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FACTORIAL STRUCTURE OF THE GENERAL APTITUDE TEST BATTERY (GATB) FOR INDIAN SAMPLE

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Abstract: *The study attempts to find out the factorial structure of GATB for Indian sample. The scores on the first seven paper-and-pencil parts of GATB are used for factor analysis. It was felt that the factorial structure of GATB for Indian sample matches the factorial structure of the originators of GATB; it can, therefore, be used as a valid test in India. The inter-correlations of the seven GATB parts are subjected to factor analysis with Thurston's centroid method. The study is carried out on a general working population sample of 3,694 individuals and four occupational divisions, namely professional, technical, and related; administrative, executive, and managerial; clerical and related; and sales. Un-rotated factors are rotated using Kaiser's varimax analytical solution. It is observed that the following aptitudes, Aptitude P - Form Perception; Aptitude N - Numerical Aptitude; Aptitude G - General Intelligence; and Aptitude Q - Clerical Perception, appear consistently among the general working population, as well as in the four occupational divisions. Therefore, it can be said that GATB can be used effectively, for both selection and counselling, in India. Finally, it is concluded that GATB can be used meaningfully in India for personnel selection, vocational guidance, and counselling. Conclusion and practical implications are also mentioned at the end of the article.*

Keywords: *Factorial Structure, GATB, Workers*

Introduction

Among the various psychological tests used in selection, differential aptitude tests assume extreme importance as they enable us to understand not only the individual differences, but also the intra-individual differences. The merits and advantages of multiple aptitude batteries, in selection and counselling, over the unitary measures of abilities are well known. Among the existing multiple aptitude batteries, the General Aptitude Test Battery (GATB), developed by the United States Department of Labour and Manpower Administration (US Department of Labour, 1970), is considered, at this stage, to be the state-of-the-art multiple aptitude test battery for vocational counselling and selection.

The GATB has been used extensively in the US, in predicting academic success in various courses of study in colleges (Enneis, 1952). GATB norms that are helpful in the counselling process have been established in the US for a number of professional fields, such as engineering, dentistry, pharmacy, nursing, teaching, business, administration, accountancy, marketing, education, and so on. In India, GATB has been used for predicting success of operative workers in textile mills, such as weavers in ordinary loom sheds, doffers in ring frames, weavers in automatic loom sheds, and so on, and in predicting academic success in professional courses such as architecture (Dolke & Sharma, 1975b), pharmacy (Dolke & Satishkumar, 1997), engineering (Dolke, 2003), a comparative study of aptitude profiles of first year students in arts and commerce (Thakar, 1968), and GATB norms and aptitude structure of postgraduate students (Singh, 1965).

Composition of GATB

The GATB consists of nine aptitudes measured in twelve parts. The twelve parts that measure the nine aptitudes are as follows:

APTITUDES	PARTS
G - Intelligence	Part 3: Three Dimensional Test
	Part 4: Vocabulary
	Part 6: Arithmetic Reasoning
V - Verbal Aptitude	Part 4: Vocabulary
N - Numerical Aptitude	Part 6: Arithmetic Reasoning

	Part 2: Computation
S - Spatial Aptitude	Part 3: Three Dimensional Test
P - Form Perception	Part 7: Form Matching
	Part 5: Tool Matching
Q - Clerical Perception	Part 1: Name Comparison
K - Motor Coordination	Part 8: Mark Making
F - Finger Dexterity	Part 11: Assemble
	Part 12: Disassemble
M - Manual Dexterity	Part 9: Place
	Part 10: Turn

The present investigator has standardised GATB in India on the general working population sample of 3,694 working adults. The aptitude-wise conversion tables with a mean of 100 and SD of 20 are also developed (Dolke, 1978). The retest reliabilities, and the concurrent and predictive validities of GATB have been established for various groups of people and for various occupations. All the reliability and validity coefficients range from 0.61 to 0.83 and from 0.50 to 0.82, respectively (Dolke, Patel & Sharma, 1975b). The first eight parts are paper-and-pencil parts, while the next four are apparatus parts. The present study on factor analysis is carried out on the first seven paper-and-pencil parts of GATB. Although part number eight is also a paper-and-pencil part, it is not subjected to factor analysis as it is more a psycho-motor type than a pure cognitive type of test. The aptitude measured by this part is called motor co-ordination.

