Uncloaking Parental Perception towards Play School in Urban India Using Interdependency Techniques

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Abstract: **Play school prevalent in the western world is a relatively new concept in India. It is predominant in the urban vista of our country and is rapidly expanding. Though the prime objective of such schools are to induce sensory-motor and social development in a child, encourage them to play so that it becomes a learning experience, these schools also act as centers of childhood education before they commence formal education at primary school. Parental perception plays an important role in admitting their wards to play schools. These schools not only compete with each other to grab parental attention but also make strong marketing effects to influence perceptions of parents, thereby making this domain a hotspot for researchers to delve and explore. The researchers in the present paper aim at finding out the parental perception towards play schools in urban Kolkata and also explore the factors causing such perceptions. Interdependency techniques used include multi-dimensional scaling and exploratory factor analysis. Five schools in the city were identified as the frame on which study was conducted and the outcome shows interesting and convincing results.**

Keywords **- Multi-dimensional scaling, principal component analysis, exploratory factor analysis, perceptual map**

I. INTRODUCTION

Every child plays and the drive to play is so intense that they do so even without having any playing item. One may try and recall their initial preschool days that had plenty of space with lots of time and the child energy going into unstructured plays, art, music and enjoying their very early learning days but such schools are rapidly getting extinct. While experts continue to expound a powerful argument for the importance of play in children's lives, the actual time children spend playing continues to decrease. Today, children play eight hours less each week than their counterparts did two decades ago (Elkind, 2008) owing to pressure of rising academic standards. In India, play schools are a new trend which started off with the concept to assemble a small group of kids at a place, usually 10-20, who spend few hours (1–3) under the supervision of a couple of teachers. Even kids of the age group of 14-16 months attend play schools in India today. Though the prime objectives of such schools are to induce sensory-motor and social development in a child, encourage them to play so that it becomes a learning experience, rather than set academic goals that might create stress to perform, play is being replaced by test preparation in many such schools and parents who aim to give their preschoolers a leg up are made to believe education at such nascent age are the path to success. It seems that the society has created a false dichotomy between play and learning. Thus, one may consider play schools as a nursery or pre-primary school, offering childhood education to children prior to their commencement of formal education at primary school. They are mostly run by privately bodies in urban India with some operated by government also with the objective to subsidize the costs.

Play schools are of prime importance to parents today since many have found faster child development in their own way as an outcome of a formal training method followed by most of these schools. It is a very common practice these days for parents to put their kids in play school. Parents focus on a host of factors before selecting a pre-school. Initially, the major concern revolves around child's fun at such early age but with the child nearing the primary school entry stage, the parental focus shifts, and their attitude changes as if formal education begins at birth. However, many of them do not have proper information about what to do and they tend to follow others – a fast entry into the rat race. The parental decision in play school selection is most guided by their perception and this forms a very interesting area of investigation. What guides parental perception is also a matter of great heed? While play schools are vying with each other to get higher enrolment, they are also putting in a lot of marketing effort to create positive parental perception towards them. In other words, play school marketing starts with parental perception. The present study focuses on parental perception towards play school in urban India with focus on Kolkata city. Five schools have been considered in the study. These schools have been so selected that they represent both the affordable & nearby ones along with the other high profile ones having created a big brand name for them.

