

## The place of impulsiveness in a dimensional system of personality description

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Three questionnaire studies are reported in which sets of items traditionally used to measure impulsiveness were intercorrelated and the resulting matrices factor analysed; the factors extracted were correlated with measures of the major personality dimensions E (extraversion), N (neuroticism) and P (psychoticism), and also with the L (lie; dissimulation) scale. It was found that impulsiveness in the broad sense ( $Imp_B$ ) breaks down into four factors (narrow impulsiveness or  $Imp_N$ , risk-taking, non-planning and liveliness) which are replicable from sample to sample and from males to females. These factors are positively correlated with each other and also with sociability to varying degrees.  $Imp_B$  correlates quite well with extraversion, but even better with psychoticism;  $Imp_N$  correlates positively with N and P, suggesting that this trait is somewhat pathological. It is suggested that the distinction between  $Imp_B$  and  $Imp_N$  is crucial for the discussion of the nature and measurement of extraversion and also for future experimental work on the causal background and experimental testing of impulsive behaviour patterns.

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The problem of the relationship between sociability and impulsiveness and the propriety of combining these traits to form a more general personality dimension of extraversion, has been much discussed (Carrigan, 1960). She feels that the American picture of E is made up largely of *sociability*, the European one of *impulsiveness*; and she concludes that, 'the unidimensionality of extraversion/introversion has not been conclusively demonstrated' (p. 355). Guilford (1975) summarizes his feeling about extraversion by saying that, 'as for his [Eysenck's] factor E, I am forced to conclude that it is not a factor at all, but a kind of "shotgun wedding" of R and S' (p. 809). (R and S are Guilford's symbols for rhythmia and sociability. R does not stand for impulsiveness, but for care-freeness and liveliness; however, the scale contains some impulsiveness items also. Guilford has no impulsiveness scale as such.) Guilford's conclusion is somewhat at odds with demonstrations by S. B. G. Eysenck & H. J. Eysenck (1963), replicated by Sparrow & Ross (1964), that sets of impulsiveness items and sets of sociability items correlate together quite well ( $r = 0.47$ ); this would seem to contradict the notion of a 'shotgun wedding'. The position is complicated by the fact that impulsiveness also tends to correlate positively with neuroticism (N), while sociability correlates negatively with N; in addition, Guilford's sociability factor is by no means univocal, but breaks down into two quite independent parts (Eysenck, 1956) correlating respectively with R and with neuroticism.

The most cogent argument against Guilford's position derives from a genetic study, using 837 pairs of adult twins, reported by Eaves & Eysenck (1975). The main purpose of this study was to explore the applicability of various genetic models to the variances and covariances arising from the measurement of sociability and impulsiveness in this sample of MZ and DZ twins. The main conclusions may be worth restating in brief. It was found that (1) 'Genetical factors contribute both to the variation *and covariation* of sociability and impulsiveness. (2) Environmental factors also contribute to the covariation of sociability and impulsiveness. (3) The genetical correlation between the two factors is estimated to be 0.42, the environmental correlation to be 0.66 after correction for unreliability. (4) Combining sociability and impulsiveness scores by addition to provide a measure of extraversion provides the most powerful single means of discriminating between individuals with respect to the genetical and environmental determinants of their responses to the sociability and impulsiveness items of the questionnaire. (5) The interaction between subjects and tests has a significant genetical component, so there is some justification for regarding sociability and impulsiveness as distinguishable genetically' (p. 110, emphasis added).

One problem attends all these discussions, namely the somewhat arbitrary assignment of the term 'impulsiveness' to a variety of different items, some of which have only marginal relationships with acting on impulse. Thorndike (1966), for instance, has published an impulsiveness scale, one pole of which he describes in the following words: 'carefree, happy-go-lucky, ready to do things at a moment's notice'. The negative pole of this scale is described as follows: 'careful to plan life out in advance, systematic, orderly, foresighted'. This description rather follows Guilford's notion of rathymia, but there is no evidence that impulsiveness is highly correlated with carefreeness, a happy-go-lucky disposition, lack of planning, or lack of orderliness. Intuitively, one might accept such relationships but there is no psychometric evidence to back up such intuitive notions which broaden  $Imp_N$  (narrow, specific impulsiveness) into  $Imp_B$  (broad, general impulsiveness). The admissibility of this process is a research problem in itself.

