Use of personality inventories in non-English country like Pakistan: A comparison of Costa & McCrae's NEO-PI-R and Goldberg's IP-IP

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Abstract

Purpose: This paper aims to share the experiences of using two empirically-related yet conceptually distinct instruments i.e., Goldberg's IP-IP and Costa and McCrae's NEO-PI-R to measure the respondent's personality factors and facets.

Methodology: This research paper presents findings on six methodological issues i.e., sampling, validity, reliability, data collection, screening confirmatory factor analyses. For validity concerns both instruments reached to obsolescence as these were developed ages ago and not updated with pace of human development.

Findings: For replication in non-English countries Goldberg's IP-IP has edge over Costa & McCrae's NEO-PI-R for three counts; (a) it has less words and relatively simple syntax made it really easy for participant with linguistic barriers; (b) shows no sign of US cultural specificity in terms of places, slang or implicit meanings made it closer to participants in a non-English speaking country like Pakistan and (c) it takes less than half time to complete the survey. For reliability issues NEO-PI-R represented better results. For both instruments consistency might be compromised while replicating these instruments in non English speaking country. IP-IP does not provide any guideline for data screening while NEO-PI-R provides a very detailed data screening process. During factor analyses it was revealed both instruments replicated five factor model at both levels i.e., first order factor analyses resulting in facets and second order factor analyses provided the factors but during the NEO-PI-R factor analyses it was observed that a large number of items were dropped out from the analyses that raised the question of item validity in non-English speaking countries.

The paper aims to present the comparative experiences of using two empirically-related yet conceptually distinct instruments i.e., Goldberg's IP-IP and Costa and McCrae's NEO-PI-R to measure the respondent's personality factors and facets. These two instruments are extensively used by personality counsellors to diagnose personality disorders in their subjects. Realizing the worth of these instruments, academicians have also used these personality inventories in academic studies as well. This research presents comparisons between the two personality instruments on six methodological issues; (a) sampling issues; (b) validity issues; (c) reliability issues; (d) data collection issues; (e) data screening issues and (f) confirmatory factor analyses for both instruments. It provides valuable insights in selection of particular personality instrument especially outside North America.

LITERATURE REVIEW

One of the most important developments in personality is the convergence on five common factors as a general model for describing the concept (Pervin & John, 2001) commonly referred as 'Big Five' (Goldberg, 1981) or academically known as five-factor model (FFM) of personality (Costa & McCrae, 1985). There is a general convergence on three issues that are claimed to be consistent across: (a) instruments - the lexical approach, questionnaire approach and observers; (b) age and sex groups; and (c) languages and cultures for the lexical approach.

Goldberg (1981) convincingly proposed a five-factor personality model, referred to as the 'Big Five':(1)Extraversion- outgoing and stimulation-oriented, (2) Neuroticism – emotionally reactive, (3) Agreeableness- affable, friendly, conciliatory, (4) Conscientiousness - dutiful, planful, and orderly, and (5) Openness to experience - open to new ideas and change (Goldberg, 1981). The Big Five can also be remembered as OCEAN (Goldberg, 1993). Support for the Five-Factor Model (FFM) comes from Costa and McCrae (1985) as an alternate five-factor model having almost similar output.

Goldberg (1992) developed the IPIP-NEO (International Personality Item Pool); a 120-item scale to measure one's standing on five broad personality domains. Similarly, Costa and McCrae (1992) developed another personality inventory; a 240-item measure of the Five Factor Model along with six subordinate facets of each of the personality factors. This instrument is commonly known as NEO PI-R (The Revised NEO Personality Inventory) and used for personality disorder diagnosis among adults (Costa & McCrae, 1992). This instrument is a proprietary instrument and items are copyrighted by the test authors.

