.1%)	just Little
Does your child fail to finish any games?	74(23%)	169(52.8%)	60(18.7%)	17(5.3%)	just Little
Does your child is forgetful?	55(17%)	157(49%)	93(29%)	15(4.6%)	just Little
Does your child lose toys/ any things repeatedly?	50(15.6%)	154(48%)	91(28.4%)	25(7.8%)	just Little
Does your child is disorganized?	42(13.1%)	146(45.6%)	110(34.4%)	22(6.8%)	just Little

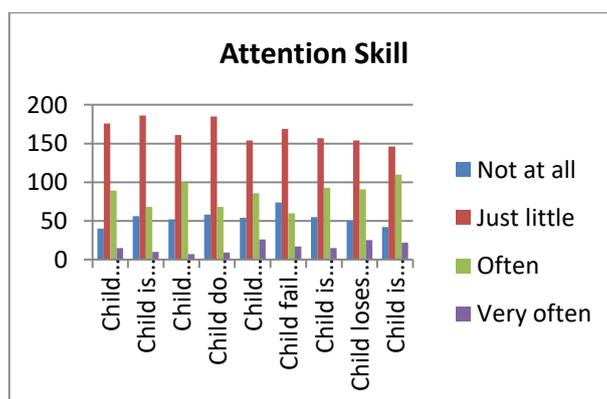


Figure 2: Frequency of Attention aspects

Table 3 evaluated multiple dimensions of attention such as concentration, listening abilities, distractibility, forgetfulness, organization, and attention maintenance. The responses primarily fell under the "just a little" category, suggesting that the majority of children displayed attention behaviors that needed some level of improvement or encountered occasional difficulties.

III) Logical Problem Solving: The logical problem-solving skill assesses whether the child can solve logical problems dependently or independently.

Table 4: Frequency of Logical Problem Solving aspects

Logical Problem Solving (independence and Interdependence)	Agree	Disagree	Neutral	Partially agree	Partially disagree	Strongly agree	Strongly disagree	Overall response
Does your child always seek your advice if there are any obstacles while playing game or solving puzzle?	71(22%)	60(18.7%)	36(10%)	68(18%)	55(17%)	13(4%)	17(4.7%)	Neutral
Does your child value other people's help and advice when making important decisions?	106(33%)	33(10%)	29(8%)	80(22%)	33(9%)	33(9%)	6(1%)	Agree
Does your child not like to take help from other to solve problem?	92(28.7%)	25(7.8%)	35(9.7%)	76(21%)	21(6%)	37(11%)	34(10%)	Agree
Does your child able to draw conclusion from serial/video content or game playing method?	106(33%)	18(5.6%)	43(13%)	57(17%)	41(12%)	51(16%)	4(1%)	Agree
Does your child take any advice from others while playing game or interpreting contents?	74(23%)	54(16.8%)	60(18%)	60(18%)	46(14%)	20(6%)	13(4%)	Neutral
Does your child consult with others before making important decisions?	88(27.5%)	30(9.3%)	53(16%)	22(6%)	74(23%)	46(14%)	7(2%)	Neutral
Does your child find other people's advice to be the most helpful source of information for solving my problems?	69(21.5%)	69(21.5%)	44(13%)	54(16%)	41(12%)	17(5.3%)	26(8%)	Neutral
Does your child struggle with playing with game on their own rather than discussing it with others?	61(19%)	78(13%)	46(14%)	44(13%)	40(12%)	20(6%)	31(9%)	Neutral
Does your child hate relying on other people to solve his problems?	99(30.9%)	40(12%)	39(12%)	63(19%)	40(12%)	34(10%)	5(1%)	Agree
Does your child usually prefer to ask other people for help rather than to try to solve problems on my own?	71(22.18%)	80(25%)	37(11%)	50(15%)	35(10%)	16(5%)	31(9%)	Neutral

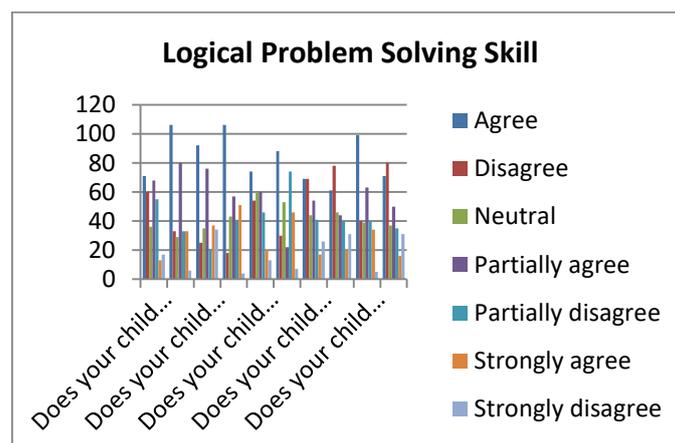


Figure 3: Frequency of Logical Problem Solving aspects

According to Table 4, children have different 'behaviour' in terms of logical problem solving. There are some children who tend to prefer to solve problems alone and value their own skillset and abilities, and others who are more inclined to seek and appreciate input from outside of them. Additionally, many children remain neutral, indicating equal tendency towards seeking help and solving problems.

IV) Memory: The memory skills of children play a crucial role in their overall cognitive development. Memory involves the ability to encode, store, and retrieve information, which is essential for learning, problem-solving, and daily functioning.

