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Evaluating Psychometric Properties for IT HOME: A Case Study from Assam

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(Abstract)

An outstanding tool for methodically evaluating the quality of children's home environment is the Home Observation for Measurement of the Environment (HOME) inventory. The reliability and validity of the first version of HOME (0-3)—IT-HOME—were tested with a sample of 2,153 households with children younger than three years old Meece [2002]. This was done through inspections of the study area and interviews with the children's main caregivers. A multi-trait multi-method correlation matrix and the Cronbach alpha (α) measure of internal consistency have been employed for this objective. The results proved the validity and reliability of the Assamese version of the test.

Key words: Cronbach's alpha, internal consistency reliability, multi trait multi- method correlation matrix, construct validity.

1. Introduction:

For every individual, the journey of learning begins at home. A child's stress response system, the quality of care they receive and their healthy development can all be negatively impacted by a troubled home situation, even from the time they are infants [Blair et al. 2011]. Meece [2002] noted that parents

have the greatest impact on their children's cognitive development in the formative years of infancy and early childhood. The provision of a stimulating home environment by family's accounts for a significant portion of the diversity income along with children's intellectual development, rather than socioeconomic position [Yeung, et. al, 2002]. Parental respond/ react to their child, the degree to which the family's routine is consistent and predictable, the physical environment of the home, availability of playing equipment, parents' involvement in different activities of child's learning process all these constitute the home environment of children. A child's physical and mental health, might benefit from a parent who is responsive to their needs [Zaffetal., 2003].Thus, home environment has great impacts on individual's health behavior. Home environment is one of the important functions of social relationships. Also, parenting style has significant impact on an infant's behavior as well as its development. As infants and toddlers stay most of the times in their home under parental care, so, their home environment is considered as a risk factor for the socio-emotional along with cognitive development of a child.

Child development is a complex phenomenon which involves biological, psychological and emotional changes. Children grow and learn an amazing amount in their first five years. Anderson et al. [2003] found out that children get considerable opportunity for growth in their early years of life. If a child fails to learn different things like roll, crawl, stand, talk etc. within the expected time like the other child of the same age, then it is considered to be suffering from developmental delay. Without additional intervention, a child with this developmental delay can have a typical and healthy life. On the other hand, long-term learning impairments can be a symptom of substantial delay in some youngsters. Therefore, it is crucial to identify potential risk factors for infant developmental delays so that healthcare providers can focus their efforts on minimizing these delays. Sonnander & Claesson [1999] predicted that along with biological factors, environmental factors also influence the developmental. A major barrier to children's optimal development in low-income nations is the

absence of a family environment that supports their cognitive and social-emotional growth [Walker et al., 2007]. Consequently, it is helpful for early childhood practitioners to have access to a tool that allows them to systematically evaluate home stimulating opportunities. When it comes to a child's healthy growth, the home environment is crucial.

This study is a part of major research project entitled "A study on Impact of Some Obstetrical, Environmental and Biological factors on Child Developmental Delays using Statistical Modeling". The main objective of this work was to estimate the prevalence of child developmental delays along with to trace the risk factors of the same using appropriate statistical modeling and with a glimpse into major risk factors in Dibrugarh district of Assam, India. As part of this study, the investigators must use tools to measure the home environment of the children in their early ages. HOME [Caldwell & Bradley, 1984] is such a measure that can systematically assess the quality of children's home environment. The initial version of HOME (0-3) i.e., Infant Toddler HOME (IT-HOME) is utilized to get information through interview with the primary caregivers along with through observation. Literature showed various works [Elardo et al., 1975; Bradley et al., 1988; Bradley et al., 1989; Bradley, 1993; Luster & Dubow, 1992; Johnson et al., 1993; Molfese et al., 1997; Saudino & Polmin, 1997; Hanetal., 2001; Totsika & Sylva, 2004; Tongetal., 2007; Bang, 2008] that had been carried out using HOME inventory to examine the relationship between home environment, daycare along with children's development. This assessment tool did not originate in our nation or the state of Assam; its creators are from a distinct cultural and geographical background. Thus, before using this, the reliability and validity check for the instrument for the specified area is mandatory. Keeping this point in view, an attempt has been made to test the reliability and validity of IT-HOME for the study area initially for a sample (pilot survey) of 100 children up to 3 years. The reliability and validity of the instrument for screening the CDD viz. Denver II has already been tested for the same context of Assam, for children up to 3 years and found satisfactory [Saikia & Hazarika, 2013]. A discussion on

the scoring of the instrument IT-HOME has been made in section 2 of this paper. The remaining sections of this study have been devoted to the case studies for testing reliability and validity of the instrument in study area.