Both models have some common characteristics, which were presented mainly for Costa's and McCrae's FFM, but are also valid for Goldberg's Big Five. Firstly, both models used factor analysis as major analytical tool. Factor analysis is the most commonly used statistical techniques among

sociologists and psychologists to the study of personality. This technique is used for determining those variables that increase or decrease together and is used in the development of personality theory (Pervin & John, 2011). By using this mathematical tool the researcher identifies groups of traits that are correlated with one another but not correlated with other groups. Then each group of traits is labelled as a personality dimension that underlies it (Bernstein, Stewart, Roy, Srull, & Wickens, 1994). Secondly, these factors remain stable in adulthood (McCrae & Costa, 1990); thirdly these are dimensions, not types, so people vary continuously on them (McCrae, & Costa, 1997); fourth, the factors and their specific facets are heritable (i.e., genetic), at least in part (Loehlin, McCrae, Costa, & John, 1998). Fifth, the factors probably had adaptive value in a prehistoric environment (Buss, 1996). Sixth, the factors are considered universal, having been recovered in languages as diverse as German and Chinese (McCrae & Costa, 1997). Finally, knowing one's placement on the factors is useful for improvement through therapy (Costa & McCrae, 1992).

On the other hand there are several differences between the two empirically-related yet conceptually distinct models, Goldberg's (1981) Big Five and Costa and McCrae's (1992) Five Factor Model (FFM). For instance, the Big Five are encoded as the lexical hypothesis, while FFM uses a comprehensive model of genetic and environmental causes and contexts commonly known as traits. Secondly, Goldberg used a circular measurement model in which many items are dependent on two factors rather than just one, whereas Costa and McCrae used a hierarchical model in which lower-level facets combine to form higher-level factors. Most obvious is Goldberg's (1996) use of adjectives known as the Big Five Markers (IPIP-NEO) in his questionnaires. In contrast, Costa and McCrae use sentences in their questionnaire inventory (NEO-PI-R) (Pervin & John, 1997).

Skimming through literature it is apparent that most of the literature is directed towards Big Five or FFM and not towards the instruments measuring Big Five and there is a significant gap in the literature on personality instrument's reliability, validity and usability issues outside North America.

DISCUSSION

The purpose of this research is to report the comparative results of two studies using two instruments (i.e., IP-IP & NEO-PI-R) to measure the personality factors and facets. It provides a step-by-step comparison of two studies conducted in Pakistan.

It presents findings on six methodological issues. Firstly, it provides findings related to sampling issues. Secondly, it covers validity issues in personality inventories (Costa & McCrae's NEO-PI-R and Goldberg's IP-IP) for adoption in non-English speaking country. Thirdly it presents the

reliability issues for both instruments. Fourth, it provides a comparison of data collection issues. Fifth, it highlights data screening issues and finally it compares confirmatory factor analyses for both instruments.

Sampling Issues: The sample used in both studies comprised university students enrolled on at least their second year. All three levels of university education, i.e. undergraduate, graduate and doctoral were considered for this study. Although quotas were not assigned according to age or sex, special considerations were made to ensure as representative a sample as possible. Although this study does not use quota sampling all efforts were made to ensure that a good representative sample was obtained in terms of sex and age groups.

The student component provided a significant proportion of young people, who have excellent command over written and spoken English language as the medium of instruction for higher education in Pakistan is English. It is important to note that both of these populations have been selected from larger populations on the basis of both judgment and convenience. Psychologists often select samples based on convenience and many modern day researchers do not consider this practice as any problem (MacCallum, Widaman, Preacher & Hong, 2001).

The samples used in both studies were comprised of university students aged between 15 and 34 years, enrolled in different undergraduate, postgraduate and doctoral programs throughout Pakistan. The university student component was chosen so as to make sure the respondents are likely to be read and understand the questionnaires and respond them quickly. Another point worth mentioning in this case is the cognitive problems of students for NEO-PI-R. Although the target audience were selected with care, i.e. university students at least in their second year of study, and at university level the medium of instruction and examination is English language throughout Pakistan, it was observed that many respondents sought advice from their colleagues for particular items which reflects the difficulty level of NEO-PI-R.