Barratt (1959, 1965), who has made much use of a scale of impulsiveness which he has found to be independent of anxiety measures, includes items, the relevance of which to  $Imp_N$ , is even more marginal. Some of these relate to happy-go-lucky dispositions, others to excitement, to sociability, risk-taking, lack of patience and carefulness, liking of variety, sensation seeking, a dislike for solving complex problems, impatience with people, forgetfulness, dislike of mathematics, dislike of playing chess, liking to spend leisure time out of doors and many others. The resulting 'impulsiveness' scale was found to be factorially complex, and indeed it resembles much more an extraversion scale (in the variety of primary traits included), than a pure impulsiveness scale. In a similar way, Schalling (1975), in the construction of her new scale for the measurement of impulsiveness, included traits such as acting on the spur of the moment, lack of reflectiveness, lack of restraints, no anticipation, no planning, carefreeness, rapid decision and action. This scale is an extension of one formerly used, based on Sjöbring's (1973) model of personality which includes a factor called, 'solidity', which resembles general impulsiveness. In a series of factor analyses in which Sjöbring's scales were included, as well as the EPI sociability and impulsiveness scales, and several others, the EPI impulsiveness subscale and the solidity scale defined a factor essentially different from another factor defined by the EPI sociability scale and Sjöbring's 'stability' scale; however, these factors were not uncorrelated. Schalling reports that the correlation between sociability and impulsiveness decreases considerably in criminal groups (see also Blackburn, 1974).

The view that 'impulsiveness' itself is not a unitary trait is supported by the outcome of a factorial study by Twain (1957). As he states: 'The literature indicates that "impulsivity" is generally regarded as a unitary sort of behavior, similar in all instances in which it appears. Our hypothesis was that tests which measure aspects of behavioral control representative of "impulsivity" upon statistical analysis will reveal the operation of more than one factor underlying such behavior. . . The hypothesis of this study was confirmed in that the factor analysis revealed the operation of more than one factor underlying the variables under study' (p. 136).

The object of the present study was twofold. In the first place, we were concerned to discover whether items traditionally grouped under the heading of 'impulsiveness' would define a unitary factor and if not, what major factors could be identified in this field and what the intercorrelations of these factors would be with each other and with sociability. In the second place, we were concerned to discover the relationship of the emerging impulsiveness factor(s) with the major personality dimensions, E, N and P. Extraversion and neuroticism have been discussed extensively elsewhere (H. J. Eysenck & S. B. G. Eysenck, 1969); psychoticism is a less widely known personality dimension which is treated *in extenso* by H. J. Eysenck & S. B. G. Eysenck (1976). Our anticipation (based on previous published and unpublished factorial work) was that impulsiveness would break up into several factors not very closely related to each other and that these factors would correlate mainly with E and with P. It was also expected

that one of these factors into which  $Imp_B$  can be subdivided would be  $Imp_N$ , i.e. a quite specific impulsivity factor. No predictions were made for the L (lie, dissimulation) scale which was also administered as part of the EPQ (Eysenck Personality Questionnaire). A preliminary study (reported below) suggested that when typical  $Imp_B$  items were correlated and factor analysed, four major factors could be extracted from the matrix, namely  $Imp_N$ , risk-taking, non-planning and liveliness; two further experiments were carried out to test the replicability of this analysis with other samples.