2. Scoring of IT-HOME:

The latest version of IT-HOME [Caldewell & Bradely, 2003] containing the instruction for its administration and revised up to date information about its psychometric properties are utilized in this study. Other factors that are taken into account by the HOME inventory include the following: parental education level, dwelling region, family type, mother's depression, social support and so on. Researches on the growth and development of children are extensively done in the United States and Korea through this tool. The 45 items on the HOME total score and the 6 subscales are all of binary choice.

Table.2: Structural form of IT-HOME Inventory

Name of the Domain	Responsively	Acceptance	Organization	Learning	Involvement	Variety	Total
No. of items	11	8	6	9	6	5	45

As mentioned earlier the IT-HOME inventory is consisted of 45 test items under six domains where each item is to be filled up either by interviewing the caregiver or by simple observation. Scoring for all items on the IT-HOME is binary, plus (positive response) or minus (negative response). The scores for each item are noted on the record form and then later these are transferred to the subtotals along with the total in the summary sheet. For each of the six domains, the maximum possible scores and the median values are given. Any time a subscale score is 2-3points below the median, a flag has been raised and scores more than 5 points below the median on the total score are recorded as suspected.

2.1.: Principles behind Psychometric properties, Their Measures and Methodologies:

The consistency of the results we get from an evaluation, or the accuracy with which any measuring device assesses various properties, is what we mean when we talk about reliability. Estimating an instrument's reliability can be done in a number of ways; these some examples are parallel form and internal consistency reliability. The consistency of scores over time is known as test-retest reliability. The dependability of two versions of a test that assess the same topic is called parallel form reliability. Internal consistency reliability allows one to compare the findings of several tasks or parts of an evaluation to determine how well they relate, as stated in Hitchhiker's guide to reliability [Charles, 2005]. Even though there are a number of options, the one most often used is coefficient of Cronbach's alpha [Cronbach, 1951]

$$\propto = \frac{k}{k-1}\left(1 - \frac{\sum S_i^2}{S_t^2}\right)$$

Here, k is the number of items s_i^2 is variance of i^{th} item and s_t^2 is the variance of the total score.

High levels of consistency are indicated by Cronbach's alpha, which can take on values near to 1. Bjordal et al. [1992] states that a dependable scale is the one with alpha value higher than 0.07. Additionally, this coefficient's social cutoff is considered as equivalent to or higher than 0.7. An improved reliability of the produced scale is indicated by a higher score. A reliability value of 0.7 is considered adequate by Nunnally [1978], however lower standards have been found in the literature on occasion. Instruments are deemed to have strong internal consistency when the total $\propto$ value is greater than 0.6 [Downing SM, 2004]. Reliability was tested using the Cronbach alpha coefficient in this study.

According to Brown [1996], a test's validity actually assesses the constructs it sets out to measure. We can have three different kinds of validity: content, criteria and construct. A test's content should accurately reflect the conceptual domain it aims to assess in order to ensure content validity. One way

to determine whether a test is criterion valid is to look at the correlation or relationship between test scores and scores on a measure that represents the criteria. Examining the instrument's ability to measure the concept it claims to assess is what construct validity is all about, according to Cronbach and Meehl [1955].