Validity Issues: A number of observations are presented on validity issue for both instruments in line with the guidelines available in the literature to test whether or not an indicator (or set of indicators) that is devised to gauge a concept really measures that concept (Bryman and Bell, 2007). Firstly, both instruments were developed by observing thousands of objects by Costa & McCrae, (1992) and Goldberg's (1981). These measures were processed in a systematic manner and provide acceptably reliable and valid measures and adopted in different later studies.

Secondly, it was the US cultural specific nature of NEO-PI-R. For example, an item from NEO-PI-R inventory: 'I wouldn't enjoy vacationing in Las Vegas.' Unsurprisingly, this item like some other items were not properly understood by some of the students in a developing Muslim country like Pakistan, where an average student does not have an idea what 'Las Vegas' is famous for. In

contrast Goldberg's IP-IP inventory shows no sign of US cultural specificity in terms of places, slang or implicit meanings.

Thirdly, the NEO-PI-R has 240 items in total with 2512 words; making it 10.5 words per item. In contrast Goldberg's IP-IP has 120 items with only 547 easy words; making it 4.5 words per item which might have resulted in lesser dropout rate for individual items during the factor analysis. One of the limitations of NEO-PI-R is that having more words and relatively complicated syntax (Exhibit– I) made it really difficult for participant with linguistic barriers and cultural distance in a non-English speaking country like Pakistan.

INSERT EXHIBIT – I

Finally and probably most importantly these instruments were developed during late eighties and revised in early nineties. Since then world has changed a lot but these instruments were not updated as society has moved over a period of time. For instance, mobile phones became the most common gadget around the globe (Kalba, 2007). With more 3 billion subscribers around the world [implying that more than 50% of the world's [adult] population is using mobile phones], mobile phones have out-diffused virtually every prior technology, whether it be television sets, radios, wrist watches, wallets, or the internet, and have done so in only 25 years (Encyclopaedia Britannica Online, 2010). Mobile Phones could be considered as just one example common manifestation of the latest phase of globalisation in the modern age (Kalba, 2007). Other examples of common manifestations of modern world could be social networking websites, sports, events and media. Both the instruments failed to take any leverage of modern day manifestations in their instruments trying to solicit information for one's personality in modern days.

Data Collection Issues: A methodological criticism often directed at the Big Five is that much of the evidence relies on self-report questionnaires so that self-report bias and falsification of responses is impossible to deal with completely. These assessments may be less reliable or objective than behavioural observations, performance indices, or the judgments of multiple others (McAdams, 1992). The five-factor structure has been replicated in peer reports as well (e.g., Goldberg, 1990); however, many of the substantive findings rely on self-reports. These studies used the self report formats. A typical questionnaire administration session started with a brief introduction to the author, which was normally presented by the respective faculty member. Then the author welcomed the students, giving a brief overview of the research, its objectives and the importance of such research for academia in general and Pakistan in particular. After the briefing, the author asked for student consent to participate, and invited those students who declined to leave the room. Very few students actually left the class rooms. The author assured the remaining

students that their responses would remain strictly confidential and that data from the survey would be reported only in the aggregate. The questionnaires were then distributed and the author engaged the respondents in the task of completing them in order to reduce the possibility of response sets or random responses to the items. At the end of each session the author thanked the students and respective faculty members for their co-operation. For NEO-PI-R study a total of 1160 questionnaires were distributed, 8 were returned without being filled and 165 were rejected during screen phase, hence a total of 987 questionnaires were accepted for further analysis. Under IP-IP study 600 questionnaires were distributed and all were returned, only 12 were reject during screen phase and a total of 588 questionnaires were accepted for further processing.

For IP-IP study all respondents indicated that they had no problems in completing any of the items while for NEO-PI-R there were several linguistic and cognitive difficulties observed among the respondents. Time to complete IP-IP questionnaire in semi-natural classroom settings was 15 to 25 minutes. While in the similar settings most of the sessions for NEO-PI-R lasted for 60 to 90 minutes.