Present Status of GATB

GATB is one of the most intensively developed and carefully assessed instruments for selection and placement in industries. It has been accorded favourable reviews by leading measurement text books, as well as in Buros' Mental Measurement Year Books, for which there is more published validity research data than for any other competitive test battery. According to Super (1956), GATB is "Potentially the most useful instrument of individual (vocational) diagnosis which has been developed". According to Cronbach, "the GATB is designed with an efficiency that has never exceeded" (Cronbach, 1960).

Sample

The factor analysis is conducted for the entire general working population sample (N = 3694) and for the four occupational divisions as per the National Classification of Occupations (NCO) prepared by the Government of India (1969). The four divisions included in the study are:

- Professional, Technical, and Related
- Administrative, Executive, and Managerial
- Clerical and Related
- Sales

Each division of NCO has various groups of occupations, each group has various families of occupations, and each family has various specific occupations. For example, division 1 (Professional, Technical, and Related) includes 19 groups of occupations, such as physical scientists, architects, life scientists, and so on. Each group contains various families of occupations. For example, the physical scientists group contains families such as physicists, chemists, geologists, and geophysicists. Each family is further broken down into various occupations. The family of physicists, for example, includes the following occupations: general physicists, mechanics, physicist, heat physicists, sound, and so on. We classified people into various divisions according to their occupations. Each division includes several occupations and obviously, the sample does not include every occupation.

The data for two divisions, i.e., division 5 - service workers (production and related workers, transport, equipment operators, and labourers) and division 6 - farmers, fishermen, hunters, loggers, and related workers (not classified), could only be collected with a bit of difficulty, as most of these workers are in the unorganised sector, which makes it difficult to contact them. Moreover, it is unlikely that workers in the unorganised sector, particularly working in these two divisions, will be selected, at least in the near future, with the help of psychological tests.

For the above mentioned four divisions the data is collected from all types of industries - small, big, labour intensive, technique intensive, new, modern, old, and bureaucratic. Geographic representation is also maintained, as far as possible, in the sample.

Sampling Design

In India, the employed working population in the organised sector, in 2008, was 27.5 million. Since 2008, this number might have increased exponentially. This is the base population for the GATB general working population norm study. It is intended to obtain a stratified sample to make it proportionally representative of the base population with respect to selected control factors of occupation, sex, and age.

Occupation

To obtain a proportional representation within each selected occupational division, the exact number of people working in each division in the country has to be determined. The investigator could not get this information. Therefore, it was decided to have as many people as possible in each occupational classification, and a substantial number of people in each occupational division. It yielded a reasonably close approximation to test performance typical of the general working population.

Sex

Sometimes sex differences have been observed on the GATB scores (Droege, 1967). The male-female ratio in total working population in the organised and unorganised sectors is not very different from our sample's ratio. This is presented in Table 1.

Table 1 shows the size of the sample in each division, and the number of males and females in the sample.

Table 1: GATB - General Working Population Sample in Six Occupational Divisions

Sr. No.	Occupational Divisions	Male	Female	Total
1.	Professional, Technical, and Related	515	69	584
2.	Administration, Executive, and Managerial	565	26	591
3.	Clerical and Related	821	165	986
4.	Sales	480	10	490
5.	Productive and Related Workers, Transport, Equipment Operators, and Labourers	718	145	863
6.	Not Classified	164	16	180
	Total	3263	431	3694

Age

Our sample is between 18 to 62 years of age. Since GATB is unlikely to be used for selecting employees outside this age range, it is decided to represent the portion of the general working population that falls within this age range. The average age of the sample is 31.71 years, with a standard deviation of 9.55 years. The average age of the sample in each occupational division did not vary considerably. There were more younger people than older ones, which is in a way desirable, as beyond 35 years, age starts acting negatively on the GATB scores. Secondly, younger people dominate the employment market. Table 2 shows the division-wise mean, SD, and standard error of the age of the sample.