The Phi coefficient is one metric for evaluating a tool's content validity [Yule G.U., 1912]. It is a variant of Pearson's definition of r when two variables of every state assigned values of 0 and 1, respectively and it is the product-moment coefficient correlation. In its original form, it compared distributions with only two possible values, or "truly dichotomous," meaning they indicate an indescribable quality i.e. whether something is white or black, successful or unsuccessful, etc. (Copyright©2006 John Wiley & Sons, Inc. from the Encyclopedia of Statistical Sciences). The formula for the phi coefficient is,

$$\emptyset = \frac{(ad - bc)}{\sqrt{(a+b)(c+d)(a+c)(b+d)}}$$

Where, *a*, *b*, *c* and *d* are the cells of a 2x2 table. The Phi coefficient has range from -1 to +1.

A variety of matrices, including those involving correlation, inter-item correlation and multi-trait multi-method correlation, can be used to evaluate an instrument's construct validity. Campbell and Fiske [1959] established that convergent and divergent validity are required for concept validity. It is an associated idea. It makes use of the idea of item discriminant validity and item internal consistency. A good level of item is indicated by a Pearson's coefficient of correlation for things with their skill is greater than 0.40. It is recommended to agree correlation values lower than 0.40 in certain cases, nevertheless [Ware and Gandek, 1998]. When an instrument's domains correlate more strongly than rival domains, we say that the instrument has discriminant validity.

The instrument viz. IT-HOME has gone through multi-trait multi-method correlation matrix. The responses obtained from the survey are considered in the respective analysis as suggested by the

instrument and methods. The data is analyzed using SPSS Vr. 16.0.

3. Results obtained from Pilot Survey:

3.1.: Reliability of IT-HOME:

Inside consistency reliability is used to figure out how reliable IT-HOME is in Assam, more especially in the Dibrugarh district of Assam., using Cronbach's α coefficient and presented in Table-3.1(a) below.

Table-3.1(a): Internal Consistency Reliability of IT-HOME Inventory

Scales	Cronbach's Alpha(α) co-efficient	Cronbach's Alpha Based on Standardized Items
Responsivity	0.705	0.735
Acceptance	0.702	0.745
Organization	0.653	0.592
Learning Materials	0.662	0.671
Involvement	0.547	0.562
Variety	0.691	0.660

From the table it is observed that the reliability values for the six domains of the instrument are showing reliable results.

3.2: Validity of IT-HOME:

The multi-trait multi-method correlation matrix for assessing the validity of IT-HOME in the context of Assam, more specifically for Dibrugarh district of Assam is computed through construct validity measure and is presented in Table-3.2(a).

Table-3.2(a): Multi Trait Multi Method Correlation Matrix for IT-HOME

Scales		Mean	SD	R	A	O	LM	I	V
R	Q1	0.59	0.53	**.517****	-.092	.228*	.135	.101	.333**
	Q2	0.86	0.35	**.454****	-.146	.154	.083	.034	.099
	Q3	0.75	0.43	**.605****	-.183	.432**	.341**	.369**	.483**
	Q4	0.53	0.50	**.587****	.033	.180	.128	.094	.114
	Q5	0.91	0.29	**.415****	.361**	-.172	.028	.135	.097
	Q6	0.94	0.24	**.404****	.099	-.071	-.099	.037	.189
	Q7	0.93	0.25	**.426****	.189	-.083	-.165	.224*	.154
	Q8	0.73	0.44	**.648****	-.157	.099	.074	.175	.128
	Q9	0.90	0.30	**.465****	-.102	.045	.139	.034	-.015
	Q10	0.96	0.20	**.429**	.071	-.090	-.021	.008	-.027
	Q11	0.84	0.37	**.534****	.043	.043	.310**	.226*	.111
A	Q12	0.62	0.49	.209*	**.433****	-.080	.100	-.057	-.129
	Q13	0.52	0.50	.070	**.492**	.199*	-.081	.017	.008
	Q14	0.74	0.44	-.037	**.597****	-.213*	.080	-.194	-.172
	Q15	0.79	0.40	-.115	**.611****	-.301**	-.033	-.052	.048
	Q16	0.75	0.44	-.183	**.665****	-.213*	-.041	.161	.012
	Q17	0.86	0.35	.037	**.805****	-.180	.058	.107	.122
	Q18	0.82	0.39	-.052	**.606****	-.202*	-.117	.110	.161
	Q19	0.27	0.44	-.138	**.336****	-.034	.103	-.146	-.068
O	Q20	0.99	0.09	.^{c}	.^{c}	**.**^{c}	.^{c}	.^{c}	.^{c}
	Q21	0.67	0.47	.298**	-.164	**.602****	.171	.218*	.419**
	Q22	0.81	0.39	.376**	-.234*	**.519****	.060	.157	.464**
	Q23	0.97	0.17	.026	-.031	**.403***	-.018	.025	.054
	Q24	0.53	0.50	-.056	-.069	**.583****	.285**	.068	.008
	Q25	0.55	0.49	-.066	-.078	**.468****	.255*	-.203*	-.111