II. LITERATURE REVIEW

Literature review was done with the objective to have an understanding of the research works aleady done in similar and related field and find out the gap where further research is needed. In the process it also helped in developing the required knowledge base on the subject of enquiry. The focus on the importance of factors like practicality, affordability, location and previous experience, knowledge and understanding of these factors is highlighted by ***(Turk, 2015)***. He also states that the environment for learning is of importance for the parents as it makes their kids ready for next stage of formal learning and also helps them achieve a successful life. ***(Warash, 2016)*** mentions early education for young children serves as a preparation for formal education and supports the development of basic skills that help children deal with more difficult tasks like learning to read, etc. Play is valuable for parents but this perception changes as the child approaches higher studies. ***(Goldfield, 2012)*** highlights the importance of physical activities in preschool. He also opines that since the young generation spends their maximum awake time in day care, the preschools should have facilities of sports and some physical activities to avoid a lot of diseases which are very common in young generation. ***(Stephen, 2005)*** in his work indicates on the impact of Computer on Children in Pre School. Difference between kids playing in play groups and nurseries are discussed**.** Factors which affect the physical activities of children in play School were studied by ***(Brown & Pfeiffer, 2009)***. According to them the activities of preschool are sedentary in nature. ***(Roskos, 1988)*** studied the reading and writing pattern of the children. The results showed their sustaining power and also how much they learn through play**.** ***(Cress, 2016)*** tried to differentiate between children on the basis of their behavioral and emotional aspects using normative assessment. This investigation helped in finding out how many students need extra educational help out of the total strength. ***(Marcon, 1992)*** in his study on “Differential effects of three preschool models on inner-city 4-year-olds” selected a randomly selected cluster and three different preschool models. The result of this analysis showed that students belonging to different models have different characteristics and the students falling in Child Initiated model are better than the other two models. ***(Marcon, 1991)*** in another study “Positive relationship between parent school involvement and public school inner city pre-schoolers: Development and academic performance” assess the involvement of parents in child’s early development and academics. The different relationship between parent involvement and outcomes of preschool between boys and girls is identified in this research. ***(Slowiaczek, 1994)*** discusses parent involvement in child’s schooling and measures their motivational level. The results show that the parental involvement is uni-dimensional and the child is a self constructor of his/ her schooling experience**.** Learning styles of students were analyzed ***(Hassan, 2012)*** using the non-parametric test, Kruskal Wallis test. Student on the basis of their behavior and streams were compared. ***(Blake, 2003)*** highlights use of multidimensional scaling for perceptual studies using similarity or dis-similarity data.

III. RESEARCH GAP

Though many studies have been conducted in the western world, significant perception studies on play schools in Indian context is scarce, especially within a societal structure that is changing fast. It is also observed that research studies on parental perception, which is of paramount importance for selecting play schools, is missing with respect to the only metropolis of eastern India. This scarce study on parental perception towards play schools in Kolkata has clearly emerged as the gap area where research may be conducted and creates platform for the ensuing research.

IV. OBJECTIVES

The researchers have framed some basic objectives for the ensuing study that includes (1) Generating parenting perceptual map for play schools in Kolkata with five schools as the frame that include Kid Zee (KZ), Little Laureates (LL), Euro Kids (EK), Tree House (TH), Blossoms Play School (BPS) and (2) Identifying factors responsible for parental perception towards play schools.

V. RESEARCH FRAMEWORK

V.1. Research Design

Of the two types of study methods available, cross-sectional study and longitudinal study, the former is chosen in the present case as it helps in getting consumer feedback on a near real time basis which also helps in generalizing the output. Also descriptive research form the basis of the study since it facilitates finding different consumer characteristics as detailed in research problem.

V.2. Data Collection

Primary Data forms the basis of the present descriptive study with questionnaire, an instrument for data capturing, forming an integral part of data collection. The instrument is a mix of both open and close ended questions. There was emphasis on ascertaining the dissimilarity among five play schools followed by a set of questions that was aimed at performing exploratory factor analysis. For the purpose of data collection, undisguised personal interview method was employed. The sample size required was estimated using the following formula: $N = [\ \{ t^2 \times p\ (1 - p)\ \} / m^2\ ]$ where N: Required Sample Size, t: confidence level at 95% (standard value of 1.96), m: margin of error at 5% (standard value of 0.05) and p: estimated prevalence of consumer knowledge about play schools (15%). N was calculated to be 196 and in the full-scale survey, 500 respondents were approached of which 248 filled in questionnaire were received at a rate of 49.6%. Many of them were in hurry; hence did not co-operate in the survey. The filled in questionnaires were then scrutinized and the incomplete ones rejected. Responses of 220 questionnaires were finally considered for analysis owing to their completeness. Information thus collected was used for further analysis. Internal consistency estimates of reliability of primary data were found out and Cronbach’s α was found to be in acceptable range.

V.3. Sampling Technique & Procedure

Sampling, a method of selecting a subset of individuals from the population, is extremely critical since the sample is expected to represent the population characteristic so that generalization can be made. In accordance to our research objectives, judgmental or purposive sampling, a non-probabilistic sampling method is chosen to arrive at optimal results. This method uses knowledge and professional judgment of the researcher.

V.4. Methodology

The present study uses two methods of multivariate statistical analysis; more precisely inter dependency techniques; namely (i) multi-dimensional scaling and (ii) exploratory factor analysis. While the former technique is used to understand the parent's perception towards play schools the latter is used to understand the underlying structure arising out of the relationships amongst variables that form perception. Both these techniques are separately discussed and the mathematical models analyzed in order to make appropriate utilization.