Data Screening Issues: IP-IP does not provide any guideline for data screening. For NEO-PI-R data was scanned using a very stringent screening process based on the guidelines provided by Costa and McCrae (1992), who stated that the NEO PI-R should not be scored if: a)41 or more responses are missing for a particular respondent; b) a particular respondent answered 'Strongly Disagree' to more than 6 consecutive items; 'Disagree' to more than 9 consecutive items; 'Neutral' to more than 10 consecutive items; 'Agree' to more than 14 consecutive items; or 'Strongly Agree' to more than 9 consecutive items. Based on these guidelines, all the questionnaires were manually examined and a number of questionnaires were rejected for further processing as they fell short of meeting above criteria.

Reliability Issues: The International Personality Item Pool website (http://ipip.ori.org) has reported excellent internal consistency results for IPIP inventory (Exhibit-III). The domain scales (N, E, O, A and C) had correspondingly larger coefficient alphas, which ranged from 0.79 to 0.87 while internal consistencies for the scales for the 30 individual facets ranged from 0.51 to 0.80. These scales were further validated in many other studies (Gow, Whiteman, Pattie & Deary, 2005; Guenole & Chernyshenko, 2005). Both of these studies reported that the IPIP scales have good internal consistency and relate strongly to major dimensions of personality. In the similar fashion the Cronbach alpha were calculated for domains scales (N, E, O, A and C) and found the acceptable range i.e. α = 0.58 to 0.79. The individual facet wise also resulted in acceptable internal consistencies.

INSERT EXHIBIT – III

Internal consistency results were obtained from the NEO-PI-R (form-S) manual (Exhibit-III). The 48-item domain scales (N, E, O, A and C) had correspondingly larger coefficient alphas, which ranged from $\alpha = 0.86$ to 0.95 while internal consistencies for the scales for the 30 individual facets ranged from $\alpha = 0.56$ to 0.81 and were considered acceptable (Costa & McCrae, 1992). Similarly, Cronbach alphas were calculated for domain scales (N, E, O, A and C) resulting in acceptable internal consistencies ranging from $\alpha = 0.71$ to 0.79 (Exhibit-II). Internal consistency results for individual facets were also found in an acceptable range [i.e. $\alpha = 0.81$ to 0.98]. It shows that there is a significant difference between alpha figures before and after factor analyses. In both cases domain score obtained from the current studies found far lower than the reported in the original inventory scores. This reflects that consistency might be compromised while replicating these instruments in non English speaking country.

INSERT EXHIBIT – II

Factor Analysis Issues: Using a priori knowledge about five high order factors i.e., Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness were factor analysed separately in both studies. These confirmatory factor analyses were performed using 24/48 items related to each factor and hence making the five separate analyses for all 120/240 items in the IP-IP/NEO-PI-R inventory. Items were factor analysed using the maximum likelihood method of extraction and direct oblimin form of oblique rotation. These items were analysed using a criteria based on a priori knowledge was used which is critical for any confirmatory factor analysis (Byrne, 1998) and based on theoretical underpinning and empirical research, relations between the observed variables and the underlying factors were postulated a priori.

During the NEO-PI-R factor analyses it was observed that a large number of items were dropped out from the analyses (Exhibit-IV). It was considered as standard practice for filtering the scales to drop the items with the lowest item-to total correlations or the lowest factor loadings (Churchill, 1979). The resultant factors having lesser number of items per factors were considered adequate for several reasons. Firstly, NEO-PI-R provides 8 items per facet making it 48 items for each factor and IP-IP provides 4 items per facets resulting in 24 items for each factor. This number was more than sufficient as the criteria outlined for factor analysis require loading of at least two items per factor. Secondly, conventional guidelines for construct measurement states that: (a) construct indicators should be internally consistent for valid measures; (b) there are optimal magnitudes of correlations between items (Bollen & Lennox, 1991). Under cross-loadings situations items were loaded on a

single factor which has the highest loading among all other loadings and it must fall for a particular factor using a prior criteria (Hair et al, 2006) and available guidelines (Costa and McCrae, 1992).