Table 2: Mean, Standard Deviation, and Standard Error of the Age of the Sample

Sr. No.	Division	N	Mean	S.D.	S.E
1.	Professional, Technical, and Related	584	30.06	6.52	0.27
2.	Administrative, Executive, and Managerial	591	31.51	7.78	0.32
3.	Clerical and Related	986	32.45	11.49	0.37
4.	Sales	490	32.00	8.53	0.39
5.	Production and Related Workers, Operators, and Labourers	863	31.88	9.46	0.32
6.	Not Classified	180	26.95	4.62	0.64
	Total	3694	31.71	9.55	0.16

Procedure

Factor analysis is conducted to identify the basic aptitudes underlying the seven parts of GATB, and to find out whether aptitudes measured by the GATB in our culture are same as those in the USA. The GATB can be accepted as a factorial valid test in our culture only if it shows a similar factor structure. In addition, it is intended to see how cultural differences affect the development of intelligence and other abilities. The factor analysis is conducted for the entire general working population sample (N = 3694) and for the four occupational divisions.

The first step in factor analysis is to compute correlations among GATB parts. The distributions of scores on these parts are tested for normality, using Geary's test of normality (Geary, 1947). The distribution of scores on all the parts is normal.

Correlations among the seven parts of the GATB for the general working population (GWP) sample and for the four occupational divisions are computed, using Pearson's product moment method. The four occupational divisions subjected to factor analysis are:

- Professional, Technical, and Related
- Administrative, Executive, and Managerial
- Clerical and Related
- Sales

Thurston's method of multiple factor is employed to extract centroid factors from the correlation matrix with unities in the main diagonal. Un-rotated factors are rotated using Kaiser's varimax analytical solution (Kaiser, 1958). The seven parts of GATB subjected to factor analysis measure six aptitude factors. Even if it is assumed that each part measures one

factor, one can get a maximum of seven factors. Therefore, a seven-factor solution is attempted for the inter-correlations, and factors found insignificant are rejected. In the original factor analysis of GATB, Thurston's centroid method has been used. This investigator has used Thurston's centroid method, mainly to avoid variation in methods, and to obtain psychologically meaningful results.

Factor Analysis of GATB for General Working Population Sample

Table 3 presents the matrix of inter-correlations among the seven GATB parts. The correlations range from 0.19 (between part 2 – computation and part 3 – three dimensional space) to 0.68 (between part 2 – computation and part 6 – arithmetic reasoning). The median test inter-correlation is 0.35.

The correlation matrix of the seven GATB parts for general working population sample is factor analysed by Thurston's centroid method. The seven-factor un-rotated solution is presented in Table 4. Rotation to simple structure is accomplished using Kaiser's varimax analytical solution (Kaiser, 1958). The resulting rotated matrix is presented in Table 5.

Table 3: Inter-Correlations of GATB Parts for General Working Population Sample (N = 3694)

Sr. No.	Parts	1	2	3	4	5	6
1.	Name of Comparison						
2.	Computation	.3791					
3.	Three Dimensional Space	.2715	.1902				
4.	Vocabulary	.3789	.2863	.3672			
5.	Tool Matching	.4299	.2524	.3795	.2389		
6.	Arithmetic Reasoning	.3599	.6847	.3433	.5408	.2697	
7.	Form Matching	4016	.2568	.3533	.2655	.5268	.3048

Table 4: Un-Rotated Factor Loadings*

Sr. No.	GATB Parts	Factors						
		I	II	III	IV	V	VI	VII
1.	Name Comparison	6113	1048	0845	−2320	0773	1235	0993
2.	Computation	6327	−3650	3679	−0484	0439	−1655	−0888
3.	Three Dimensional Space	5333	1520	−2541	1880	0979	−0627	−0529
4.	Vocabulary	6085	−1416	−3351	−0661	1443	1562	−0798
5.	Tool Matching	6052	4329	1617	1285	1157	0497	1759
6.	Arithmetic Reasoning	7352	−4843	0463	1207	1645	0448	−1983
7.	Form Matching	6099	3629	1247	1222	−1301	1429	−1006

*Factor loadings rounded to four places and decimals omitted.