V.4.I. Multi-Dimensional Scaling (MDS):

MDS is a set of mathematical techniques that enables a researcher to uncover the hidden structure of database. The term MDS is used in two essentially different ways in statistics (de Leeuw & Heiser, 1980a). MDS in wide sense refers to any technique that produces a multidimensional geometric representation of data, where quantitative or qualitative relationships in the data are made to correspond with relationships in the representation. MDS in another sense starts with information about some form of dissimilarity between the elements of a set of objects and it constructs its geometric representation from this information. The data on dissimilarities are distance like quantities while data on similarities are inversely related to distances. MDS is an important class of multivariate data analysis which is a descriptive in nature and represents one of the most important interdependency techniques.

MDS calculations are highly complex and even the simplest versions are never performed without the aid of a computer. In MDS, data pertaining to some collection of objects are represented in terms of proximity, represented by δ_{ij} (data value connecting one object; i with another object; j) by the below matrix notation, Δ.

$$\Delta = \begin{bmatrix} \delta_{11} \ \delta_{12} \ \delta_{13} & \cdots & \delta_{1I} \\ \vdots & \ddots & \vdots \\ \delta_{J1} \ \delta_{J2} \ \delta_{J3} & \cdots & \delta_{JI} \end{bmatrix}$$

Each object is represented by a point x_i which corresponds to the i^{th} object. X is used to indicate the entire configuration of points $x_1, x_2, x_3 ..., x_i$. In many situations there is no effective difference in the meaning between δ_{ij} & δ_{ji} and using a coordinate system each point can be represented by coordinates. For 2 dimensional space the coordinates of x_i are written as (x_{i1}, x_{i2}). For R-Dimensional space the coordinates of x_i may be written as

$$x_1 = (x_{11}, x_{12}, ..., x_{1R})$$
$$\vdots$$
$$x_i = (x_{i1}, x_{i2}, ..., x_{iR})$$
$$\vdots$$
$$x_I = (x_{I1}, x_{I2}, ..., x_{IR}).$$

Strictly speaking, a point is a geometrical object and is distinct from the sequence of coordinates which represents it. The distance between the points of X plays a central role in MDS. The distance between the two point's x_i & x_j; d (x_i, x_j) is denoted by d_{ij}. The general formula for calculating distances is:

$$d_{ij} = \left[\sum_{r=1}^{R}(x_{ij} - x_{jr})^p\right]^{\frac{1}{p}} \text{ where p is the specified power.}$$

Unless, otherwise indicated distance always mean ordinary Euclidean distance that may be calculated by Pythagorean formula (where p=2)

$$d_{ij} = \sqrt{(x_{i1} - x_{j1})^2 + \cdots + (x_{iR} - x_{jR})^2}$$

$$d_{ij} = \sqrt{\sum_{r=1}^{R}(x_{ir} - x_{jr})^2} \text{ where } d_{ii} = 0 \text{ for all i and } d_{ij} = d_{ji} \text{ for all i \& j}$$

The central motivating concept of MDS is that the distance, d_{ij}, between the points should correspond to the proximities δ_{ij}. Goodness of fit is a very important consideration in deciding how many dimensions are appropriate. A measure of fit widely used in MDS is "stress" which is a square root of a normalized residual sum of squares. Stress varies between 0 and 1 with values near 0 indicating better fit. Each stress results from an iterative computational procedure. Stress (S) for metric and non-metric multi-dimensional scaling is calculated using formula 1 and 2 respectively.

$$Stress\ (S) = \sqrt{\frac{\sum_{i<j}(d_{ij} - \hat{d}_{ij})^2}{\sum_{i<j} d_{ij}^{\ 2}}} \ where\ \hat{d}_{ij} = \|x_i - x_j\| \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$Stress\ (S) = \sqrt{\frac{\sum(f(x) - d_{ij})^2}{\sum d_{ij}^{\ 2}}} \ where\ f(x) is\ the\ monotonic\ transformation\ of\ x \ldots\ldots\ldots\ldots (2)$$

It is to be noted that stress always decreases as the dimensionality increases. Also, the points usually form a convex pattern i.e. the line connecting between any two points on the plot is above the intermediate points. Violation of either of these conditions may suggest incomplete convergence or local minima. Iterations terminate when the maximum absolute difference between any coordinate in the solution at iteration 'i' vs iteration 'i-1' is less than the specified convergence criteria. Because the configuration is standardized to unit variance on every iteration, iteration stops when no coordinate moves more than the specified convergence criteria (0.005 by default) from its value on the previous iteration.