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CONCLUSIONS

This research paper has demonstrated originality on several levels. One aspect refers to the comparisons of two empirically-related yet conceptually distinct instruments rather than comparisons of two theoretical models. The study concludes a number of issues based on the related literature and empirical findings.

For validity concerns both instruments reached to obsolescence as these were developed ages ago and not updated with pace of human development. For replication in non-English countries Goldberg's IP-IP has edge over Costa & McCrae's NEO-PI-R for three counts; (a) it has less words and relatively simple syntax (Exhibit – I) made it really easy for participant with linguistic barriers; (b) shows no sign of US cultural specificity in terms of places, slang or implicit meanings made it closer to participants in a non-English speaking country like Pakistan and (c) it takes less than half time to complete the survey.

For reliability issues NEO-PI-R represented better results. For both instruments consistency might be compromised while replicating these instruments in non English speaking country. IP-IP does not provide any guideline for data screening while NEO-PI-R provides a very detailed data screening process.

During factor analyses it was revealed both instruments replicated five factor model at both level i.e. first order factor analyses resulting in facets and second order factor analyses provided the factor structure but during the NEO-PI-R factor analyses it was observed that a large number of items were dropped out from the analyses (Exhibit-IV) that raises the questions of item validity in non-English speaking countries.

LIMITATIONS

The results obtained from this empirical work must be interpreted in light of the study's limitations. These arose because of the exploratory nature of the research and its restriction in scope, and they are summarised as follows.

As mentioned earlier, the sample for this study comprised university students enrolled in any discipline at any level of university education i.e. undergraduate, graduate and doctoral. Additionally, all efforts were made to make this a representative sample in terms of demographic background (age, sex, marital status, income group and subjects of study), and this strategy had some problems associated with it. Firstly, whilst business and computer studies departments had

good enrolments, other departments had low enrolments and low attendance, and this resulted in a reliance on business and computer studies students. Secondly, some students were unable to comprehend the research instrument completely, despite being taught in English. Thirdly, the target populations were selected from larger populations on the basis of both judgment and convenience, thereby making it impossible for the researcher to completely control the randomness of the sample. The questionnaire survey used in this study is subject to a number of limitations. Firstly, the approach may have been ineffective in encouraging and stimulating free expressions concerning the behaviour of the respondents. This is because lack of resources cannot permit an in-depth investigation. For instance, if a questionnaire is too long or too detailed, results can be adversely affected. Consequently, this questionnaire could only obtain information concerning certain influences on the consumer's behaviour.

A few strengths of personality research; the universal use of self-reporting questionnaires, and use of students in the research process, which make the process robust and economically feasible, are actually highly criticised in different non-academic quarters.

RECOMMENDATIONS

Despite its limitations, the findings of this study provide a platform/basis for future investigation and diagnosis, as well as yielding valuable insights into the importance of a number of instrument issues.

Implications: The study produces various implications for practising researchers especially those who would like to use personality instruments in their research or those who would like to develop new instruments to measure respondent's personality. The results from the analysis of the two instruments have the potential to offer new and important insights concerning personality instruments.

Need for Further Research: While the two instruments were considered two conceptually related but practically distinct constructs in this study, other researchers could conduct a more thorough investigation and examine these constructs from psychological and behavioural points of view. Organising focus groups or in-depth interviews may be a good way to clarify the differences as well as similarities between these two concepts from the user's perspective.