The seven-factor solution accounts for 60.72% of the total variation in seven parts. The factors account for 19.70% 19.92%, 14.57%, 4.89%, 0.00%, 0.64%, and 1.08%, of the total explained variance, respectively. Of the seven factors, the first four are easily interpretable. They not only explain substantial variance individually, but together account for 56.48% of the 60.72% total explained variance. The next three factors are extremely small in magnitude, together accounting for a portion of total variance less than one-fourth of that explained by the first four factors. They have eigenvalues less than unity and none of them have loading greater than 0.20. Therefore, the last three factors are considered insignificant, and no interpretation is offered for them.

Table 5: Rotated Factor Loadings* of GATB Parts for General Working Population Sample (N = 3694)

Sr. No.	GATB Parts	Factors							h2
		I	II	III	IV	V	VI	VII	
1.	Name Comparison	3894	−2561	−2223	−4584	0000	0015	−0006	4768
2.	Computation	1764	−7997	−0847	−1586	−0007	−0736	0008	7083
3.	Three Dimensional Space	3787	−1033	−5007	0238	0007	−1094	0638	4215
4.	Vocabulary	1324	−2417	−6465	−2386	−0006	0699	−0531	5586
5.	Tool Matching	7384	−1078	−1515	−1811	0000	−0162	1739	6431
6.	Arithmetic Reasoning	1139	−7647	−4876	−0532	0013	1471	−0175	8602
7.	Form Matching	6906	−1540	−1845	−0896	−0001	0237	−1955	5816
	% Common Variance	32.44	32.80	24.00	7.92	0.00	1.05	1.78	
	% Total Variance	19.70	19.92	14.57	4.81	0.00	0.64	1.08	

*Decimals omitted.

Factor I: This is best defined by parts in which subjects have to perceive pertinent details in objects, or pictorial or graphic materials. In these parts, subjects have to make visual comparisons and perceive slight differences in shapes and shades of figures, and lengths and widths of lines. Two parts in which these abilities are involved are part 5 – tool matching and part 7 – form matching, which have the highest loadings on this factor. Clearly, this factor is the form perception (F) factor.

Part 1, name comparison, also has high loading on this factor, because subjects have to perceive pertinent details in verbal or tabular material. However, a difference exists between perceiving verbal or tabular materials and perceiving graphic or pictorial materials. The parts representing the second type of details have much higher loadings on this factor than the parts representing the first type of details. However, part 1 has the highest loading on a separate factor.

Another part that has a sizeable loading of Factor I is part 3 – three dimensional space. This might be due to the similarity of pictorial and graphic materials in this part, and parts 5 and 7.

Factor II: This is confined to those parts in which subjects have to perform numerical calculations. The parts that involve numerical calculations (part 2 – computation and part 6 – arithmetic reasoning) have the highest loadings (0.80 and 0.76, respectively) on this factor. This is clearly the numerical aptitude (N) factor. Part 4 – vocabulary, has a slightly high loading on this factor because it measures verbal comprehension which is required, to some extent, in part 6 – arithmetic reasoning.

Factor III: This contains parts that measure general learning ability or intelligence (G). The tests that measure G are part 3 – three dimensional space, part 4 – vocabulary, and part 6 – arithmetic reasoning. These parts have very high loadings (0.50 for part 3, 0.65 for part 4, and 0.49 for part 6) on this factor. Thus, this can be named as the G factor.

Factor IV: This is defined only by part 1 – name comparison, which has the highest loading on this factor. Subjects have to perceive pertinent details in verbal or tabular material and observe differences in copy, to proofread words and numbers. This ability is required in many clerical jobs. Therefore, this factor can be named clerical perception (Q).

Part 4 also loads 0.24 on this factor. It is expected, since part 4 measures verbal comprehension and the materials presented in part 1 are also verbal. Thus, results of the factor analysis (Table 5) clearly show the existence of the following four factors in our data: G – General Intelligence, N – Numerical Aptitude, P – Form Perception, and Q – Clerical Perception.