V.4.II. Exploratory Factor Analysis (EFA):

EFA is a popular interdependent technique used for the purpose of grouping together correlated variables. It tries to explore, if possible, the covariance relationship among many variables in terms of few underlying, but unobservable, random quantities called factors. If all variables within a particular group are highly correlated among themselves but have relatively small or low correlation with variables in a different group, then is conceivable that each group of variables represent a single underlying construct, or factor, that is responsible for the observed correlations.

The application of EFA is based on the concept of the Factor Models, the Orthogonal Factor Model to be precise. If the observable random vector *X*, with *p* components, has mean μ and covariance matrix $\sum$, the factor model postulates that *X* is linearly dependent upon few unobservable random variables F_1, F_2, F_3…, and F_m, called common factors / factors and *p* additional sources of variation $\varepsilon_1, \varepsilon_2, \varepsilon_3, \dots, \varepsilon_p$ called errors or, sometimes specific factors, which cannot be explained by extracted factors. However, F_1, F_2 etc. are not measured. So they are estimated by various methods like principal axis method, minimum residual method, maximum likelihood method, and so on with iteration. In particular the factor analysis model is

$$X_1 - \mu_1 = l_{11}F_1 + l_{12}F_2 + \dots\dots + l_{1m}F_m + \varepsilon_1$$

$$X_2 - \mu_2 = l_{21}F_1 + l_{22}F_2 + \dots\dots + l_{2m}F_m + \varepsilon_2$$

$$X_3 - \mu_3 = l_{31}F_1 + l_{32}F_2 + \dots\dots + l_{3m}F_m + \varepsilon_3$$

$$\vdots$$

$$X_p - \mu_p = l_{p1}F_1 + l_{p2}F_2 + \dots\dots + l_{pm}F_m + \varepsilon_p$$

In matrix notation, $\underset{(p\mathrm{x}1)}{X - \mu} = \underset{(p\mathrm{x}m)}{L}\ \underset{(\mathrm{m}\mathrm{x}1)}{F} + \underset{(p\mathrm{x}1)}{\varepsilon}$ ……..……………………………………. (i)

The coefficient l_{ij} is called loading of the ith variable on the jth factor so the matrix L is the matrix of factor loadings. With so many unobservable quantities, a direct verification of the factor model from observations on X_1, X_2, X_3, …, X_p is not feasible. However, with some additional assumptions about the random vectors F and ε, the model in (i) implies certain covariance relationship, which can checked. The unobservable factors F and ε, satisfy the following conditions:

(a) F and ε are independent.
(b) *E*(F) = 0, Cov(F) = 1
(c) *E*(ε) = 0, Cov(ε) = Ψ, where Ψ is a diagonal matrix

From the model in (i), the orthogonal factor model implies a covariance structure for X. The covariance structure for the orthogonal factor model includes:

(I) Cov(X) = LL′ + Ψ
Or,
$\mathrm{Var}(X_i) = l_{i1}^2 + l_{i2}^2 + \dots\dots + l_{im}^2 + \Psi_i$ and
$\mathrm{Cov}(X_i, X_k) = l_{i1}l_{k1} + l_{i2}l_{k2} + \dots\dots + l_{im}l_{km}$

(II) Cov(X , F) = L
Or,
$\mathrm{Cov}(X_i, F_j) = l_{ij}$

That portion of variance of the ith variable contributed by the m common factors is called the ith communality. That portion of $\mathrm{Var}(X_i) = \sigma_{ii}$ due to the specific factor is often called uniqueness or specific variance. Denoting the ith communality by h_i^2 one gets

$$\underbrace{\sigma_{ii}}_{\mathrm{Var}(X_i)} = \underbrace{l_{i1}^2 + l_{i2}^2 + \dots + l_{im}^2}_{\text{Communality}} + \underbrace{\Psi_i}_{\text{Specific Variance / Uniqueness}}$$

Or, $\sigma_{ii} = h_i^2 + \Psi_i \ i = 1,2,\dots,p$; and $h_i^2 = l_{i1}^2 + l_{i2}^2 + \dots + l_{im}^2$