Table-3.2(a): Multi Trait Multi Method Correlation Matrix for IT-HOME (contd.)

Scales		Mean	SD	R	A	O	LM	I	V
LM	Q26	0.02	0.14	.108	.036	.141	**.185**	-.100	.146
	Q27	0.02	0.14	.117	.133	-.005	**.201***	.132	-.107
	Q28	0.67	0.47	.082	.047	.119	**.666****	.156	.273**
	Q29	0.69	0.46	.142	.125	.140	**.644****	.171	.150
	Q30	0.08	0.28	.192	-.005	.340**	**.488****	-.046	-.005
	Q31	0.36	0.48	.184	-.141	.371**	**.603****	-.109	.081
	Q32	0.01	0.14	-.147	-.110	-.074	**.201***	-.051	-.107
	Q33	0.01	0.09	.c	.c	.c	**.c**	.c	.c
	Q34	0.019	0.14	.079	.011	.063	**.263****	.040	.019
I	Q35	0.99	0.09	.262**	-.036	.052	-.010	**.429***	.120
	Q36	0.61	0.48	.475**	-.139	.276**	.326**	**.404****	.247*
	Q37	0.01	0.09	.c	.c	.c	.c	**.c**	.c
	Q38	0.42	0.49	.086	.022	-.091	-.052	**.680****	.309**
	Q39	0.01	0.14	.056	.036	.044	.185	**.028**	-.031
	Q40	0.75	0.43	-.185	.079	-.055	-.201*	**.517****	-.005
V	Q41	0.86	0.35	-.071	-.163	.043	-.117	.071	**.353****
	Q42	0.27	0.45	.134	.062	.190	.181	.090	**.632****
	Q43	0.45	0.50	.310**	.043	.052	.112	.280**	**.624****
	Q44	0.65	0.48	.312**	-.005	.320**	.033	.357**	**.596****
	Q45	0.11	0.31	.211*	-.090	.278**	.342**	.099	**.427****

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05level (2-tailed).

c. Cannot be computed because at least one of the variables is constant.

R: Responsivity; A: Acceptance; O: Organization; LM: Learning Material; I: Involvement;

V: Variety

From thetable-3.2(a), on validity measure of IT-HOME few items are not in favor of its use in the study area. However, these exceptions may occur due to smaller sample size of the pilot survey and will not occur in case of large sample, as most of the other items of the instrument are showing positive results in their use in the study area. So, the larger sample after completion of the data collection will be used to recheck the exceptions as well as to re-verify others. Nevertheless, if same situation arises in the second visit also, then those items are needed to be dropped from the final analysis and those will be the modifications of the instruments in the study area.

4. Results obtained from Main Survey:

4.1.: Reliability of IT-HOME:

Even though they demonstrated reliable results in the last visit, the dependability of the IT-HOME instrument is being computed again, particularly for the Dibrugarh area of Assam after collection of complete data. The reason behind this is to double-check them with a bigger sample. The Cronbach's alpha (α) coefficients are displayed in Table-4.1(a).

Table-4.1(a): Internal Consistency Reliability of IT-HOME

DOMAIN	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
Responsivity	0.673	0.685	11
Acceptance	0.730	0.765	8
Organization	0.653	0.592	6
Learning Materials	0.851	0.854	9
Involvement	0.589	0.599	6
Variety	0.691	0.660	5

From the reliability tables, it is observed that all the six domains of IT HOME are demonstrating consistent outcomes with the second (main) sample as well. Therefore, its usage in the Dibrugarh district and throughout Assam is undeniable.

