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The structure of the Adult EAS Temperament Survey for Afrikaans- and English-speaking students in South Africa

Summary

The responses of 273 South African university students to the items of the EAS Temperament Survey for Adults were subjected to a principal factor analysis. Four interpretable factors were extracted and rotated to oblique simple structure. Three factors provided strong support for the factorial validity of the EAS Sociability, Anger and Activity scales. Contrary to expectations, the items of the Emotionality-Distress and Emotionality-Fear scales merged into a single Distress/Fear factor. Low correlations among the factors suggest that Activity may be an independent personality dimension in its own right and not merely a facet of extroversion. In addition, Anger appears to represent a personality dimension independent of the broader Emotionality temperament proposed by Buss & Plomin 1984.

Die struktuur van die Volwasse EAS Temperament opname vir Afrikaans- en Engelssprekende studente in Suid-Afrika

Die response van 273 Suid-Afrikaanse universiteitstudente vir die items van die EAS Temperament opname vir volwassenes is aan 'n hoofasfaktorontleding onderwerp. Vier interpreteerbare faktore is onttrek en na eenvoudige struktuur geroteer. Drie faktore het sterk ondersteuning vir die faktotiale geldigheid van die EAS Sosiaaliteit, Agressiwiteit en Aktiwiteit skale gebied. Die items van die Emosionaliteit-Distres en Emosionaliteit-Bevreesdheid skale het teen die verwagting in 'n enkele Distres/Bevreesdheid faktor gedefinieër. Die lae korrelasies tussen die faktore dui daarop dat Aktiwiteit moontlik as 'n onafhanklike persoonlikheidsdimensie, eerder as 'n komponent van ekstroversie beskou kan word. Dit blyk dat Agressiwiteit ook as onafhanklik van die breër Emosionaliteit temperament wat deur Buss & Plomin 1984 voorgestel word, beskou kan word.

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This study examines the item level factor structure of the EAS Temperament Survey for Adults (Buss & Plomin 1984) for Afrikaans- and English-speaking South African university students. According to Buss & Plomin (1984: 84) the EAS survey measures basic personality dimensions that are largely inherited, may be observed in childhood, and have important implications for the functioning of an individual throughout his or her life-span. Personality dimensions that fulfil the abovementioned criteria may be referred to as dimensions of temperament (Buss & Plomin 1984: 84).

The EAS measures three dimensions of temperament, namely Emotionality, Activity and Sociability, widely recognised as important and basic dimensions of temperament (Prior 1992: 251). Sociability is related to the extent to which an individual strives for or avoids contact with other people. People who obtain high scores on this dimension are reinforced by social contact. This temperament appears similar to the extroversion factor also described by Eysenck & Eysenck 1985 and McCrae & Costa 1992.

Activity is not always recognised as a basic personality dimension, but rather as a facet or component of extroversion (McCrae & Costa 1995: 28). However, both Comrey (1995: 2) and Zuckerman *et al* (1991: 930) support Buss & Plomin (1984: 85) in their contention that activity constitutes a basic personality dimension. Three recent factor-analytic studies support this view. In the first study Zuckerman *et al* (1988: 99) demonstrated that in a five-factor solution of 46 personality scales, activity formed a factor separate from the sociability/extroversion factor. In the second and third studies Comrey and his co-workers jointly factor-analysed the Comrey Personality Scales and the NEO-PI and in both studies activity emerged as a factor separate from extroversion (Hahn & Comrey 1994: 361; Caprara *et al* 1995: 197). The Activity dimension consists of two components, namely tempo and vigour. While tempo refers to "the pace of movements", high vigour refers to "responses of high amplitude" (Buss 1988: 51).

The Emotionality dimension is represented by three subscales, namely Emotionality-Distress, Emotionality-Fear and Emotionality-Anger. The broad Emotionality dimension appears to correspond to

the neuroticism factor also found in the personality taxonomies of Comrey 1995: 2, Eysenck 1991: 785 and McCrae & Costa 1995: 28. Buss (1995: 50) regards distress as the most basic part of emotionality and describes it as "being upset", "high arousal" and "generalised negative affect". Buss (1995: 51) notes that distress can be observed on the first day of life of babies. In adults distress refers to the emotions experienced in frustrating situations over which one has no control, such as being stuck in heavy traffic when one ought to be at an important meeting.

Fear and anger differentiate from general distress during the first year of life (Buss 1995: 51). Fear and anger are moderately correlated with distress in childhood. Buss (1995: 52) reports that the correlation between Emotionality-Fear and Emotionality-Distress range between 0,39 and 0,52. For Emotionality-Anger and Emotionality-Distress the correlations in childhood range between 0,52 and 0,72. However, in adulthood the correlations are lower. In the case of adult women Buss & Plomin (1984: 100) report that the correlation between Emotionality-Distress and Emotionality-Fear is 0,52 and in the case of adult men 0,63. Buss & Plomin (1984: 100) also report correlations between Emotionality-Distress and Emotionality-Anger of 0,37 for men and 0,28 for women. These correlations suggest that the three components of the broader Emotionality temperament are related yet clearly differentiated from each other in adults.