### The experiment

A questionnaire containing the items of the EPQ (S. B. G. Eysenck & H. J. Eysenck, 1975) and varying sets of impulsiveness items was administered to three different populations; the items included in the impulsiveness scales were largely similar, but not identical for these populations. (Items were changed from one study to the next on the basis of psychometric results from the earlier studies.) Population 1 consisted of 126 males and 194 females; population 2 of 235 males and 375 females; population 3 of 348 males and 829 females. The members of the third group were part of our twin register and the results of the study will be analysed separately in relation to the problem of heritability of impulsiveness; here only the results of the factor analysis performed on the data will be reported.

The subjects taking part in these studies were far from constituting a random sample of the population, but in our work we have found that as far as these personality factors are concerned, social class does not have much influence (H. J. Eysenck & S. B. G. Eysenck, 1976). Consequently, the fact that our subjects would have been predominantly lower middle class, with a number of upper middle class and working class subjects included, would not seriously distort the conclusions. Age and sex were found much more important. We have analysed results for the sexes separately. As regards age for samples 1 and 2, nearly all the participants were between 20 and 30 years of age, i.e. sufficiently homogeneous to make it unnecessary to partial out age effects. Participants were students in halls of residence in various universities; technical and administrative staff; students in colleges of education; and advanced course teachers. As far as the twins are concerned, their age range and also their social class dispersion are rather wider than this; ages vary from 18 to 60.

### Results

Product-moment ( $\phi$ ) correlations were calculated between the non-EPQ items, i.e. the items supposedly measuring such traits as impulsiveness, risk-taking, planning and liveliness. The resulting matrices were factor analysed separately for three populations and two sexes, using principal components methods, extracting four factors and rotating by means of Promax (Hendrickson & White, 1964). The results of these six factor analyses are given in Tables 1, 2, 3 and 4. Table 1 shows the actual items which defined (through high loadings) the factor of *impulsiveness* ( $Imp_N$ ). The nature of the items clearly specifies the character of the factor. Indices of factor similarity (H. J. Eysenck & S. B. G. Eysenck, 1969) were all in excess of 0.95. It will be seen that the loadings for given items are very similar between samples; there is thus little doubt about the replicability of the factor. Where no loadings are given, that particular item was not included in the questionnaire administered to that sample.

Table 2 shows the loadings for the risk-taking factor. Again there is considerable agreement between samples and sexes and the nature of the items makes interpretation easy. Highest loadings appear for items 'Would life with no danger in it be too dull for you?' and 'Do you quite enjoy taking risks?'

Table 3 shows the loadings for the non-planning factor. Agreement between groups is as marked as for the other factors, with these items having the highest loadings: 'Do you like planning things carefully well ahead of time?' and 'When you go on a trip do you like to plan routes and timetables carefully?' The nature of this factor seems quite clear.

Table 1. Items defining impulsiveness ( $Imp_N$ )

	Male loadings			Female loadings		
	$I_1$	$I_2$	$I_3$	$I_1$	$I_2$	$I_3$
1. Do you often buy things on impulse?	0.42	0.44	0.31	0.49	0.46	0.52
2. Do you often get into a jam because you do things without thinking?	0.56	0.67	0.64	0.65	0.71	0.65
3. Do you generally do and say things without stopping to think?	0.68	0.67	0.78	0.71	0.77	0.70
4. Do you usually think carefully before doing anything?	-0.37	-0.45	-0.65	-0.28	-0.65	-0.51
5. Are you an impulsive person?	0.63	0.63	0.26	0.42	0.49	0.58
6. Do you often do things on the spur of the moment?	0.51	0.56	0.32	0.50	0.42	0.51
7. Do you often get involved in things you later wish you could get out of?	0.65	0.47	0.39	0.51	0.48	0.64
8. Do you mostly speak before thinking things out?	0.66	0.60	0.72	0.62	0.63	0.61
9. Do you get so 'carried away' by new and exciting ideas that you never think of possible snags?	0.51	0.60	0.51	0.61	0.41	0.51
10. Do you need to use a lot of self-control to keep out of trouble?	0.50	0.32	0.33	0.42	0.22	0.26
11. Before making up your mind, do you carefully consider all the advantages and disadvantages?	-0.29	-0.41	-0.55	-0.40	-0.56	-0.35
12. Do you get extremely impatient if you are kept waiting by someone who is late?	-	0.40	0.16	-	0.32	0.31
13. Do you hate standing in a long queue for anything?	-	0.16	-	-	0.46	-