4.2: Validity of IT-HOME:

The validity of IT-HOME in context of Assam, more specifically for Dibrugarh are computed again with the whole data set through multi trait multi-item correlation matrix and the presented in Table-4.2(a) below:

Table-4.2(a): Multi Trait Multi Method Correlation Matrix for IT-HOME

Scales		Mean	SD	R	A	O	LM	I	V
R	Q1	0.80	0.404	**0.393****	-0.114**	0.106**	0.055**	0.127**	0.22**
	Q2	0.91	0.291	**0.451****	0.252**	0.055**	-0.018	0.106**	0.085**
	Q3	0.87	0.335	**0.574****	0.018	0.247**	0.159**	0.228**	0.289**
	Q4	0.80	0.508	**0.6****	0.057**	0.248**	0.21**	0.241**	0.214**
	Q5	0.97	0.276	**0.494****	0.099**	0.121**	0.064**	0.132**	0.083**
	Q6	0.94	0.324	**0.383****	-0.022	0.029	0.043*	-0.036	-0.044*
	Q7	0.97	0.176	**0.46****	0.092**	0.094**	0.033	0.09**	0.055**
	Q8	0.94	0.331	**0.538****	0.122**	0.132**	0.087**	0.135**	0.129**
	Q9	0.94	0.297	**0.416****	0.056**	0.142**	-0.017	-0.028	0.068**
	Q10	0.97	0.172	**0.365****	0.114**	0.103**	0.07**	0.082**	0.046*
	Q11	0.92	0.354	**0.404****	0.268**	0.107**	0.193**	0.127**	0.078**
A	Q12	0.65	0.477	0.109**	**0.659****	0.077**	0.096**	0.137**	0.025
	Q13	0.58	0.541	0.012	**0.408****	0.061**	0.049*	0.103**	0.073**
	Q14	0.78	0.414	0.099**	**0.772****	0.024	0.089**	0.047*	0.003
	Q15	0.77	0.420	0.132**	**0.83****	0.036	0.106**	0.057**	0.017
	Q16	0.78	0.417	0.12**	**0.84****	0.054*	0.126**	0.082**	0.031
	Q17	0.78	0.413	0.133**	**0.836****	0.043*	0.099**	0.058**	0.021
	Q18	0.72	0.448	0.145**	**0.717****	0.087**	0.145**	0.111**	0.066**
	Q19	0.34	0.473	0.034	**0.451****	0.17**	0.184**	0.129**	0.189**
O	Q20	0.86	0.344	-0.006	0.123**	**0.3****	-0.042*	-0.124**	0.034
	Q21	0.86	0.346	0.281**	0.003	**0.588****	0.198**	0.189**	0.124**
	Q22	0.87	0.337	0.227**	0.008	**0.591****	0.205**	0.156**	0.265**
	Q23	0.97	0.166	0.109**	0.032	**0.353****	0.122**	0.127**	0.115**
	Q24	0.63	0.482	0.132**	0.077**	**0.612****	0.347**	0.37**	0.172**
	Q25	0.79	0.410	0.165**	0.106**	**0.621****	0.317**	0.29**	0.247**

Table-4.2(a): Multi Trait Multi Method Correlation Matrix for IT-HOME (contd.)