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Exhibit - I Comparison of NEO-PI-R and IP-IP - facets and examples

Facets	NEO-PI-R[1]	IPIP-NEO[2]
	Extraversion Facets	
Warmth	I'm known as a warm and friendly person.	Make friends easily.
Gregariousness	I like to have a lot of people around me.	Love large parties.
Assertiveness	I am dominant, forceful, and assertive.	Take control of things.
Activity	I am a very active person.	Am always busy.
Excitement-seeking	I like to be where the action is.	Love excitement.
Positive Emotions	I laugh easily.	Have a lot of fun.
	Agreeableness Facets	
Trust	My first reaction is to trust people.	Trust others.
Straight-forwardness	I couldn't deceive anyone even if I wanted to.	Cheat to get ahead.
Altruism	I'm not known for my generosity.	Love to help others.
Compliance	I would rather co-operate with others than compete with them.	Insult people.
Modesty	I try to be humble.	Have a high opinion of myself.
Tender mindedness	I have sympathy for others less fortunate than me.	Sympathize with the homeless.
	Conscientiousness Facets	
Competence	I keep myself informed and usually make intelligent decisions.	Complete tasks successfully.
Order	I like to keep everything in its place so I know just where it is.	Like to tidy up.
Dutifulness	I try to perform all the tasks assigned to me conscientiously.	Keep my promises.
Achievement striving	I work hard to accomplish my goals.	Work hard.
Self-Discipline	I have a lot of self-discipline.	Handle tasks smoothly.
Deliberation	I always consider the consequences before I take action.	Jump into things without thinking.
	Neuroticism / Emotional Stability	
Anxiety	I often worry about things that might go wrong.	Worry about things.
Angry Hostility	I often get angry at the way people treat me.	Get angry easily.
Depression	I have a low opinion of myself.	Dislike myself.
Self-Consciousness	At times I have been so ashamed I just wanted to hide.	Am afraid to draw attention to myself.
Impulsiveness	Sometimes I do things on impulse that I later regret.	Go on binges.
Vulnerability	I often feel helpless and want someone else to solve my problems.	Panic easily.
	Openness / Intellect Facets	

[1] *NEO-PI-R refers to the 'Revised NEO Personality Inventory' developed by Costa and McCrae, (1992).*
[2] *IPIP-NEO stands for International Personality Item Pool – NEO which was developed by Goldberg (1999).*

Fantasy	I have an active fantasy life.	Enjoy wild flights of fantasy.
Aesthetics	Aesthetic and artistic concerns aren't very important to me.	Believe in the importance of art.
Feelings	I experience a wide range of emotions or feelings.	Experience my emotions intensely.
Actions	I follow the same route when I go someplace.	Prefer variety to routine.
Ideas	I have a lot of intellectual curiosity.	Love to read challenging material.
Values	I believe letting students hear controversial speakers can only confuse and mislead them.	Believe that we should be tough on crime.

