

"Exploring Equity in Cognitive Skills: A Study of Visual Perception in Children under NEP 2020 Framework"

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Abstract

This research investigates the visual perception abilities of children across different domains: Numbers, Signs, Geometrical Shapes, Finding Objects, and Pictures. The study analyses the influence of demographic variables such as gender, medium of instruction, school management, parental education, and parental income using one-way ANOVA. The findings are interpreted in light of the National Education Policy (NEP) 2020 and implications for inclusive, equitable, and child-centric education are discussed.

Introduction

Visual perception is integral to children's cognitive and academic development. NEP 2020 emphasizes early childhood education, equitable learning opportunities, and reducing disparities. This study aims to determine if demographic variables influence visual perception and to derive pedagogical implications that align with NEP 2020 goals.

Methodology

- **Participants:** 60 school children
- **Variables:** Gender, Medium of Instruction, School Management, Parental Education, Parental Income
- **Domains:** Numbers, Signs, Geometrical Shapes, Finding Objects, Pictures
- **Tool:** Visual Perception Tasks
- **Analysis:** One-Way ANOVA

Domain-Wise Analysis and Results

Domain 1: Numbers

Factor	Mean Scores	F-value	Significance
Gender (M/F)	51.67 / 58.33	1.022	Not Significant
Medium (Telugu/English)	54.17 / 55.83	0.063	Not Significant
School (Govt/Private)	55.83 / 54.17	0.063	Not Significant
Parental Education (Illiterate/SSC/Inter)	50.93 / 55.36 / 60.53	0.784	Not Significant
Parental Income (Lower/Middle)	60.00 / 53.33	0.763	Not Significant

Interpretation: No statistically significant differences observed in this domain. Female children and those from lower-income groups showed slightly higher mean scores.

Domain 2: Signs

Factor	Mean Scores	F-value	Significance
Gender	61.67 / 60.56	0.035	Not Significant
Medium	63.33 / 58.89	0.571	Not Significant
School	58.89 / 63.33	0.571	Not Significant
Parental Education	64.20 / 59.52 / 57.89	0.466	Not Significant
Parental Income	63.33 / 60.37	0.189	Not Significant

Interpretation: Mean differences exist, but none were statistically significant. Illiterate parental background showed slightly higher performance.

Domain 3: Geometrical Shapes

Factor	Mean Scores	F-value	Significance
Gender	43.33 / 59.17	6.140	Significant
Medium	43.33 / 59.17	6.140	Significant
School	59.17 / 43.33	6.140	Significant
Parental Education	46.30 / 48.21 / 60.53	1.876	Not Significant
Parental Income	43.33 / 53.89	1.912	Not Significant

Interpretation: Gender, medium, and school type significantly affect geometric visual perception.

Domain 4: Finding Objects

Factor	Mean Scores	F-value	Significance
Gender	60.83 / 66.67	0.607	Not Significant
Medium	50.83 / 76.67	14.785	Significant
School	76.67 / 50.83	14.785	Significant
Parental Education	60.71 / 61.11 / 69.74	0.589	Not Significant
Parental Income	68.33 / 62.22	0.499	Not Significant

Interpretation: Medium of instruction and type of school are significant influencers.

Domain 5: Pictures

Factor	Mean Scores	F-value	Significance
Gender	75.83 / 66.67	1.782	Not Significant
Medium	80.00 / 62.50	7.070	Significant
School	80.00 / 62.50	7.070	Significant

Parental Education	67.59 / 69.74 / 80.36	1.096	Not Significant
Parental Income	71.67 / 71.11	0.005	Not Significant

Interpretation: Medium and management of school are statistically significant factors in picture perception.

Discussion in Light of NEP 2020

NEP 2020 emphasizes foundational learning, equity, and contextualized pedagogy. This study's findings reveal:

- **Equity:** Minimal differences based on parental income or education suggest progress toward reducing learning inequities.
 - **Medium of Instruction:** English medium children performed better in most domains, aligning with NEP's flexible multilingual approach.
 - **School Infrastructure:** Significant advantages observed among government school students in some domains may reflect better-trained teachers or focused interventions.
 - **Gender Sensitivity:** Females outperform males in some domains, underlining the need to maintain gender-sensitive classroom practices.
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Educational Implications

- **Targeted Interventions:** Domains with significant gaps (e.g., Geometrical Shapes, Finding Objects, Pictures) require tailored pedagogical strategies.
- **Curriculum Design:** Integrate visual perceptual skill development into early childhood and foundational stage curricula.
- **Teacher Training:** Emphasize inclusive techniques that support diverse learners regardless of gender, income, or parental education.

- **Policy Focus:** Encourage resource allocation toward multilingual, equity-based teaching in line with NEP 2020.
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Findings

1. **Gender:** Statistically significant differences were observed in the domain of geometrical shape perception, where female students outperformed males. In other domains, gender differences existed but were not statistically significant, although females showed consistently higher mean scores in most domains.
2. **Medium of Instruction:** Children from English medium schools performed significantly better in the domains of Finding Objects and Pictures, and had higher mean scores across all domains except Signs. This suggests that medium of instruction plays a vital role in shaping visual perceptual skills, likely due to differences in instructional methods and exposure to learning materials.
3. **Type of School Management:** Surprisingly, children from government schools outperformed those in private schools in several domains, including Geometrical Shapes and Finding Objects. This could be attributed to better implementation of foundational learning programs, or more inclusive and participatory teaching methods. However, in the domain of Pictures, private school students had the upper hand, indicating variability in how different domains are supported institutionally.
4. **Parental Education:** Although children of more educated parents (especially those with intermediate-level education) showed slightly better visual perception scores, these differences were not statistically significant across any domain. This implies that school-related variables might have a stronger influence on children's perceptual abilities than the home educational environment.
5. **Parental Income:** Children from lower-income backgrounds often had higher mean scores than their middle-income peers, particularly in Numbers and Signs. However, these differences were not statistically significant, suggesting that economic background may not be a limiting factor for visual perception when effective school environments are in place.
6. **Cross-Domain Insights:**
 - a. Domains such as Numbers and Signs showed no significant differences across any variable, suggesting these skills may develop uniformly across children regardless of demographic background.
 - b. Geometrical Shapes, Finding Objects, and Pictures showed more pronounced differences, highlighting them as areas where learning environments, instruction quality, and classroom experiences may play a more critical role.

Conclusion: The study demonstrates that children's visual perception is influenced more by institutional and environmental factors such as medium of instruction and school management than by socioeconomic variables like parental income or education. This highlights the crucial role of schools in shaping foundational cognitive skills. Findings also underscore the effectiveness of the NEP 2020 vision, which advocates for equity, early intervention, and child-centered pedagogy.

Significant differences in visual perception related to medium of instruction and type of management suggest that systemic efforts in curriculum delivery and teacher preparedness are yielding measurable outcomes. Gender-based differences in spatial domains point to the importance of ensuring gender-inclusive learning materials and teaching practices.

The absence of significance in income and education levels of parents, despite variations in mean scores, suggests that schools are increasingly serving as leveling grounds for cognitive development, a vital step toward achieving universal foundational literacy and numeracy.

To further this momentum, it is recommended that educators and policymakers:

- Prioritize visual perception development in early grades.
- Train teachers to identify and address perceptual differences.
- Ensure access to equitable resources across public and private institutions.
- Promote inclusive, multi-sensory, and discovery-based learning environments.

Aligning with NEP 2020, this research emphasizes a transformative approach where every child, irrespective of background, receives the support needed to thrive cognitively and perceptually from the foundational years onward.

References

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