

# **DEVELOPMENT OF A METHOD TO TEST ADEQUACY OF EXISTING PERSONALITY TESTS FOR A CAREER IN ENGINEERING**

**ANILA D. BHAGAVATUALA<sup>1</sup>, RAVI S. BHAGAVATULA<sup>2</sup>,  
CHANDRA S. PUTCHA<sup>3</sup>, AND JESA H. KREINER<sup>4</sup>**

<sup>1</sup> **Adjunct Faculty, Department of Psychology,  
California State University, Fullerton, Ca 92834, USA**

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<sup>2</sup> **Management Consultant, Orange County, CA, USA**

/  
<sup>3</sup> **Professor, Department of Civil Engineering,  
California State University, Fullerton, CA 92834, USA**

/  
<sup>4</sup> **Professor, Department of Mechanical Engineering,  
California State University, Fullerton, Ca 92834, USA**

## **Abstract**

The success of any industry depends on the morale as well as the hard work and dedication of its staff as well as the compatibility of the person for a career in the particular line of work. These three factors –morale, hard work and dedication are not actually independent but have some kind of correlation between them. It will be suffice to say that morale is the base factor which will affect the other two parameters, all affecting the success and affecting the output of the industry in consideration. A method is developed based on this research to test the adequacy of the existing personality tests.

## **Introduction**

Morale is in general affected by the following key factors:

- 1. Job satisfaction (intellectually stimulating)**
- 2. Base salary and benefits**
- 3. Good technical interaction among colleagues**
- 4. Good work environment**

The authors believe that any questionnaire dealing with personality test should definitely address the above stated key factors.

The adequacy or otherwise of the existing personality tests will be evaluated on a scale of 1-5 (1 being highest and 5 being lowest) and a numerical score will be assigned to each of the test. The acceptance/rejection criterion is as follows:

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If the overall numerical score is  $\geq 5$ , test is considered satisfactory and hence acceptable.

If the overall numerical score is  $<5$ , test is considered unsatisfactory and hence unacceptable.

The overall numerical score of the test is calculated based on the average of the numerical scores assigned to each of the questions (see Appendix A and Appendix B). These results are then compared to the results to be obtained from the survey conducted based on the questionnaire (see Appendix A). This survey will be conducted mainly among leading industries both engineering and non-engineering. These results will be available at the time of presentation of this paper at the conference.

These concepts will first be applied to two existing and widely used personality tests questionnaires<sup>1,2</sup>. The Keirsey and Bates questionnaire deals with a list of 70 questions based on the well known Myers-Briggs approach. The Ewen model deals with a list of 48 questions based on the Big Five factors.

These five factors are listed below for quick reference and a better understanding of this paper. They are:

**Extroversion-introversion**  
**Neuroticism**  
**Conscientiousness**  
**Agreeableness**  
**Openness**

The reader is advised to refer to other references<sup>2,3</sup> in this area for details regarding the five factors cited.

A sample questionnaire has been developed to check the adequacy or not of the two personality tests discussed above. The adequacy is mainly tested based on the four key factors discussed earlier in this paper. Appendix A deals with questionnaire to determine the adequacy of the personality test based on Keirsey and Bates model while Appendix B contains questionnaire to determine the adequacy of the personality test based on the Big five factors model<sup>2</sup>. These Appendices also show the rating given by the authors to the existing personality test questionnaire. Ten questions are picked based on the best judgment of the authors due to page limitations of this paper. The results based on these 10 questions are used to explain the methodology. A numerical score will be computed for both these tests based on the numerical scores assigned to each questionnaire (for the chosen 10 questions).

## **Methodology**

For the chosen 10 questions for the two personality tests (See Appendix A and Appendix B for sample questions and the ranking). A numerical score of 2.7 and 2.4 is obtained for the Keirsey and Bates model and Ewen model respectively. That proves that the existing leading personality tests are not adequate to judge the morale of the staff in terms of efficiency of the industry. As

pointed out earlier, these results will be compared with the results obtained from the surveys conducted by sending the questionnaire to 10 leading industries. Those results will be available at the time of presentation of the paper.

In any case, since the present analysis showed that the existing two leading personality test questionnaire are not adequate, the recommended questionnaire (based on the key factors pointed out earlier in this paper) is suggested in Appendix C. This will be sent to the leading industries and the analysis of these numerical scores will be compared with the ones obtained previously based on the Keirsey and Bates and Ewen models. These results will be available at the time of presentation of this paper.

### **Proposed Method of Analysis of the new questionnaire**

The results of the questionnaire (See Appendix C) will be performed using the basic concept of safety index ( $\beta$ ) used widely in the field of reliability analysis of structures<sup>4,5</sup>. Similar to that, a satisfaction index ( $\beta_s$ ) is calculated for the test questionnaire in Appendix C.