Scales		Mean	SD	R	A	O	LM	I	V
LM	Q26	0.47	0.530	0.139**	0.23**	0.205**	**0.648****	0.285**	0.272**
	Q27	0.41	0.524	0.182**	0.176**	0.229**	**0.692****	0.312**	0.306**
	Q28	0.51	0.531	0.127**	0.15**	0.25**	**0.648****	0.253**	0.229**
	Q29	0.66	0.553	0.112**	0.216**	0.298**	**0.609****	0.283**	0.247**
	Q30	0.40	0.522	0.149**	0.004	0.267**	**0.54****	0.271**	0.295**
	Q31	0.33	0.505	0.072**	0.034	0.204**	**0.672****	0.281**	0.175**
	Q32	0.16	0.411	0.071**	0.024	0.175**	**0.614****	0.158**	0.196**
	Q33	0.20	0.437	0.09**	0.104**	0.166**	**0.599****	***0.388*****	0.146**
	Q34	0.33	0.502	0.103**	0.075**	0.283**	**0.551****	0.207**	0.249**
I	Q35	0.94	0.231	0.24**	0.12**	0.205**	0.102**	**0.357****	0.163**
	Q36	0.86	0.342	0.29**	0.181**	0.197**	0.164**	**0.483****	0.302**
	Q37	0.28	0.447	0.126**	0.104**	0.269**	0.215**	**0.742****	0.281**
	Q38	0.40	0.490	0.13**	0.057**	0.208**	0.245**	**0.667****	0.258**
	Q39	0.24	0.425	0.072**	0.034	0.218**	0.46**	**0.696****	0.213**
	Q40	0.92	0.277	0.121**	0.083**	0.112**	0.111**	**0.369****	0.112**
V	Q41	0.95	0.218	0.108**	0.008	0.086**	0.04	0.099**	**0.48****
	Q42	0.57	0.495	0.2**	0.083**	0.232**	0.338**	0.36**	**0.76****
	Q43	0.88	0.323	0.226**	0.084**	0.172**	0.157**	0.216**	**0.568****
	Q44	0.86	0.352	0.18**	-0.002	0.174**	0.238**	0.224**	**0.598****
	Q45	0.32	0.465	0.121**	0.076**	0.264**	0.268**	0.213**	**0.649****

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

R: Responsivity; A: Acceptance; O: Organization; LM: Learning Material; I: Involvement; V: Variety

From the revisit it is observed that the exceptional items occurred in the first visit are no longer existed in these instruments with larger sample. It can be said that the instrument is valid for its use

in the study area. So, there is no need of their modifications and further studies can be carried out with this tool.

5. Discussion:

HOME inventory, more specifically IT-HOME inventory is a tool with the help of which one can access the home environment of children. A positive along with supportive home environment is considered as one of the factors for the socio-emotional along with cognitive development of a child. It is one of the widely used and accepted tools throughout the countries in different languages. Since this instrument is a very useful tool for measuring children's home environment, it had been tried to utilize in the mentioned locality and for that it is required to translate it into local (Assamese) language before administering. But it will be utilized fully if the temporal and spatial effects are eliminated as the instrument was developed in the western country. So, the reliability and validity tests had been examined.

According to the initial research on HOME's psychometric qualities, 90% of the time observers agreed on the items and the internal consistency ranged from moderate to high (0.44 to.89). Concurrent validity was also found to have minor to moderate correlations [Elardo et. al., 1975]. Another study [Bradley, 1993] indicated that the subscales had internal consistency ranging from 0.30 to 0.80 and that the total scores had an internal consistency as high as 0.80. The inter-observer reliability was determined in a study that sought to investigate the psychometric features of two versions of the HOME assessment in a sample of Swedish social care workers and reliability displayed acceptable results. Hwanga, et. al., [2012] conducted a study in Taiwan which resulted that the inter-observer reliability (0.64 -0.97) was adequate to excellent. IT-HOME-C, the Chinese version, presented acceptable reliability for clinical use in Taiwan.

In our present study instrument is tested through Cronbach alpha. The reliability coefficients given

in Table- 3.1(a) and Table-4.1(a) for different domains of the instrument is found to be quite satisfactory as they range from 0.547-0.705 in the first sample and 0.589 to 0.851 in the second sample, which shows a high level of internal consistency for IT – HOME in its Assamese version.