Table 2. Loadings for the risk-taking factor

	Male loadings			Female loadings		
	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
1. Would you prefer a job involving change, travel and variety, even though it might be insecure?	0.32	0.61	0.43	0.37	0.41	0.50
2. Do you quite enjoy taking risks?	0.49	0.65	0.63	0.59	0.54	0.59
3. When the odds are against you, do you still usually think it worth taking a chance?	0.66	0.43	0.39	0.44	0.31	0.39
4. Would you enjoy parachute jumping?	0.47	0.51	0.41	0.47	0.53	0.49
5. Would life with no danger in it be too dull for you?	0.64	0.55	0.61	0.50	0.58	0.60
6. Would you enjoy fast driving?	0.15	0.31	0.47	0.48	0.53	0.45
7. Would you do almost anything for a dare?	0.07	0.33	0.37	0.55	0.39	0.47
8. Do you often change your interests?	0.12	0.38	0.30	0.11	0.39	0.25
9. When on holiday, do you look for relaxation instead of excitement?	-0.24	-0.63	-0.20	-0.25	-0.52	-0.40
10. Do you get bored more easily than most people, doing the same old things?	-	0.26	-	-	0.47	-
11. Do you often long for excitement?	0.32	0.33	0.60	0.29	0.46	0.47

Table 3. Loadings for the non-planning factor

	Male loadings			Female loadings		
	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
1. Do you like planning things carefully well ahead of time?	-0.53	-0.55	-0.75	-0.62	-0.61	-0.53
2. Do you save regularly?	-0.48	-0.43	-0.43	-0.42	-0.15	-0.33
3. Would you rather plan things than do things?	-0.39	-0.21	-0.53	-0.29	-0.33	-0.30
4. Would you make quite sure you had another job before giving up your old one?	-0.60	-0.34	-0.17	-0.34	-0.33	-0.43
5. Would regular health checks make you feel better?	-0.51	-0.14	-0.01	-0.34	-0.33	-0.38
6. When you go on a trip, do you like to plan routes and timetables carefully?	-0.53	-0.64	-0.49	-0.58	-0.58	-0.57
7. Are you rather cautious in unusual situations?	-0.60	-0.53	-0.05	-0.05	-0.32	-0.33
8. When buying things, do you usually bother about the guarantee?	-0.41	-0.16	0.08	-0.30	-0.30	-0.37
9. Do you prefer activities that 'just happen' to those planned in advance?	-0.08	0.46	0.41	0.22	0.66	0.18
10. If it were practically possible, would you like to live each day as it comes along?	0.29	0.32	0.19	-0.06	0.33	0.05
11. Do you think an evening out is more successful if it is unplanned or arranged at the last moment?	0.17	0.52	0.24	0.12	0.50	0.05
12. Would you agree that planning things ahead takes the fun out of life?	-	0.53	-	-	0.47	-
13. Are you an easy going person, not generally bothered about having everything 'just-so'?	0.12	0.29	0.29	0.20	0.39	0.40

**Table 4. Loadings for the liveliness factor**

	Male loadings			Female loadings		
	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
1. Do you usually make up your mind quickly?	0.67	0.75	0.69	0.17	0.74	0.73
2. Can you make decisions quickly?	0.50	0.67	0.77	0.12	0.79	0.77
3. Are you slow and unhurried in the way you move?	-0.17	-0.47	-0.32	-0.41	-0.20	-0.32
4. Can you put your thoughts into words quickly?	0.37	0.48	0.58	0.20	0.55	0.56
5. Do you prefer to 'sleep on it' before making decisions?	-0.57	-0.43	-0.50	-0.27	-0.42	-0.27
6. Are you usually carefree?	0.53	0.24	0.24	0.39	0.26	0.47