Factor Analysis of GATB for Four Occupational Divisions

Table 6 to 9 show the results of the factor analysis of the four occupational divisions. Table 7 shows the common factors in four factor analysis divisions and in the general working population.

Some salient features of the findings in Tables 6 to 9 should be noted here. Of the seven rotated factors in each factor analysis divisions, the last two (factors VI and VII) are extremely small in magnitude, accounting for less than 1% of the total variance. Factor V also is extremely small in division 1, accounting for only 0.35% of the total variance (Table 6). None of them have loading greater than 0.20. Therefore, these factors should be considered insignificant. Thus, in division 1, the first four factors, and in the rest of the divisions, the first five factors, are meaningful and important. Meaningful loadings on these factors are italicised.

Table 6: Rotated Factor Loadings* of GATB Parts for Professional, Technical, and Related Workers (N = 584)

Sr. No.	GATB Parts	Factors							h2
		I	II	III	IV	V	VI	VII	
1.	Name Comparison	37	29	−28	41	02	01	00	47
2.	Computation	80	14	−09	19	−03	02	04	72
3.	Three Dimensional Space	09	38	−16	03	−01	20	00	41
4.	Vocabulary	28	14	−61	15	01	−07	00	50
5.	Tool Matching	11	66	−17	12	11	−08	−01	50
6.	Arithmetic Reasoning	74	08	−46	−03	06	−01	−07	78
7.	Form Matching	10	70	−10	06	−09	08	01	53
	% Common Variance	37.01	30.61	23.72	6.29	0.63	1.54	0.19	
	% Total Variance	20.61	17.05	13.21	3.51	0.35	0.86		

*Decimals omitted.

Table 7: Rotated Factor Loadings* of GATB Parts for Administrative, Executive, and Managerial Workers (N = 591)

Sr. No.	GATB Parts	Factors							h2
		I	II	III	IV	V	VI	VII	
1.	Name Comparison	08	12	−13	−33	09	00	00	15
2.	Computation	79	12	−03	−12	−03	01	−08	66
3.	Three Dimensional Space	10	13	−36	−23	52	−00	00	48
4.	Vocabulary	17	07	−65	−19	18	−00	00	53
5.	Tool Matching	04	74	−08	−07	13	−04	−09	59
6.	Arithmetic Reasoning	86	02	−37	−08	25	−02	16	97
7.	Form Matching	10	76	−04	−16	00	04	09	62
	% Common Variance	35.25	29.37	17.88	6.26	9.54	0.08	1.23	
	% Total Variance	20.22	16.84	10.26	3.59	5.70	0.05	0.70	= 57.36

*Decimals omitted.

Table 8: Rotated Factor Loading* of GATB Parts for Clerical and Related Workers (N = 986)

Sr. No.	GATB Parts	Factors							h2
		I	II	III	IV	V	VI	VII	
1.	Name Comparison	25	26	−13	21	53	00	00	47
2.	Computation	77	14	−05	13	21	01	04	67
3.	Three Dimensional Space	12	25	−57	16	11	00	01	44
4.	Vocabulary	28	16	−26	57	23	00	00	55
5.	Tool Matching	13	69	−15	00	25	−09	−01	59
6.	Arithmetic Reasoning	67	15	−46	24	09	−03	−09	76
7.	Form Matching	12	68	−22	23	05	10	01	60
	% Common Variance	29.99	27.94	17.03	12.88	11.40	0.50	0.25	
	% Total Variance	17.51	16.32	9.95	7.52	6.66	0.29	0.15	= 58.4

*Decimals omitted

Table 9: Rotated Factor Loadings* of GATB Parts for Sales Workers (N = 490)