Exhibit – II Instrument Reliability IP-IP

Domains	IP-IP*		IP-IP**		NEO-PI-R*		NEO-PI-R**	
	Items	α	Items	α	Items	α	Items	α
N: Neuroticism	24	0.86	16	0.69	48	0.92	14	0.79
E: Extraversion	24	0.87	14	0.65	48	0.89	15	0.75
O: Openness	24	0.84	14	0.58	48	0.87	16	0.77
A: Agreeableness	24	0.82	13	0.79	48	0.86	15	0.74
C: Conscientiousness	24	0.79	14	0.75	48	0.90	15	0.71
Neuroticism / Emotional Stability								
N1: Anxiety	4	0.83	3	0.69	8	0.78	2	0.95
N2: Angry Hostility	4	0.88	3	0.68	8	0.75	3	0.85
N3: Depression	4	0.88	2	0.68	8	0.81	3	0.95
N4:Self-Consciousness	4	0.80	3	0.54	8	0.68	2	0.88
N5: Impulsiveness/ Immoderation	4	0.77	2	0.68	8	0.70	2	0.84
N6: Vulnerability	4	0.82	3	0.61	8	0.77	2	0.96
Extraversion Facets								
E1: Warmth/ Friendliness	4	0.87	2	0.59	8	0.73	3	0.97
E2: Gregariousness	4	0.79	3	0.55	8	0.72	2	0.96
E3: Assertiveness	4	0.84	2	0.57	8	0.77	3	0.96
E4: Activity	4	0.71	2	0.56	8	0.63	3	0.83
E5: Excitement-seeking	4	0.78	2	0.62	8	0.65	2	0.98
E6: Positive Emotions/	4	0.81	3	0.63	8	0.73	2	0.95
Openness / Intellect Facets								
O1: Fantasy /Imagination	4	0.83	3	0.61	8	0.76	2	0.97
O2: Aesthetics/Artistic	4	0.84	3	0.53	8	0.76	2	0.98
O3: Feelings/Emotionality	4	0.81	2	0.55	8	0.66	3	0.96
O4: Actions/Adventurousnous	4	0.77	2	0.80	8	0.58	3	0.93
O5: Ideas/Intellect	4	0.86	2	0.58	8	0.80	2	0.94
O6: Values /Liberalism	4	0.86	2	0.86	8	0.67	3	0.97
Agreeableness Facets								
A1: Trust	4	0.82	3	0.79	8	0.79	2	0.81
A2: Straightforwardness /Morality	4	0.75	2	0.70	8	0.71	3	0.95
A3: Altruism	4	0.77	2	0.77	8	0.75	3	0.92
A4: Compliance /Cooperation	4	0.73	2	0.61	8	0.59	3	0.76
A5: Modesty	4	0.77	2	0.54	8	0.67	2	0.86
A6: Tender-Mindedness	4	0.75	2	0.80	8	0.56	2	0.95
Conscientiousness Facets								
C1: Competence /Self Efficacy	4	0.78	2	0.57	8	0.67	2	0.93
C2: Order	4	0.82	2	0.51	8	0.66	3	0.98
C3: Dutifulness	4	0.71	3	0.52	8	0.62	3	0.98
C4: Achievement Striving	4	0.78	2	0.50	8	0.67	3	0.98
C5: Self-Discipline	4	0.85	2	0.58	8	0.75	2	0.89
C6: Deliberation /Cautiousness	4	0.76	3	0.70	8	0.71	2	0.93

** Source: International Personality Item Pool (http://ipip.ori.org)*

*** Current Study – items retained after factor analysis*

Exhibit – III Confirmatory Factor Analyses – Goldberg's IP-IP

First Order							Second Order			
Facets	**#**	**α**	**EV**	**VE**	**M**	**SD**	**Factors**	**α**	**M**	**SD**
Depression	2	0.91	5.23	21.8	2.66	0.55	Neuroticism	0.79	2.56	0.81
Anxiety	3	0.86	3.09	12.9	2.79	0.87				
Anger	3	0.82	2.39	9.98	2.54	0.67				
Self-Consciousness	3	0.79	2.28	9.53	2.13	1.14				
Immoderation	2	0.72	1.87	7.81	1.85	0.79				
Vulnerability	3	0.64	1.80	7.50	3.41	0.81				
Excitement Seeking	2	0.92	5.29	26.5	2.69	0.69	Extraversion	0.84	2.92	0.93
Activity Level	2	0.91	2.74	13.7	2.58	0.99				
Friendliness	2	0.88	1.97	9.87	3.42	0.86				
Gregariousness	3	0.87	1.74	8.70	2.74	1.21				
Assertiveness	2	0.72	1.49	7.47	2.68	0.96				
Cheerfulness	3	0.71	1.27	6.38	3.43	0.86				
Cooperation	2	0.93	5.29	26.5	2.96	0.99	Agreeableness	0.83	2.62	0.86
Altruism	2	0.88	2.74	13.7	2.58	1.07				
Trust	3	0.84	1.97	9.87	2.68	0.52				
Modesty	2	0.8	1.74	8.70	2.81	0.84				
Morality	2	0.79	1.49	7.47	2.56	0.64				
Sympathy	2	0.73	1.27	6.38	2.15	1.11				
Cautiousness	3	0.84	4.32	20.6	1.87	0.76	Conscientiousness	0.74	2.80	0.86
Self-Efficacy	2	0.81	3.29	15.7	3.43	0.78				
Self-Discipline	2	0.79	2.56	12.2	2.71	0.66				
Orderliness	2	0.74	2.11	10.1	2.6	0.96				
Dutifulness	3	0.67	1.46	6.95	3.44	0.83				
Achievement	2	0.61	1.22	5.84	2.76	1.18				
Liberalism	2	0.82	3.69	15.4	2.70	0.93	Openness	0.77	2.88	0.84
Adventurousness	2	0.81	3.17	13.2	3.45	0.83				
Emotionality	2	0.80	2.49	10.4	2.98	0.96				
Imagination	3	0.78	2.34	9.76	2.60	1.04				
Intellect	2	0.72	2.03	8.46	2.70	0.49				
Artistic Interests	3	0.68	1.56	6.50	2.83	0.81				

