

The personality of physicists

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Summary—The Eysenck Personality Profiler (EPP) was given to 109 male and 133 female physicists and comparisons made with male and female population norms. Results confirm previous research with male scientists, showing them to be introverted and cautious (particularly careful, controlled, inhibited and unsociable). They were not, however, especially stable relative to same-sex controls. The personality profile of the female physicists showed a similar pattern to that of males (as regards comparisons with gender norms). Although significantly more tough-minded than women at large, female physicists could not be described as generally masculine.

INTRODUCTION

The stereotype of a scientist is that of an 'egghead', eccentric, detached from reality, and so focused on his theories that he is hardly able to dress himself properly, let alone function socially. (Einstein was reputed to have appeared in public wearing only one sock.) This is an unflattering image, and almost certainly exaggerated, but is there any amount of truth in it?

There have been few empirical studies of the personality of scientists. Cattell (1963) tested 140 eminent researchers in physics, biology and psychology on the 16PF and found that they departed from the adult male norm on several factors. They were higher in intelligence, more schizothymic (withdrawn), dominant, inhibited, emotionally sensitive, radical and self-sufficient. Physicists were particularly high in schizothymia, whereas psychologists were less inhibited and more dominant. Compared with both general population norms and high intelligence control groups (such as administrators and teachers) researchers appeared as generally introverted (withdrawn, internally preoccupied, inhibited and self-sufficient). Cattell went on to show that creative people in art and literature shared a similar profile to that of researchers, so introversion seems to be characteristic of creativity in general, rather than science *per se*.

Cattell further suggests that *success* in creative fields may depend upon a quality of 'impatient masculinity' which leads some people to want to 'make history rather than contemplate it'. This, he says, is what distinguishes men like Pasteur and Galileo from contemporaries who were equally prominent at the time.

More recent reviews of research on the personality of creative scientists (e.g. Simonton, 1988) confirm the general picture provided by Cattell. Scientists are typically introverted, though motivational factors such as ambition and assertiveness appear to be more important in determining productivity and fame.

Eysenck and Eysenck (1975) give EPQ norms for a sample of 31 male scientists, showing them to be somewhat introverted, stable and low on P. Although only 9 female scientists were available, the same characteristics seemed to apply.

In this paper we report a detailed examination of the personality of physicists using the Eysenck Personality Profiler (EPP; Eysenck & Wilson, 1991). This test works basically within the P-E-N system but divides the superfactors into 21 primary traits each of which has some internal coherence (Eysenck, Barrett, Wilson & Jackson, 1992).

This study goes beyond previous work in that we were able to obtain a large sample of female physicists to compare with both male physicists and female norms. Since physics is traditionally a male speciality, it was thought interesting to investigate the question of whether female physicists present a personality profile that is generally more masculine than women at large.

METHOD

The EPP was sent to a sample of 600 members of the Institute of Physics with a request for it to be completed anonymously and returned by post. This sample was stratified to comprise equal numbers of men and women, and equal representation of three main specialities: industry, research and teaching. The return rate was 40% (109 males and 133 females). This compares favourably with postal surveys of this type, though it remains possible that those who replied are in some sense different from those who did not.

RESULTS

Results are shown in Table 1. Given the large sample involved, physicists differ from same-sex norms on many of the traits. In order of *t*-values the female physicists are controlled, careful, inhibited, responsible, unsociable, and tough compared with female norms. Male physicists are characterized as careful, unsociable, controlled, inhibited, submissive and unadventurous. It follows that both male and female physicists appear as introverted and cautious on the superfactors (equivalents to E and P).

Although physicists (both male and female) are significantly free of guilt relative to same-sex norms, and the males slightly more anxious, emotionality does not emerge as a major area distinguishing physicists from same-sex controls. Dissimulation scores were elevated for female physicists only.

Table 1. Comparisons of male and female physicists with male and female norms on EPP variables