Table 5: Frequency of Memory aspects

Memory Aspect	Yes	No
Does your child remember name of the serial or serial characters?	304 (95%)	16 (5%)
Does your child remember previous episodes of serial?	295 (92.2%)	25 (7.8%)
Does your child remember game playing method?	281 (87.8%)	39 (12.2%)
Does your child remember name of the friend or relative that last meet?	235 (73.4%)	85 (26.6%)
Does your child remember family member's instructions?	254 (79.4%)	66 (20.6%)
Does your child remember any important conversations?	250 (78.1 %)	70 (21.9%)
Does your child forgetting something they recently heard or saw?	44 (13.8%)	276 (86.3%)
Does your child forgetting where they put things?	125 (39.1 %)	195 (60.9%)
Does your child forgetting recent experiences of game playing?	82 (25.6%)	238 (74.4%)
Does your child forgetting some ones name or asking same question repeatedly?	111 (34.7%)	209 (65.3%)
Does your child forgetting what they are doing or experiencing confused regarding their tasks or activities?	101 (31.6%)	219 (68.4%)

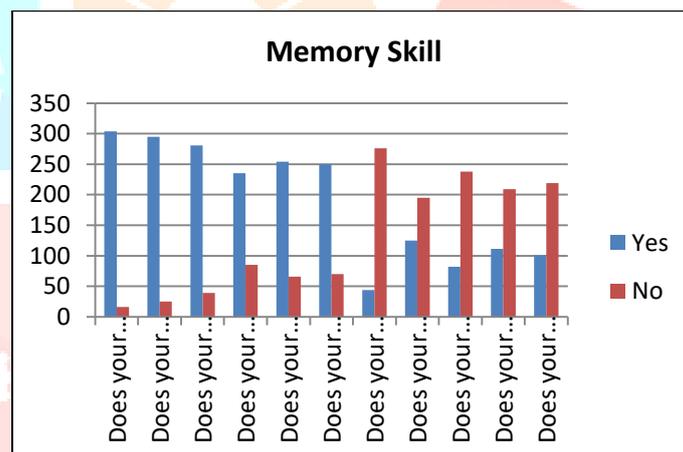


Figure 4: Frequency of Memory aspects

Table 5 shows important aspects of recent and remote memory as mentioned above. Concerning remote memory, it is worth noting that a relatively large number of children showed high levels of performance. They were able to recall the names of TV series, characters, previous episodes, game-playing tricks, friends or relatives met more recently, instructions received from parents and important discussions held at home, etc. These highlighted results suggest that children can encode, store and retrieve information from prior situations or events. However, in terms of recent memory, some children face challenges. They exhibited difficulties in remembering something they had recently heard or saw, where they put things, recent experiences of game playing, someone's name, and sometimes became confused about what they were doing. The results of these findings suggest that some children may experience difficulties in remembering and recalling events or information that occurred recently. The ability to use memory can differ from one to another child and some can do some tasks much better than others can.

2. Testing Hypothesis:

Testing Hypothesis: Chi-square of independence

The chi-square test is a statistical test used to determine whether there is independence between two categorical variables. Following describes the chi-square test of independence between parental occupation and children's cognitive skills at 5% level of significance.

- Null Hypothesis (H_0): Parental occupation and Children's cognitive skills are independent.
- Alternative Hypothesis (H_1): Parental occupation and Children's cognitive skills are associated.

The research reveals that parental occupation does affect children's susceptibility to distraction, with those from households where both parents work being less prone to distractions compared to children with only one working parent. Additionally, children from families with a single working parent are more inclined to seek and value advice from others. Furthermore, children residing in households where both parents are employed tend to make fewer careless mistakes. It is worth noting that a significant correlation

exists between parental occupation and various attention-related issues in children, including attention deficit, difficulty concentrating, lack of attentiveness, and a tendency to be easily distracted. Nevertheless, there are noteworthy gender differences, as boys tend to exhibit more careless mistakes during play, whereas girls demonstrate higher levels of forgetfulness.

Testing Hypothesis: Kruskal Wallis

The Kruskal-Wallis test was conducted with parental occupation, screen time, and toy playing time as the dependent variables and various cognitive skills as the independent variables.

- **Null Hypothesis (H_0):** Parental occupation, screen time, and toy-playing time have no significant impact on children's memory, attention, logical problem-solving ability, perception, or behavior in seeking advice and help from others.
- **Alternative Hypothesis (H_1):** Parental occupation, screen time, and toy-playing time have a significant impact on children's attention, logical problem-solving ability, and behavior in seeking advice and help from others.

The results showed that there was no significant impact of the dependent variables on recent and remote memory of the child. However, there was a slight influence of toy playing time and screen time on the child's attention. Additionally, toy playing time and screen time had an impact on the child's ability to solve logical problems independently. Parental occupation was found to have an impact on the child's behavior with regard to seeking advice and help from others. On the other hand, there was no significant impact of parental occupation or toy playing time on the child's perception.

V. CONCLUSION

The data analysis reveals gender based differences in cognitive skills. During game-play, boys were more prone to make careless mistakes and girls were more forgetful. Moreover, parental occupation played a role in the children's behavior in such a way that children from dual working parent households were less distracted and less likely to seek advice than children from single working parent families. An ethical aspect ensure that findings regarding cognitive differences will not enforce gender stereotypes but on the contrary contribute to individualized educational strategies leading those children to fully realize themselves. These insights can be practically useful for parents and educators to design the cognitive based learning environment for both boys and girls. Additionally, knowing the effect of parental occupation on children's focus and independence can help to develop educational methods to encourage the development of focus and independence. Future research needs to study lasting impacts of parent occupations, screen usage and play habits on children's cognitive abilities and gender-specific training methods. Biological and social impact also explored in further studies

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