The ith communality is the sum of squares of loadings of the ith variable on m common factors. Factor analysis is usually applied to interval or ratio scaled data, though there have been examples of its application to dichotomous or mixed set of variables in Malhotra’s (2004) book Marketing Research: An applied orientation. In EFA an attempt is made to find out some pattern of relationships in which a factor would be heavily loaded on some variables while other factors would heavily load on to some other variables. Such a condition would suggest rather ‘pure’ constructs underlying each factor. One attempt to secure this near ‘pure’ condition or less ambiguous condition between factors and variables and the same is achieved by “Rotation”. The process of rotation allows 2 choices:

1. Orthogonal rotations – When the factors are intentionally rotated to result in no correlation between the factors in the final solution.
2. Oblique rotations – When the factors are not manipulated to be zero correlation but may reveal the degree of correlation that exists naturally.

If the factors may theoretically allow interdependence, the latter should be considered. The former includes the varimax rotation, which is most common and simple to maximize squared column variance). The latter includes promax and oblimin rotations. The present study uses varimax rotation. In order to get results those are interpretable, it most important to check the adequacy of factor analysis. The same is done by some tools described below:

1. **Criteria of sample size adequacy -** sample size 50 is very poor, 100 is poor, 200 is fair, 300 is good, 500 is very good, and more than 1,000 is excellent (Comfrey and Lee, 1992, p.217).
2. **Kaiser-Meyer-Olkin's sampling adequacy criteria (KMO) with MSA (individual measures of sampling adequacy for each item) -** It tests whether there are a significant number of factors in the dataset. Kaiser (1975) suggested that KMO > 0.9 were marvelous, in the 0.80s - meritorious, in the 0.70s - middling, in the 0.60s - mediocre, in the 0.50s - miserable, and less than 0.5 - unacceptable.
3. **Bartlett's sphericity test –** It is a test statistic that tests the hypothesis that the variables are uncorrelated (H_0) in the population. p-value being < 0.5 indicates that H_0 to be rejected and H_1 accepted i.e. variables are correlated in the population.

The number of factors to be extracted is based on certain criteria (mentioned below) but no 100% full proof statistical tests exist. The two techniques that are used most often for the purpose of extracting factors are Principal Component Analysis (PCA) and Common Factor Analysis.

1. **Eigen value Criteria –** The criteria says eigen values to be > 1.
2. **Scree Plot -** A graphical plot of the eigen values (amount of variance explained by an extracted factor) against the number of factors in order of extraction. The adequate number of factors is before the sudden downward inflexion of the plot.

V.5. Computing Language & Software Used

The researchers in their ensuing work have used R 3.4.0 version for conducting MDS, PCA and EFA.

VI. ANALYSIS & DISCUSSION

Before conducting the analytical tests, the reliability of data set was checked (Fig 1). Alpha value was found to be in the acceptable range and hence data set is considered reliable. Fig. 2 shows the dis-similarity data and the distance between the points while Fig. 3 shows the MDS fit with 2 dimensions. Convergence of data is observed after 5 iterations and the co-ordinates of points in a 2-dimensional space is indicated and the same is shown in Fig. 3. Calculated Stress value of 1.785438e-14 is found to be very low and close to zero hereby indicating a good fit. Finally the MDS plot or the perceptual map is shown in Fig. 4 in which one finds the spatial distribution of five schools on two co-ordinates (axis). LL and EK are found to be ahead or distant apart from the rest of the schools in these axes. It is also seen that along co-ordinate 1, the proximity is maximum between LL and KZ and between EK & KZ along co-ordinate 2. The co-ordinates are still not known at this stage of analysis and inference cannot be made till one finds them. The next stage of analysis involves naming the two axes using PCA & EFA.