A recent factor analysis of 33 personality scales sheds light on the construct validity of the temperament dimensions in the EAS model (Zuckerman *et al* 1991: 935).¹ In a five-factor solution of the intercorrelations among the 33 variables, the Sociability scale loaded highly on a factor defined by other sociability scales such as the Extroversion scale of the Eysenck Personality Questionnaire (Eysenck & Eysenck 1975) and the Affiliation scale of the Personality Research Form (Jackson 1974). The Activity scale loaded jointly on a factor

1 Instead of EAS, its forerunner, the EASI III, was used for the study cited here. The most important difference between the two instruments is that the EASI III includes a scale of Impulsivity.

with the Energy Level scale of the Jackson Personality Inventory (Jackson 1976). The Emotionality-Anger scale loaded highly on a factor defined by scales such as the Aggression scale of the Personality Research Form. Lastly, the General Emotionality and Emotionality-Fear scales loaded on a factor also defined by the Neuroticism scale of the Eysenck Personality Questionnaire. Overall these findings strongly support the fundamental importance of the temperament dimensions measured by the EAS.

As it appears that the EAS measures important temperament dimensions, it is necessary to establish whether the items define the same constructs for South African samples as in the case of the American normative sample, before the EAS may be employed in the South African situation for research purposes. Such information may also provide insight into the cross-cultural universality of the dimensions measured by the EAS. An important criterion in this regard would be whether the pattern of item loadings on the factors that emerge from a factor analysis are similar across cultures. Accordingly, it was decided to perform a factor analysis on the items of the EAS for a South African sample and to compare the resulting factors with those reported by Buss & Plomin (1984: 99) for a similar American sample. Since Buss & Plomin (1984: 99) reported only salient loadings in their factor analysis, it will not be possible to compute coefficients of congruence between the two sets of factors. The similarity of the factors will be judged on visual inspection only.

1. Method

1.1 Participants

The participants were 273 university students (202 females and 71 males) between the ages of 18 and 37 years ($M = 19,51$; $SD = 1,82$). The majority of the students were Afrikaans-speaking ($n = 172$). Of the remaining students 96 indicated English as their mother tongue and five another language. All the students were registered for a psychology course in personality and their participation in the EAS study was voluntary. The EAS was completed during lectures and all students later received feedback on their scores. McCrae & Costa (1994) recently concluded from a series of factor analyses that the

personality structure of students is similar to that of adults in general. De Bruin *et al* (1997: 872) produced similar results. These findings suggest that the results of the present study concerning the structure of the EAS may be generalised to other Afrikaans- and English-speaking adults in South Africa.

1.2 Instrument

The EAS was the only instrument. It consists of five subscales, namely Sociability, Activity, Emotionality-Distress, Emotionality-Fear and Emotionality-Anger. Each subscale contains four items which were selected by means of factor analysis (Buss & Plomin 1984: 98). The study by Zuckerman *et al* (1991: 935) showed that in a joint factor analysis of 33 personality scales, the Emotionality, Activity and Sociability scales of the EASI III loaded the factors they were expected to load. These findings provide support for the construct validity of EAS scales. Buss & Plomin (1984: 101) report test-retest reliability coefficients (after a two-week interval) for the five scales ranging between 0,75 and 0,85 with an average coefficient of 0,82. Alpha coefficients were computed for the scores of the present sample and these ranged between 0,58 (Emotionality-Fear) and 0,72 (Emotionality-Distress) with an average coefficient of 0.65. Considering that the scales consist of only four items each, the scores appear to be sufficiently reliable for research purposes. Because the items of the EAS are easily understood, and all participants had passed English (higher grade) at the grade 12 standard, all students completed the original English version of the EAS.

1.3 Data analysis

The 20 items of the EAS were subjected to a principal factor analysis with iterated communalities. To ensure that enough factors were extracted, six and five factors were called for. However, only four factors had sufficiently large loadings ($\geq |0,30|$) to be meaningful and interpretable (Gorsuch 1997: 545). The fifth and sixth factors appeared to be residual factors and no item loaded meaningfully on these factors. Accordingly, four factors were retained and rotated to a simple oblique structure according to the Direct Oblimin criterion.

2. Results

The rotated factor pattern matrix appears in Table 1 and the correlations between the oblique factors appear in Table 2. Each of the four rotated factors will now be discussed. Following convention, only factor loadings $\geq |0.30|$ are regarded as salient.

2.1 Factor I

The first factor was defined by the four items comprising the Emotionality-Distress scale and the four items comprising the Emotionality-Fear scale, respectively. Thus, contrary to the findings of Buss & Plomin (1984: 99), the Emotionality-Distress and Emotionality-Fear scales merged to form a single factor which is here labelled Distress/Fear.

2.2 Factor II

The four items assigned to the Activity scale had loadings $\geq |0.30|$ on the second factor. In addition item 9 (which is assigned to the Emotionality-Distress scale) showed a loading of 0.30. This factor corresponds with the Activity scale and supports its factorial validity. Buss & Plomin (1984: 99) noted a factor very similar to that revealed by the present study.