**Table 5.** Intercorrelations between the four factors

	Males				Females			
	Imp <sub>N</sub>	Risk	Plan	Lively	Imp <sub>N</sub>	Risk	Plan	Lively
Imp <sub>N</sub>	–	0.24	0.33	0.11	–	0.35	0.41	0.24
Risk	0.32	–	0.22	0.21	0.26	–	0.38	0.12
Plan	0.37	0.12	–	0.20	0.42	0.18	–	0.32
Lively	0.16	0.09	0.35	–	0.23	0.19	0.31	–

**Table 6.** Relation between impulsiveness and P, E, N and L

	Males			Females		
	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
P	0.41	0.32	0.29	0.24	0.27	0.28
E	–0.13	0.05	–0.09	0.21	–0.02	0.14
N	0.54	0.51	0.35	0.59	0.28	0.47
L	–0.47	–0.24	–0.19	–0.49	–0.17	–0.19

**Table 7.** Relation between risk-taking and P, E, N and L

	Males			Females		
	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
P	–0.13	0.22	0.24	0.47	0.22	0.19
E	0.27	0.22	0.36	0.05	0.48	0.16
N	–0.12	–0.01	0.15	–0.08	0.19	0.08
L	0.04	–0.03	–0.12	0.01	–0.32	–0.10

Table 4 shows the loadings for the liveliness factor, which emerges equally clearly and replicably as do the other three factors.

The intercorrelations between the factors may be of interest; if all of them are components of extraversion (or of psychoticism), then they should intercorrelate positively. Table 5 shows the intercorrelations between the four factors, for males and females separately; sample 2 is shown above the leading diagonal, sample 3 below. Sample 1, being the smallest and more in the nature of a preliminary try-out of the scales, is not given. It will be clear that all the correlations are positive, but much lower than the products of the reliabilities of the scales; these range for the most part between the 70s and 80, and will be given later.

How are these four factors related to P, E, N and L, as measured by the EPQ? These scales were reflected into the four-factor space delineated in our factor analyses, using a method described in H. J. Eysenck & S. B. G. Eysenck (1969) and the results are shown in Tables 6 (impulsiveness), 7 (risk-taking), 8 (non-planning) and 9 (liveliness). Results are given separately for men and women and for the various samples used; there is considerable agreement over groups. Taking impulsiveness (Imp<sub>N</sub>) first, it seems clear that this factor is closely related to P



**Table 8.** Relation between non-planning and P, E, N and L

	Males			Females		
	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
P	0.18	0.30	0.16	0.03	0.30	0.19
E	0.12	-0.02	-0.04	0.03	0.03	-0.07
N	-0.39	-0.22	-0.15	-0.22	-0.27	-0.31
L	-0.20	-0.04	-0.00	0.06	-0.00	-0.14

**Table 9.** Relation between liveliness and P, E, N and L

	Males			Females		
	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
P	-0.01	-0.04	-0.14	-0.18	-0.02	-0.14
E	0.43	0.36	0.31	0.59	0.26	0.39
N	-0.30	-0.09	-0.28	-0.41	-0.38	-0.32
L	0.08	0.01	-0.01	0.01	0.05	0.11

and N (positively) and to L (negatively). Impulsiveness in its narrow form, is apparently a somewhat pathological trait which is not essentially related to E in its pure form.

Risk-taking shows a clear relationship (positive) with extraversion and an almost equally clear one with P. It is doubtful if there is any relationship with N or L, figures differing for different samples.

Non-planning is positively related to P and negatively to N; of the two semi-pathological groups, it appears that pseudo-neurotics plan, pseudo-psychotics do not. This is perhaps what one would have expected on *a priori* grounds and in view of what is known about their pathological components. There is no obvious relationship with E or with L.

Liveliness clearly correlates with E (positively) and with N (negatively). It does not seem to relate at all with P or L. Again these results are not surprising, in the light of previous work and of common sense.