Sr. No.	GATB Parts	Factors							h2
		I	II	III	IV	V	VI	VII	
1.	Name Comparison	17	21	−16	−43	02	00	00	28
2.	Computation	66	08	−07	−29	−02	−01	−06	54
3.	Three Dimensional Space	10	23	−57	−23	25	00	−01	50
4.	Vocabulary	23	13	−68	−09	−10	00	00	55
5.	Tool Matching	06	69	−13	−25	−03	00	.12	57
6.	Arithmetic Reasoning	76	16	−44	02	07	02	09	81
7.	Form Matching	13	71	−16	−06	07	00	−10	57
	% Common Variance	29.23	29.44	27.62	10.55	2.21	0.02	0.92	
	% Total Variance	16.03	16.15	15.15	5.79	1.21	0.01	0.51	= 54.8

*Decimals omitted

In the four factor analysis divisions, the first three factors appear in the same order. Factor I has been defined by parts 2 and 6, factor II by parts 5 and 7, and factor III by parts 3, 4, and 6. These three factors are N (numerical aptitude), F (form perception), and G (general intelligence), respectively. Factor I accounted for maximum covariance of the tests,

followed by factors II and III. The position of factor IV is the same for the three out of four divisions. (Table 6, 7, and 9). In these divisions, part 1 − name comparison, which measures clerical aptitude (Q) has the highest loading on this factor. Only in division 3 (clerical and related workers) is this factor relegated to the fifth position. Its position is occupied in this division by factor V – vocabulary, which is measured by part 4. In division 2 and 4 (Tables 7 and 9) factor V has the highest loading for part 3 – three dimensional space, which measures aptitude S − spatial perception. In short, in the factor analysis of four occupational divisions, factors G, N, P, and Q emerge in all the divisions, factor S emerges in two divisions, and factor V in one division.

Common Factors Identified

Table 10: Common Factors in Four Analysis Groups and in the General Working Population Sample

Sr. No.	Group	Factors					
1.	Professional, Technical, and Related	G		N		P	Q
2.	Administrative, Executive, and Managerial	G		N	S	P	Q
3.	Clerical and Related	G	V	N		P	Q
4.	Sales	G		N	S	P	Q
5.	General Working Population Sample	G		N		P	Q

Table 10 shows that factors G, N, P, and Q emerge in four occupational divisions and in the general working population. Factor V emerges in only one division, i.e., clerical and related workers, and factor S in two divisions, i.e., administrative, executive, and managerial workers, and sales workers. The existence of the four factors − G, N, P, and Q − in our data on GATB is established beyond doubt. The existence of factors V and S cannot be ruled out completely since these factors also appear in some divisions. Thus, the results of the factor analysis are consistent within the sample and with the findings of the originators of the GATB. It shows that the original factor structure of the GATB can be replicated, by and large, suitably in India. The factor analysis provided a strong basis to accept GATB as a factorially valid test battery for our country. The results of the factor analysis can be interpreted and explained against massive information available on the genesis of cross-cultural differences in mental abilities.

Factorial Studies and Cross-Cultural Differences

In the past fifty years, numerous studies have been completed on the cross-cultural application of Western test of abilities and aptitudes in Non-Western cultures. The need for such studies arose because Western and Non-Western cultures vary on several parameters, particularly in the context of psychological tests. While spelling out these parameters, Vernon (1970) has pointed out that in Non-Western cultures, the tested have had little or no experience of taking tests, attending and following oral or pictorial instructions, and working competitively with speed at objective multiple choice items, whereas American and British children are exposed to these aspects. Non-Westerners speak a different language, their understanding of English is usually inadequate, and they are unfamiliar with Western pictorial representations. It has been generally observed that when the disparity between Western and Non-Western cultures on these parameters is larger, the test takers in Non-Western cultures will not only perform poorly on the tests developed in the West, but will also reveal a relatively simple structure of mental abilities. The level of literacy and urbanisation are two crucial factors in determining the complexity of mental structure among various cultures. Several studies support this observation. Ord (1972) has presented an extremely systematic, comprehensive, and brilliant review of studies on this topic. As the level of education and familiarity with taking the test increase, an array of primary mental abilities more closely approximating the model theorised by Thurston, and more typical for members of technologically advanced and literate communities, can be revealed. As literacy and urbanisation increases, a more complex ability structure can be obtained. Studies on urban and rural groups have shown that urban groups show a more complex ability structure than rural groups.