2.3 Factor III

Only the four items assigned to the Sociability scale had loadings $\geq |0.30|$ on the third factor, thus providing support for the factorial validity of the Sociability scale. This factor appears similar to the Sociability factor reported by Buss & Plomin (1984: 99).

2.4 Factor IV

This factor was meaningfully loaded on by the four items assigned to the Emotionality-Anger scale. No other items loaded on this scale. This finding supports the factorial validity of the Emotionality-Anger scale. A similar factor was reported by Buss & Plomin (1984: 99).

Table 1: Rotated factor pattern matrix (Direct Oblimin rotation) of EAS items

Item	Factor			
	I	II	III	IV
<i>Distress/Fear</i>				
11. Everyday events make me troubled and fretful	65	14	-17	-11
16. I get emotionally upset easily	63	-00	14	00
3. I am easily frightened	62	-06	08	07
4. I frequently get distressed	61	22	-05	03
12. I often feel insecure	58	03	-17	-20
14. When I get scared, I panic	56	-13	06	06
9. I often feel frustrated	36	30	-17	28
19. I have fewer fears than most people my age	33	-20	10	16
<i>Activity</i>				
10. My life is fast paced	-01	66	01	07
2. I usually seem to be in a hurry	16	58	06	02
7. I like to keep busy all the time	-07	53	10	02
17. I often feel as if I'm bursting with energy	-18	33	24	19
<i>Sociability</i>				
1. I like to be with people	-05	15	62	-06
15. I prefer working with others rather than alone	06	03	58	02
6. I am something of a loner*	05	-09	53	15
20. I find people more stimulating than anything else	02	09	53	-17
<i>Anger</i>				
8. I am known as hot blooded and quick-tempered	08	11	-05	64
18. It takes a lot to make me mad*	02	06	07	63
5. When displeased I let people know it right away	-09	-03	07	52
13. There are many things that annoy me	27	17	-20	36

* Items scored in reverse.

Note: Decimal points have been omitted. Variables have been arranged in order of their loadings on the factors. The number before each variable indicates its position in the questionnaire.

The correlations among the factors were low. As expected the highest correlation was between the Distress/Fear and Anger factors (see Table 2). Overall, the correlations support the independence of the temperament dimensions measured by the EAS.

De Bruin/The Adult EAS Temperament Survey

Table 2: Intercorrelations between the rotated factors of the EAS

Factor	Distress/Fear	Activity	Sociability	Anger
Distress/Fear	1,00			
Activity	-0,03	1,00		
Sociability	0,17	0,05	1,00	
Anger	0,23	-0,21	-0,10	1,00

3. Discussion

Four meaningful factors could be extracted from the intercorrelations among the 20 items of the EAS. Three of the factors provide strong support for the validity of the Sociability, Activity and Emotionality-Anger scales. These factors closely resemble those reported by Buss & Plomin (1984: 99) for an American sample. No support was found for the distinction between distress and fear as separate components of Emotionality in adulthood. However, the Emotionality-Distress and Emotionality-Fear items jointly defined a factor that appears similar to the neuroticism dimension described by other personality researchers (eg Eysenck 1991; McCrae & Costa 1992). This finding is in contrast with the finding of Buss & Plomin (1984: 99) who reported clearly differentiated Emotionality-Distress and Emotionality-Fear factors.

Since Buss & Plomin contend that Anger, Distress and Fear are components of a broader emotionality temperament, it was expected that the Anger and Distress/Fear factors would show the highest correlation ($r = 0.23$). However, this correlation is relatively weak, suggesting that Anger may constitute a largely independent dimension from Distress/Fear. In this regard Zuckerman *et al* (1991: 938) also reported separate aggressiveness and emotionality dimensions in their factor analysis of 33 personality scales. These findings suggest that it may be more appropriate to view anger as a basic dimension or temperament in its own right. Inspection of the item content of the factors suggests that the Anger factor corresponds to the negative pole of the Agreeableness factor described by Costa & McCrae 1992.

The finding that the Activity and Sociability items defined two separate and weakly correlated factors ($r = 0,05$) supports the findings of Zuckerman *et al* (1988: 103), Zuckerman *et al* (1991:

938), Caprara *et al* (1995: 197) and Hahn & Comrey (1994: 361) that Activity may constitute an independent personality factor. This is in contrast with the views of Eysenck (1991) and McCrae & Costa (1995: 28) that Activity should be regarded as a component or facet of Extroversion.

In conclusion, the study provides support for the factorial validity of the Sociability, Activity and Emotionality-Anger scales of the EAS. However, the findings suggest that the original conceptualisation of distress, fear and anger as components of a larger emotionality dimension is not valid for the present sample. This study suggests that it may be more appropriate to view the Emotionality-Fear and Emotionality-Distress items as measuring a single factor (similar to neuroticism), and the Emotionality-Anger items as measuring an independent factor (similar to the opposite of agreeableness). It is recommended that if the EAS is used to assess the temperament of Afrikaans- and English-speaking South African university students, the items of the Emotionality-Fear and Emotionality-Distress scales should be combined in a single scale. It is proposed that the resulting scale would measure a construct similar to neuroticism.

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