Trait	Population means		Population SD (M/F)	Physicists male		Physicists female		t males (df = 107)	P males (df = 107)	t females		P females (df = 132)
	Male	Female		mean	SD	mean	SD			males	females	
1. Active/Inactive	12.94	13.59	7.39	17.04	7.65	15.29	7.43	-5.58	<0.001	-2.64	<0.01	
2. Sociable/Unsociable	13.06	13.63	8.18	21.11	8.91	19.77	8.55	-9.42	<0.001	-8.28	<0.001	
3. Expressive/Inhibited	23.07	21.29	6.28	26.62	5.19	16.16	6.25	-7.14	<0.001	-8.98	<0.001	
4. Assertive/Submissive	15.34	18.03	7.31	20.06	7.18	20.28	7.63	-6.86	<0.001	-3.40	<0.001	
5. Ambitious/Unambitious	17.64	19.19	7.97	22.30	8.02	21.06	6.73	-6.06	<0.001	-3.21	<0.01	
6. Dogmatic/Flexible	25.02	25.97	5.71	26.03	5.44	26.56	5.24	-1.93	NS	-1.30	NS	
7. Aggressive/Peaceful	26.05	27.97	6.70	28.30	6.35	30.09	5.94	-3.74	<0.001	-4.10	<0.001	
8. Inferiority/Self-esteem	31.51	27.30	8.47	29.71	7.70	26.93	8.51	2.44	<0.05	0.49	NS	
9. Unhappy/Happy	32.65	30.33	8.34	31.73	7.95	30.53	8.42	1.21	NS	-0.27	NS	
10. Anxious/Calm	30.60	25.89	8.45	27.84	7.97	26.21	7.53	3.61	<0.001	-0.49	NS	
11. Dependence/Autonomy	32.17	30.00	6.51	31.71	5.50	30.88	5.97	0.88	NS	-1.69	NS	
12. Hypochondria/Sense of health	36.58	35.48	4.53	36.84	3.36	36.16	3.49	-0.79	NS	-2.26	<0.05	
13. Guilt/Guilt freedom	32.67	31.14	7.04	34.40	4.77	33.30	5.04	-3.78	<0.001	-4.94	<0.001	
14. Obsessive/Casual	27.45	26.92	6.56	28.47	6.36	26.58	6.38	-1.67	NS	0.60	NS	
15. Risk taking/Careful	18.69	20.05	6.91	24.17	6.05	26.27	6.29	-9.46	<0.001	-11.41	<0.001	
16. Impulsive/Control	21.77	19.85	7.58	26.73	7.14	27.03	6.93	-7.25	<0.001	-11.94	<0.001	
17. Irresponsible/Responsible	22.96	22.57	7.16	24.99	6.05	27.09	6.01	-3.50	<0.001	-8.66	<0.001	
18. Manipulation/Empathy	22.13	25.05	6.59	26.02	6.33	27.30	5.38	-6.40	<0.001	-4.82	<0.001	
19. Sensation seeking/Unadventurous	17.13	20.93	7.80	20.71	6.22	24.13	7.18	-5.99	<0.001	-5.14	<0.001	
20. Tough minded/Tender minded	15.44	26.33	7.70	16.86	4.82	23.12	5.24	-3.08	<0.01	7.05	<0.001	
21. Practical/Reflective	19.85	21.30	7.44	22.51	7.37	22.24	6.45	-3.75	<0.001	-1.69	NS	
22. Dissimulation	12.08	13.35	7.00	13.11	6.70	16.03	7.27	-1.60	NS	-4.25	<0.001	
23. Extraversion/Introversion	19.02	19.95	7.08	23.07	4.39	22.74	4.31	-9.62	<0.001	-7.48	<0.001	
24. Emotional/Stable	31.95	29.58	7.13	31.53	4.57	30.08	4.56	0.96	NS	-1.28	NS	
25. Adventure/Caution	19.71	22.30	7.31	23.14	3.41	25.31	3.40	-10.50	<0.001	-10.21	<0.001	
26. Can't Decide	25.99	33.11	34.53	31.66	30.70	38.46	35.15	-1.92	NS	-1.75	NS	

Possible scores range from 0-40. A low score indicates a similarity to the antithetical adjective to the left (e.g. Active) and a high score indicates a similarity to the antithetical adjective to the right (e.g. Inactive).

DISCUSSION

These results confirm the picture of physicists as somewhat socially withdrawn and show that this applies to female physicists as well as males. It also confirms that physicists (both male and female) are generally low on P (cautious). There was, however, little sign that they are especially stable, as suggested by EPQ norms. On most of the 'N' traits they were hardly distinguished from the population norms; in fact, male physicists were slightly more anxious than male controls.

Female physicists do not show a particularly masculine pattern of traits overall. On 16 out of the 21 traits they are more similar to female norms than male norms. This even applies to the 'tough-tender' trait, which is the one that distinguishes males from females most sharply in the general population (indeed, it was previously described as 'maculinity-femininity'). This trait is interesting in that female physicists are 'tougher' than female norms, whereas male physicists are 'tender' in relation to male norms; nevertheless, the size of these differences is small (amounting to only about two items differently answered) so they are unimportant for practical purposes. In fact, there are two items in this scale that actually refer to an interest in science, which would be sufficient to account for the difference. On the other hand, the elevated dissimulation score for the female physicists suggests they may have some sensitivity concerning the way in which they are perceived by others.

We conclude that physicists are careful, controlled, inhibited and unsociable as a group (whether male or female), but not to an extent that could be called clinically significant. Female physicists, although appearing slightly 'tough' in relation to female norms, do not present a profile that could be described as masculine overall. However, recalling that our response rate was only 40% of those initially canvassed, it is possible that the present sample was in some way biased (perhaps in an anxious/feminine direction). Cooperation is usually greater from women, as it was in this instance.

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