***#** - No. of items loaded; **α** - Alpha; **EV** – Eigenvalue; **VE** - % variance explained*

Exhibit – IV Confirmatory Factor Analyses – Costa & McCrae's NEO-PI-R

		First Order					Second Order			
Facets	**#**	**α**	**EV**	**VE**	**M**	**SD**	**Factors**	**α**	**M**	**SD**
Depression	3	0.95	1.10	7.90	2.29	0.37	Neuroticism	0.79	2.66	0.39
Anxiety	2	0.95	1.82	13.00	2.37	0.31				
Angry Hostility	3	0.85	1.01	7.22	2.53	0.30				
Self-Consciousness	2	0.88	4.29	30.70	2.64	0.59				
Impulsiveness	2	0.84	2.59	18.50	3.02	0.41				
Vulnerability	2	0.96	1.94	13.90	3.10	0.37				
Excitement Seeking	2	0.98	4.21	23.40	3.16	0.43	Extraversion	0.75	3.02	0.34
Activity	2	0.83	1.16	6.46	2.97	0.33				
Warmth	3	0.97	2.49	13.80	3.02	0.41				
Gregariousness	2	0.96	1.69	9.41	3.10	0.37				
Assertiveness	3	0.96	1.99	11.10	2.89	0.31				
Positive Emotions	2	0.95	3.12	0.92	2.99	0.21				
Compliance	3	0.76	2.16	14.40	3.07	0.37	Agreeableness	0.74	3.04	0.38
Altruism	3	0.92	2.90	19.40	2.69	0.48				
Trust	2	0.81	4.53	30.20	3.14	0.37				
Modesty	2	0.86	1.00	6.33	3.00	0.19				
Straightforwardness	3	0.95	1.70	11.70	3.09	0.45				
Tender-Mindedness	2	0.95	1.26	8.40	3.22	0.44				
Deliberation	2	0.93	4.10	29.30	3.04	0.42	Conscientiousness	0.71	3.07	0.36
Competence	2	0.93	2.94	21.00	3.18	0.23				
Self-Discipline	2	0.89	1.88	13.50	3.01	0.35				
Order	3	0.98	2.39	17.10	3.00	0.24				
Dutifulness	3	0.98	1.00	5.81	3.08	0.47				
Achievement	3	0.98	1.15	8.28	3.13	0.44				
Values	3	0.97	2.24	13.20	2.86	0.34	Openness	0.77	2.87	0.44
Actions	3	0.93	1.53	9.00	2.78	0.54				
Feelings	3	0.96	1.09	6.41	2.96	0.31				
Fantasy	2	0.97	3.71	21.80	3.05	0.47				
Ideas	2	0.94	4.72	27.70	2.89	0.44				
Aesthetics	3	0.98	1.96	11.50	2.70	0.54				

No. of items loaded; **α** - Alpha;**EV –** Eigenvalue; **VE** - % variance explained