A more detailed analysis has been made of the results for our second sample, which is much larger than our first and more representative than our third, composed as it is entirely of twins. For the purpose of further analysis, we constructed a 13-item scale of sociability from those items in the EPQ which most obviously related to this concept and which in previous work had shown the highest loadings on sociability factors. Table 10 shows the means and s.d.s for the various scales mentioned so far, including a total 'impulsiveness' scale made up of the four scales whose intercorrelations are shown in Table 5. The table also shows the reliabilities of the various scales.\*

Calculations were made of the correlations between the various scales used and these are shown in Table 11. Some of these correlations are not very meaningful because they incorporate replicated scores. Thus the correlation between E and sociability is very high because the E

\* The intercorrelations between scales suggest that 'liveliness' belongs with 'sociability' and E rather than with Impulsiveness<sub>B</sub>, and that a total 'impulsiveness' scale would be more homogeneous if made up of the other three scales only. We have recomputed the reliabilities and means of the total impulsiveness so constituted. Reliabilities change hardly at all ( $r = 0.83$  and  $0.87$  for males and females). The means are  $19.20 \pm 6.41$  and  $18.56 \pm 7.34$ .

**Table 10**

	No. of items	Males		Females		Reliabilities	
		Mean	S.D.	Mean	S.D.	M	F
Imp <sub>N</sub>	13	6.53	3.25	6.75	3.40	0.79	0.82
Risk	11	6.08	2.66	5.05	2.79	0.71	0.74
Non-plan	13	6.59	2.62	6.77	2.83	0.66	0.72
Lively	6	3.40	1.67	3.15	1.62	0.58	0.57
Total	43	22.60	7.06	21.71	8.02	0.83	0.87
P	25	4.69	3.13	2.73	2.37	0.66	0.63
E	21	13.46	4.72	13.02	4.87	0.84	0.86
N	23	11.71	5.28	13.31	5.20	0.85	0.86
L	21	4.96	3.54	6.70	3.85	0.77	0.78
Soc	13	8.53	3.32	8.47	3.23	0.83	0.82

**Table 11**

	1	2	3	4	5	6	7	8	9	10
(1) Impulsiveness (Imp <sub>N</sub> )	—	0.43	0.32	0.22	0.08	0.79	0.48	0.19	0.37	-0.30
(2) Risk-taking	0.45	—	0.26	0.18	0.15	0.71	0.40	0.29	0.20	-0.13
(3) Non-planning	0.50	0.52	—	0.22	0.07	0.67	0.41	0.13	-0.04	-0.12
(4) Liveliness	0.33	0.22	0.24	—	0.35	0.49	0.10	0.45	-0.15	0.02
(5) Sociability	0.18	0.39	0.22	0.28	—	0.20	-0.08	0.93	-0.11	-0.02
(6) Total impulsiveness	0.83	0.76	0.80	0.50	0.34					
(7) P	0.47	0.47	0.53	0.21	0.12					Male
(8) E	0.28	0.50	0.29	0.39	0.94					
(9) N	0.13	0.09	-0.13	-0.31	-0.17					Female
(10) L	-0.29	-0.37	-0.23	-0.05	-0.15					

scale contains all the sociability items. Similarly, the total impulsiveness score incorporates all the subscales numbered 1 to 4 in the table. However, the correlations are given for the sake of completeness. A number of results emerge from the analysis: (1) The scales intercorrelate in a manner not dissimilar for males and females. (2) The scales intercorrelate in a manner not dissimilar to that in which the factors correlate (see Table 5). (3) Correlations between scales are higher for the women than for the men. (4) Sociability correlates positively with all the impulsiveness scales, both for the men and for the women, suggesting that sociability and impulsiveness (Imp<sub>B</sub>) can justifiably be combined into a more inclusive factor of extraversion. (5) Imp<sub>N</sub> has only quite small correlations with sociability and somewhat larger but still not very large ones with E; it belongs more clearly with P and to a lesser extent with N and L (negatively with the latter) than with E. (6) Risk-taking belongs almost equally with E and P, and negatively with L; correlations with N are small. (7) Non-planning belongs with P and somewhat less with E; there are slight correlations (negative) with N and L. Liveliness belongs with E and slightly with P; it also has slight negative correlations with N. (8) The total impulsiveness scale (Imp<sub>B</sub>) correlates 0.20 for men and 0.34 for women with sociability and 0.35 for men and 0.48 for women with extraversion, reinforcing our point (4). (9) Correlations of Imp<sub>B</sub> with P are 0.55 for men and 0.59 for women, clearly aligning it more closely with P than with E. (10) Correlations of Imp<sub>B</sub> are 0.19 for men and -0.02 for women with N, i.e. psychologically insignificant.