Cronbach(MDSdata)

sample.size	no.of.items	alpha
220	10	0.74

Fig – 1; Cronbach's Alpha; ***Source:*** *R Output of primary data*

MDS(data)

	TH	EK	KZ	LL	BPS
1	0.00	53.22	50.04	55.27	48.76
2	53.22	0.00	55.11	57.11	50.30
3	50.04	55.11	0.00	58.25	54.89
4	55.27	57.11	58.25	0.00	56.25
5	48.76	50.30	54.89	56.25	0.00

D(distance)

	1	2	3	4
2	75.47317			
3	71.11985	78.14540		
4	79.04544	81.07138	82.57922	
5	69.19599	71.28015	77.81130	80.17587

Fig – 2; MDS Distance; ***Source:*** *R Output of primary data*

fit-MDS(d,k=2)

```
initial  value  10.109958
iter 5 value     1.243634
final    value   0.000000
converged
```

fit(points)

	[,1]	[,2]
[TH]	-16.309474	-8.371698
[EK]	-7.896209	37.425174
[KZ]	-18.489203	-34.866419
[LL]	57.481827	-5.795593
[BPS]	-14.786941	11.608536

Fig – 3; MDS Fit and Coordinates; ***Source:*** *R Output of MDS primary data*

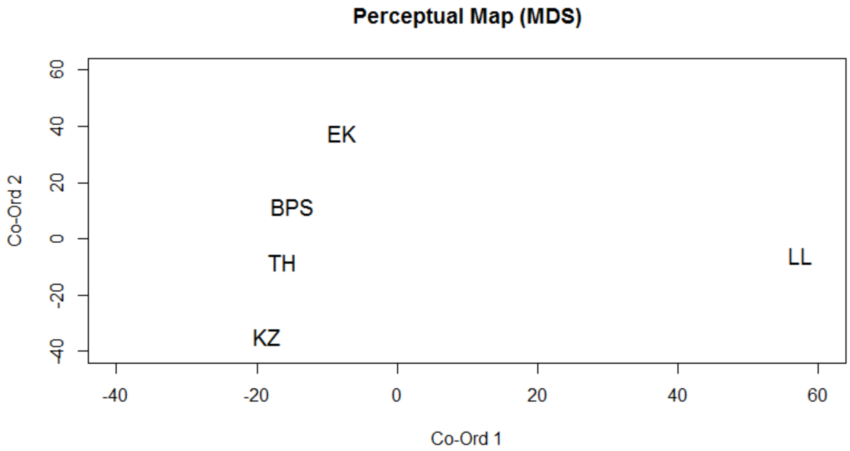


Fig – 4; Perceptual Map; ***Source:*** *R Output of primary data*

PCA & EFA: The dataset was first examined and tested if it is fit to be put to PCA & EFA. Corplot (correlation plot) was first extracted to explore the type of relationship that exists amongst the attributes. Corplot of attributes is shown in Fig. 5. The below correlation matrix displays the correlation of each variable with every other variable. Also test of multi collinearity; a situation in which two or more explanatory variables is highly related linearly, was tested. If multicollinearity exists in a data set, the estimate of impact of predictor variables tends to be less precise as the collinear independent variables contain same information about the dependent variable. However VIF (variance inflation factor), a measure of existence of multicollinearity, were found to be < 10 thereby indicating absence of multicollinearity in the data set (Fig. 6). Thus, no attributes were dropped.

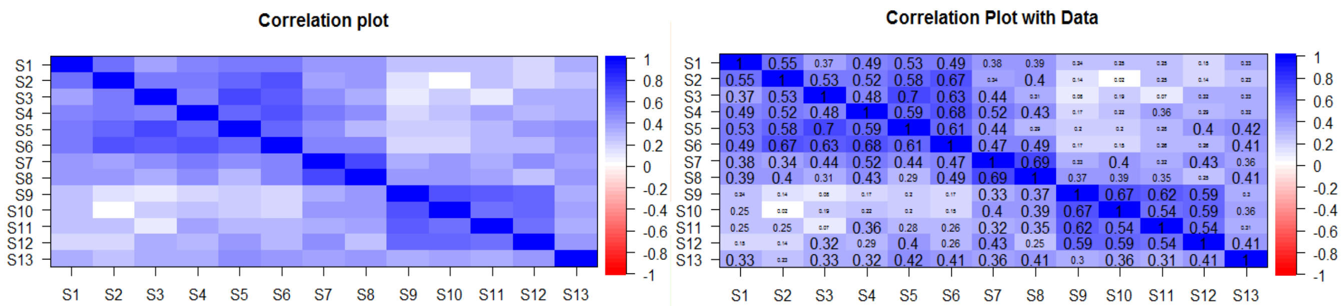


Fig – 5; Corplot, ***Source:*** *R Output of primary data*

```
cronbach(PCA_EFAdata)

sample.size       220
no.of.items       13
alpha             0.8865193
```

```
vif(data)

S1     1.873960
S2     2.547841
S3     2.720734
S4     2.416228
S5     3.008316
S6     3.081055
S7     2.643782
S8     2.656833
S9     2.551646
S10    2.554253
S11    2.191951
S12    2.476898
S13    1.563548
```