$\beta_s$  is defined as follows:

$$\beta_s = \bar{g} / s_g \quad (1)$$

where,  $g$  is the failure surface of the limit state being considered.  $\beta_s$  can be considered as the distance from the failure surface. In other words, the higher the  $\beta_s$  value, the better it is for the system.

$s_g$  is the standard deviation of the performance criteria. Once the numerical score is obtained for each of the questions, based on the results of the survey, then mean value and standard deviation can easily be calculated for each of the four key factors being studied in the questionnaire and the corresponding satisfaction index  $\beta_s$  can be calculated for each of the traits or for the whole test itself. If  $\beta_s$  is at least 3 then it shows that the staff is generally happy and will result in efficient output. Otherwise, the industry should take measures to redress the concerned so as to improve the morale and thus the efficiency.

### **Results and Conclusions**

A method has been developed in this paper to test the adequacy of the existing personality tests. It is concluded that the existing tests are not adequate to test the efficiency of the staff. A set of key factors have been outlined in this paper which in the opinion of the authors should improve the morale and thus the efficiency in an industry. It is also proposed that a satisfaction index be used as a measure of the morale of the staff.

## References

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## Biographies

### **DR. ANILA BHAGAVATULA**

Dr. Anila Bhagavatula is an adjunct faculty in the Department of Psychology at California State University, Fullerton, CA, USA. She completed her Ph.D. from USC, Los Angeles in 2003 and her M.S. from UCSD, San Diego in 1996.

### **RAVI BHAGAVATULA**

Ravi Bhagavatula works as Management Advisor to Fortune 100 companies. He finished his MBA in 1998, from Case Western Reserve University, Cleveland, Ohio, USA and M.S. in 1993 in Industrial Engineering from Cleveland State University, Cleveland, Ohio.

### **DR. JESA KREINER**

Dr. Jesa Kreiner is professor of mechanical engineering at California State University, Fullerton, California, USA. His research interests include mechanical design, mechanical behavior of materials and ergonomics. He has published numerous research papers and has served as consultant to numerous governmental agencies and private industry. Dr. Kreiner is a Fellow of the Society for Advancement of Material and Process Engineering.

### **DR. CHANDRA PUTCHA**

Dr. Chandra Putcha is a Professor of Civil Engineering at California State University, Fullerton, CA, USA. He has been there since 1981. Dr. Putcha's research interests are- Reliability, Risk Analysis and Optimization. He has published several research papers in these areas in national/International Journals/Conferences. He has recently received Distinguished Faculty Fellowship from Office of Naval Research (ONR) and ASEE (American Society of Engineering Education) to conduct research in the area of Risk Analysis as applied to Biomechanics.

## Appendix A

### Questionnaire to Determine the Adequacy of Keirsey and Bates (1978) Model

Traits Being Tested in Existing Personality Test of Kiersy (1978)	Key Factors Being Satisfied (on scale of 1-5, 1=lowest, 5=highest)				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Are you more likely to trust (your conceptions, experiences) ( Question # 5 of Keirsey and Bates (1978)	X				
With people you are usually more (firm, gentle –Question #9)		X			
You prefer ( preliminary/unalterable statements) ( Question #14)		X			
On the job, you want your activities (unscheduled/scheduled) (Question # 25)			X		
You are inclined to take what is said (literally/figuratively) (Question #27)		X			
You consider yourself (question # 41)		X			
At work, you tend to (sociable/keep more to yourself) (Question # 52)			X		
You feel better about (keeping options open/coming to closure) (Question # 55)		X			
You are more comfortable in making (critical judgments/value judgments ) (Question # 68)			X		
At work, it is more natural for you to ( point out mistakes/please others) (Question # 70)		X			

## Appendix B

### Questionnaire to Determine the Adequacy of Ewen (1998) Model

<b>Traits Being Tested In the Existing Personality Test Of Ewen (1998)</b>	<b>Key Factors Being Satisfied (on a Scale of 1-5, 1=lowest, 5=highest)</b>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Find fault with others (Question #2 of Ewen model)		X			
Comes up with new ideas (Question # 5)		X			
Helpful and unselfish  (Question # 7)	X				
Full of Energy (Question #11)	X				
Reliable worker (Question #13)	X				
Tends to be disorganized (Question #18)		X			
Generally trusting (Question #22)	X				
Inventive (Question #25)		X			
Prefers routine work (Question #35)	X				
Often on bad terms with others (Question # 48)	X				

## Appendix C

### Questionnaire to Determine the Adequacy of Key Factors

Traits being tested	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1. Job satisfaction					
2. Base salary					
3. Good technical interaction among colleagues					
4. Good work environment					