The construct validity of the instrument in this work is tested through multi-trait-multi-method correlation matrix. While going through the multi-trait-multi-method correlation matrix of IT-HOME inventory given in Table-4.1(a) it is observed that except one item in each of the 4 domains, all others are showing a high positive response in the direction of its utilization. That is the satisfactory range from 0.201 to 0.805, representing convergent validity. Also, all items each scale viz. Acceptance, Organization, Learning Material, Involvement and Variety correlates higher with its own scale than the other which establishes the discriminant validity. The 4 items that are not significant are Q.10 of Responsivity(R), Q.13 of Acceptance (A), Q.26 of Learning Material (LM) and Q.39 of Involvement (I) and another 3 items failed to compute due to inappropriate data. This may be due to the sampling bias or maybe due to translation error and thus needs a little modification. But, after revisiting the instrument with the final sample, presented in Table-4.2(a) it is observed that Pearson's coefficient of correlation of all the items with its own scale represent convergent validity with coefficients ranging from 0.3 to 0.84. Also, the maladjusted items of Responsivity, Acceptance, Learning Material and Involvement are now valid along with the others. Besides these, the items that failed to compute in the earlier visit have vanished in the larger sample. Thus, in the context of the research area, Assamese version of IT-HOME is both reliable and valid.

With a handful of notable exceptions, the instrument's psychometric (reliability and validity) qualities demonstrated satisfactory reliability and validity results. The tool has nonetheless been examined for use in the main survey, disregarding those exceptions, in order to determine if adjustments to the aforementioned instruments are necessary based on the outliers from the pilot survey with a sample

of 2153 observations.

We can conclude that the instrument is valid and reliable in the context of Assam and especially the Dibrugarh district of Assam, India, based on the results along with discussions of its psychometric properties, which include reliability along with validity. The instrument is in Assamese version, which is in agreement with the literature.

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References:

1. Anastasi, A. [1968]: Psychological Testing. New York: Macmillan.

2. Anderson, L. M., Shinn, C., Fullilove, M. T., Scrimshaw, S. C., Fielding, J. E., Normand, J. Carnade-Kulis, V. G., & the Task Force on Community Preventive Services [2003]: The effectiveness of early childhood development program: a systematic review. *Am J Prev Med; 24*(3S): 32- 46.

3. Bang, Kyungsook [2008]: Analysis of Risk Factors in Children with suspected Developmental Delays. *World academy of Science, Engineering and Technology;* 48: 429- 434.

4. Bjordal K. & S. Kaasa [1992]: "Psychometric Validation of the Eortc Core Quality of Life Questionnaire, 30-item Version and a Diagnosis-Specific Module for Head and Neck Cancer

Patients". *Acra Oncologicu*; 31(3): 311-321.

5. Blair, C., Granger, D.A., Willoughby, M., et al. [2011]: Salivary cortisol mediates effects of poverty and parenting on executive functions in early childhood. *Child Development*, 82(6), 1970-1978.

6. Bradley, R.H., Caldwell, B.M., & Rock, S.L. [1989]: Home environment and school performance: A ten year follow-up and examination of three models of environmental action. Child Development, 59, 852-867.

7. Bradley, R.H., Caldwell, B.M., Rock, S., Ramey, C.T., Barnard, K.E., Gray, C., Hammond, M.A., Mitchell, S., Gottfried, A. W., Siegel, L., & Johnson, D. L. [1989]: Home environment and cognitive development in the first 3 years of life: A collaborative study involving six sites and three ethnic groups in North America. *Developmental Psychology*; 25: 217–235.

8. Bradley, R.H. [1993]: Children's home environments, health, behavior and intervention efforts: A review using the HOME Inventory as a marker measure. Genetic, *Social, & General Psychology Monographs*, 119, 439-490.

9. Brown, J. D. (1996). *Testing in language programs.* Upper Saddle River, NJ: Prentice Hall Regents.

10. Caldwell, B. M., & Bradley, R. H. [1984]: Home observation for measurement of the environment. Little Rock, AR: Center for child development and education, University of Arkansas.

11. Caldwell, B.M., & Bradley, R. H., [2003]: HOME Inventory Administration Manual. Little Rock, AR: Print Design, Inc 194 – 206.

12. Charles D. [2005]: A hitchhiker's guide to reliability. New Zealand Council for Educational Research; 59-60.

13. Cronbach, L.J. [1951]: Coefficient alpha and the internal structure of tests.

Psychometrika, 16:297-334.

14. Cronbach, L. J., & Meehl, P. C. [1955]: Construct validity in psychological tests. Psychological Bulletin, 52, 281-302.