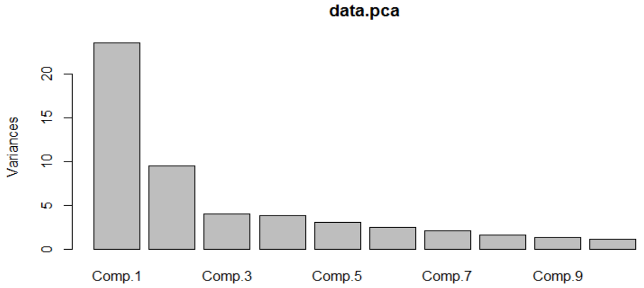
Fig – 6; Cronbach's Alpha & VIF; ***Source:*** *R Output of PCA & EFA primary data*

PCA was done to find out the relative importance of the attributes or components (Fig. 7). Those having standard deviation values > 1 were considered important but how many components to be retained for conducting EFA was checked from Scree Plot (Fig. 8). Scree Plot is a graphical representation of the Eigen values against the number of factors. It was found that 10 components had standard deviation > 1 but Scree plot suggested sharp decline in variances after component 2. Again one can observe a decline in variance in the Scree plot after component 5 after which the curve tapers gradually. Thus EFA was done with 5 components initially and checked for components 4, 3 and 2 to ascertain the best result.

PCA Summary - Importance of Components

	Comp.1	Comp.2	Comp.3	Comp.4	Comp.5	Comp.6	Comp.7	Comp.8	Comp.9	Comp.10	Comp.11	Comp.12	Comp.13
Standard deviation	4.853	3.082	2.014	1.958	1.745	1.598	1.456	1.272	1.154	1.063	0.971	0.905	0.832
Proportion of Var.	0.427	0.172	0.073	0.069	0.055	0.046	0.038	0.029	0.024	0.020	0.017	0.015	0.013
Cumulative Prop.	0.427	0.599	0.672	0.742	0.797	0.843	0.882	0.911	0.935	0.956	0.973	0.987	1.000

Fig – 7; Principle Component Analysis; ***Source:*** *R Output of primary data*



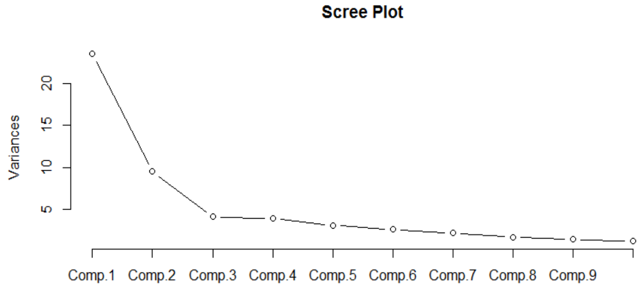


Fig – 8; Scree Plot; ***Source:*** *R Output of primary data*

Before EFA was done, KMO test was done to check if there are a significant number of factors in the dataset, R-Output of KMO yields overall MSA (measure of sampling adequacy) = 0.83.

MSA for each item, **Individual MSA:**

S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
0.86	**0.83**	**0.80**	**0.88**	**0.85**	**0.87**	**0.82**	**0.77**	**0.81**	**0.80**	**0.83**	**0.81**	**0.88**

Overall MSA value of 0.83 in the present study suggests it is meritorious. Also, MSA value for each item > 0.5 i.e. they are in the acceptable range. Adequacy of Factor Analysis was further confirmed by conducting Bartlett's Test of Sphericity. The chi sq value was fond to be 698.86 with p. value of 1.66874e-100, thus indicating H_0 to be rejected and H_1 accepted i.e. variables are correlated in the population. Also, Criteria of sample size adequacy with a sample size of 220 was met (200 is fair). EFA with 5 factors and varimax rotation were conducted and the results obtained are shown in Fig. 9

EFA Results

Uniquenesses:

S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
0.594	0.147	0.202	0.005	0.308	0.313	0.383	0.005	0.278	0.335	0.370	0.351	0.679

Loadings:

	Factor1	Factor2	Factor3	Factor4	Factor5
S1	0.173	0.499	0.216	0.193	0.207
S2		0.868	0.255	0.152	0.103
S3		0.323	0.807	0.165	0.114
S4	0.145	0.374	0.278	0.225	0.840
S5	0.198	0.445	0.623		0.250
S6		0.552	0.435	0.285	0.325
S7	0.299	0.150	0.325	0.584	0.242
S8	0.239	0.269		0.924	
S9	0.824	0.121		0.161	
S10	0.760		0.151	0.234	
S11	0.714	0.256		0.106	0.190
S12	0.722		0.344		
S13	0.340	0.131	0.313	0.286	
Avg.	0.441	0.362	0.374	0.301	0.283

	Factor1	Factor2	Factor3	Factor4	Factor5
SS loadings	2.650	1.949	1.773	1.596	1.062
Proportion Var	0.204	0.150	0.136	0.123	0.082
Cumulative Var	0.204	0.354	0.490	0.613	0.695

Fig – 9; Exploratory Factor Analysis Output; ***Source:*** *R Output of primary data*

Test of the hypothesis that 5 factors are sufficient was done and the chi square statistic found is 31.92 with the p-value being 0.102, thereby suggesting that we accept H_0 i.e. 5 factors are sufficient. Test of the hypothesis that 2, 3 and 4 factors are sufficient were also tested. The chi square statistic with 2 factors yielded 143.07 with the p-value is 3.26e-10. Since p-value < 0.05, H_0 is rejected and H_1 accepted i.e. 2 factors are not sufficient. With 3 factors the output of the test of hypothesis that 3 factors are sufficient shows the chi square statistic of 90.16 with the p-value of 2.28e-05. Since p-value < 0.05, H_0 is rejected and H_1 accepted. Thus, 3 factors are not sufficient and factor analysis was again conducted with 4 factors. The output of the test of hypothesis that 4 factors are sufficient yielded the chi square statistic of 52.72 with the p-value of 0.012. Since p-value < 0.05, H_0 is rejected and H_1 accepted i.e. 4 factors are not sufficient. The researchers thus concluded 5 factors as ideal for the present study.

The average factor loadings of the extracted factors have been calculated and the data represented in Fig. 9. Selection of the attributes within a factor is based on the criteria that attribute loadings must be greater than or equal to the average loadings of that factor. Attributes meeting this criterion have only been retained within that factor. However, if an attribute meets this criterion for more than one factor, then the attribute is loaded on to that factor in which it has a higher loading. The 5 factors and the attributes included in each factor are indicated with a different colour (red) and names given to each of the factors.

Factor 1: S9, S10, S11, S12 : Pick n drop, Known school, Co-education, Personal care n attention.
Factor 2: S1, S2, S6 : Fee structure, Safety & Security, Infrastructure
Factor 3: S3, S5 : Brand, Extracurricular activities.
Factor 4: S7, S8 : Nearby, School where child's friends go
Factor 5: S4 : Type of training

The 5 factors have been named as Primal (Factor 1); Comfort (Factor 2); Divergent (Factor 3); Convenience (Factor 4); Type of Training (Factor 5). The total variance explained is 70% out of which the first two Factors contribute 35% which is 50% of the total variance is explained by all the factors. Coordinate 1 may be named as "Comfort" i.e. factor 2 and coordinate 1 may be named as "Primal" i.e. factor 1. From the nature of schools and their USPs, it was found that LL's strength was in their infrastructure, safety-security and reasonable and parent friendly fee structure while EK's strength lay in the basic facilities expected of a school, namely care and attention, pick & drop services etc.

VI. CONCLUSION

This study clearly shows that LL is way ahead of the other four schools in terms of parental perception on safety and security, infrastructure and fee structure but when it comes to admitting the kid in a homely environment this school is not as attractive as others. Parents who are focused from the very beginning about the career of the child prefer schools like LL to other schools. On the other hand, parents prefer schools like EK when it comes to personal care and attention including that of pick and drop facilities etc. It may thus be concluded that two major influencing factors affecting parental perception are "Comfort" and "Primal".

VII. LIMITATIONS AND SCOPE FOR FURTHER STUDIES

Data was collected only from Kolkata city hence the output cannot be generalized for the entire country. Owing to feasibility constraints sample size considered was a restricted one, 220 in the present case and 5 play schools as the reference case. In future research, more schools may be added and comparison between urban and semi-urban parental perception may be carried out. These suggestions are only indicative and researchers may add new dimensions of their thought.

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