However, evidence increasingly suggests that although Western types of tests can be used in Non-Western cultures with or without establishing their factor structure, the administrator of those tests must adapt them to local use. Recently, attempts have been made to assemble handbooks on testing in Non-Western cultures, of which, one edited by Biesheuval (1969) and the other written by Schwarz and Krug (1972), are well known. They provide information on recommended tests, adaptation of standardised tests, and procedural guidelines for the development and application of tests.

Conclusion and Practical Implications

Since the advent of Binet and Simon Test of Intelligence developed in 1905, several psychological tests were developed for measuring intelligence. However, psychologists and practitioners were not very happy with the intelligence tests. It soon became apparent to

psychologists that intelligence tests alone are not adequate to measure several other abilities and aptitudes required for vocational guidance and counselling. Therefore, a number of multifactor aptitude test batteries were developed at the end of 1940s and the beginning of 1950s. The two tests that are well known all over the world, including India, are Differential Aptitude Test (DAT) developed in 1947, and General Aptitude Test Battery (GATB) developed by the US Department of Labour, Employment, and Manpower Administration, around the same time. DAT is particularly relevant for vocational guidance and counselling for the students studying in grades 8 to 12 in schools. GATB was primarily developed for selection, vocational guidance, and counselling of adults. GATB is considered one of the best multifactor aptitude test battery for this purpose. The present study is concerned with GATB.

The issue of diversity of people in the sample, such as gender, sector, occupation, and so on, is also important while standardising the test. The present investigation has taken into consideration three demographic factors of population diversity, such as age, sex, and occupation. However, other aspects of diversity, such as caste, religion, sector, nature of organisation, and place of residence, are not taken into consideration while taking general working population sample of 3,694 working adults. These factors of population diversities in work performance are explained by S. Kundu, J. Bansal, and M. Pruthi in a 2019 issue article published in Journal Strategic Human Resource Management. These factors also need to be considered while developing general working population sample.

The purpose of the present study underscores the importance of human resource management practices on organisational effectiveness. Nirmala M., and Uma Devi have said, "Human resource is the most precious resource for every business in comparison to other resources like money, material and technology as it cannot be replicated. Human capital is the only asset involved in all operations of the enterprise right from the manufacture of the goods to delivery to the consumer. Enterprises have realized the significance of this resource and have started investing huge amounts on their budget to develop this resource. These investments will be rewarding only if the human resources are properly managed and effectively utilized" (2015).

The factor analysis of GATB reported in the earlier sections can be explained against this discussion. Since the sample of the study was drawn from the population working in the organised sector, literacy and urbanisation were high. None of the test takers in the sample were illiterate; many of them were actually highly educated. The Indian system of education is modelled after the British pattern and emphasises teaching and learning English. Thus, the gap between the Western culture and our culture on certain parameters, important in the context of psychological testing, was probably less in our sample. A compound effect of these factors might have resulted in a factor structure of GATB in India that is almost similar to the original factor structure established in the US.

Whether tests developed in Western countries should be used in countries following Non-Western cultures, without finding out what they actually measure in the latter cultures, can be debated. However, the personnel selector will be on more sure and correct ground if he studies the factor structure of the test developed in the Western culture before using it in Non-Western countries, and adapts it to local conditions, keeping in mind the guidelines given by Schwarz and others. Since both these prerequisites were fulfilled in administering the GATB, this investigator feels that it can be used meaningfully in India, at least for the sample on which it has been standardised.

The use of GATB made in selecting people will definitely enhance the human resource potential of organisations. The outcome of the study would help the organisations use the test standardised in India, and the reliability and validity of the test established on the Indian sample will help the organisations have effective human resources.

It will be appropriate to end this article with a famous quotation from the autobiography of George Smith Patton, a famous hero of Second World War. Patton says, "Wars may be fought with weapons, but they are won by men. It is the spirit of men who follow and of the man who leads that gains the victory". The Indian industry, in different sectors, is facing a war like situation today. It is the human spirit, as mentioned by Patton, that can save the industry with the help of proper utilisation of its human resource. GATB used for personnel selection, vocational guidance, and counselling of employees can substantially help in this endeavour.

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