15. Davenport, E., & El-Sanhury, N. [1991]: Phi/ Phimax: Review and Synthesis. *Educational and Psychological Measurement;* 51, 821–828.

16. Downing S.M. [2004]: Reliability: on the reproducibility of assessment data. *Medical Education*; 38:1006-1012.

17. Elardo, R., Bradley, R., & Caldwell, B.M. [1975]: The relation of infants_ home environments to mental test performance from six to thirty-six months: A longitudinal analysis. *Child Development*; 46: 71–76.

18. Han, K.J., Bang, K.S., & Yun, S.N.[2001]: The study on the model development and analysis of child growth and developmental clinic. J. Korean Community Nurse, 12(1), 59-69.

19. Hwanga, A.W., Chenb, P.C., Liao, H.F & Hsiehd, W.S., [2012]: (IT-HOME-C): Measurement Properties, Predictabilities, and Cross-Culture Comparison.

20. Johnson, D.L., Swank, P., Howie, V.M., Baldwin, C.D., owen, M., & Luttman, D. [1993]: Does HOME add to the prediction of child intelligence over and above SES? *The journal of Genetic Psychology*, 154, 33-40.

21. Luster,T., Dubow,E. [1992]: Home environment and maternal intelligence as predictors of verbal intelligence: A comparison of preschool and school-age children. *Merrill-Palmer Quarterly*, 38, 151-175.

22. Meece, J. L. [2002]: *Child and adolescent development for educators (2nd Edition).* New York: McGraw Hill Companies, Inc.

23. Molfese,V.J., DiLalla, L.F., & Bunce, D. [1997]: Prediction of intelligence test scores

of 3 to 8 years old children by home environment, socio-economic status and biomedical risks. *Merrill- Palmer Quarterly,* 43, 219-234.

24. Nunnaly, J. [1978]: Psychometric theory. New York: McGraw-Hill.

25. Saikia, I., & Hazarika, J. [2012]: Reliability and validity of Denver-II as a screening tool in the context of children up to 3 years in Assam, India. *Assam Statistical Review*; Vol. 26(2), 71-85.

26. Saudino, J.K., & Plomin, R. [1997]: Cognitive & temperamental mediators of genetic contributions to the home environment during infancy. *Merrill-Palmer Quarterly*, 43, 1-23.

27. Sonnander, K., & Claesson, M. [1999]: Predictors of developmental delay at 18 months and later school achievement problems. *Dev Med Child Neurol; 41*(3):195-202.

28. Tong, H., (1974): 'A Note on the Estimation of P(Y < X) in the Exponential Case', *Technimetrics*, Vol. 16, Issue: 4, 625-630

29. Totsika, V., & Sylva, K. [2004]: The Home Observation for Measurement of the Environment Revisited-. *Child and Adolescent Mental Health*, 9(1), 25-35.

30. Walker, S. P., Wachs, T. D., Gardner, J. M., Lozoff, B., Wasserman, G. A., Pollitt, E., & Carter, J. A. [2007]: Child development: Risk factors for adverse outcomes in developing countries. *Lancet,* 369, 145- 157.

31. Ware, J.E. & Gandek, B., [1998]: "Methods for Testing Data Quality, Scaling Assumptions and Reliability: The IQOLA Project Approach", International Quality of Life Assessment, *J. Clinical Epidemiology*, 51: 945-952.

32. Yeung, W.J., Linver, M.R., Brooks-Gun, J. [2002]: How money matters for young children's development: Parental investment and family processes. *Child Development*, 73, 1861-1879.

33. Yule G. U. [1912]: On the methods of measuring the association between two attributes.

Journal of the Royal Statistical Society; 75:579-652

34. Zaff,J.F.,Smith,D.C.,Rogers,M.F.,Leavitt,C.H.,Halle,T.G.,&Bornstein,M.H.,Davidson L, Keys C.L.M., Moore K.A., [2003]: Holistic well-being and the developing child. The Center for Child Well Being, Editors. *Well-Being: Positive development across the life courses. Erlbaum*; Mahwah, N.J. 23-32.

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