- (11) Correlations of  $Imp_S$  with L are negative ( $-0.22$  for men and  $-0.34$  for women).  
 (12) Correlations with P are particularly impressive because the reliability of that scale was somewhat low in the groups here tested; if we were to correct all correlations for attenuation, those for P would increase disproportionately.

### Discussion

Our findings suggest that there are several quite separate factors involved in what is often supposed to be a general trait of impulsiveness ( $Imp_B$ ). These traits are correlated with each other, but they also correlate with sociability, suggesting that they belong into the circle of traits which go to make up extraversion as a higher-order factor. There is also a tendency for these traits to correlate with psychoticism, suggesting that they lie on a plane formed by the E and P factors; some scales also have loadings on N. This is particularly true of  $Imp_N$ , which has hardly any loading on E, suggesting that this trait is somewhat pathological, with high correlations with P and N, the two abnormal scales. This finding suggests that both sides to the original controversy were right. Impulsiveness, defined as  $Imp_N$ , is only slightly related to sociability and somewhat more closely to E; nevertheless, these correlations, though positive, do not suggest that  $Imp_N$  has any strong affinity to extraversion. Impulsiveness, defined as  $Imp_B$ , however, correlates well with sociability, and even better with E; this is the essence of Eysenck's original suggestion. It is clearly important, in discussing these matters, to discriminate most carefully between the two meanings of the term, impulsiveness. The position here appears to be rather similar to that which obtains with respect to sensation seeking (Zuckerman, 1974). Here also a broad concept can be seen to break down into several more narrow ones upon factor analysis (Farley, 1967; Zuckerman & Link, 1968; Zuckerman, 1971). These factors are TAS (thrill and adventure seeking), ES (experience seeking), Dis. (disinhibition), and BS (boredom susceptibility); the correlations between these scales fall far short of the products of their reliabilities. The scales show a differential pattern of correlations with P, E and N (Zuckerman, 1974); E seems to correlate positively with all scales, but most markedly with TAS and Dis., and only slightly with ES and BS. P correlates only with BS, although it should be said that the P scale used was a preliminary form and the later version incorporated in the EPQ might reveal higher correlations with other SS scales. The relationship with the four  $Imp_B$  scales has not yet been investigated but a study is under way.

It is clear that both  $Imp_N$  and  $Imp_B$  have a strong pathological component, both of them correlating even more highly with P than with E. This fact makes it difficult to use impulsiveness items in the construction of P and E scales, as such items will tend to have high loadings on both factors and if included in either or both, will produce positive correlations between what are otherwise orthogonal factors. It was, in fact, our experience of these difficulties in constructing the P scale (H. J. Eysenck & S. B. G. Eysenck, 1976) which gave the main impetus to the carrying out of this experiment. Possibly the best solution to this problem is to eliminate such items from the P scales and to use, if wanted, a separate impulsiveness scale made up of the various items here discussed, calculating both separate and total scores. This is the solution we have adopted in the construction of the EPQ; a final impulsiveness scale is obtainable from the authors, to be used in addition to the EPQ if wanted. The fact that many socially abnormal groups (criminals, psychopaths, etc.) lie in the plane marked out by P and E, and have high impulsiveness scores, may make such an additional scale useful for practical purposes.

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