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Personality and the experimental study of education

HANS J. EYSENCK*
Institute of Psychiatry, University of London, UK

Abstract

Literature is reviewed suggesting that a child's personality determines to a large extent his or her reaction to specific methods of teaching, and even to the whole ethos and atmosphere of the teaching situation. Thus, extraverted children benefit from being taught along the lines of discovery learning, *while introverted children benefit from being taught along the lines of* reception learning. *The apparent lack of difference in achievement in groups taught by these methods hides the large individual differences factor that appears in the interaction term. It is suggested that facts of this kind should be of considerable concern to those who design our courses for future teachers, and for teachers generally. We owe our children care in the design of methods for teaching, and personality differences play an important part in such design.*

INTRODUCTION

Thinking in education, as in many other areas—from social to experimental psychology—tends to proceed in terms of *general laws*, and to disregard *individual differences*. Cronbach (1957) emphasized the important truth that the two scientific disciplines of psychology, the correlational and the experimental, were hardly on speaking terms, and that a unification of psychology, bringing these two sides together, was essential if we were ever to have a truly scientific paradigmatic psychology. I have tried to achieve such a unification in the field of personality by adding a *causal* to the usual purely *descriptive* treatment of personality. Figure 1 shows in diagrammatic form the causal stages involved in trying to predict a variety of social behaviours in terms of personality constructs (Eysenck, 1984). Education and achievement are such *distal consequences* of personality, and it is the purpose of this paper to put flesh on this proposition in terms of a number of empirical studies.

Consider the usual facts of educational innovation. A new method of teaching is proposed, and enthusiastically welcomed by many teachers; other teachers voice

*Correspondence concerning this article should be addressed to H. Eysenck, Institute of Psychiatry, Denmark Hill, London SE5 8AF, UK.

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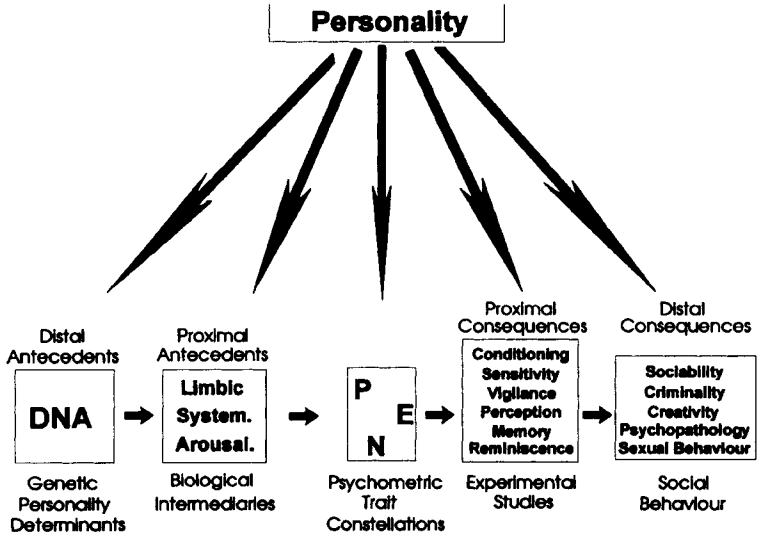

Figure 1. A schematic outline of personality theory indicating causal antecedent and consequent relations of personality variables

criticisms. The method receives official approval, is widely used, and much is claimed for it. Eventually, scientific evaluations are published, some of which seem to suggest that the method is successful, while others seem to suggest that it is a failure. Finally, meta-analyses are published to show that the new method is neither more nor less successful than the methods that preceded it. (Similar developments are observed in other social areas, such as criminality; new ideas emerge, are cherished for a time, but finally turn out to make little difference to recidivism, or whatever is the test used to establish validity.)

The fundamental error in such a procedure rests on the assumptions that a given method affects all children equally. This is unlikely on *a priori* grounds—it seems very improbable that bright and dull, anxious and stable, extravert and introvert would react *identically* to the new regime. By assigning individual differences variables to the error term, such methodologies run the danger of leaving the major experimental variables exposed to disproof, or at least to accounting for very little of the total variance. Even in experimental psychology it can be shown that the hypothesis of *equal effect* of experimental variables on all subjects is untenable (Eysenck, 1984) and that individual differences variables interact powerfully with the experimental variables.

Consider as an example the Kleinsmith–Kaplan (1963; 1964) theory of *action decrement*. They proposed that degree of arousal at the time of learning paired associates determined the course of remembering. High arousal produced a high degree of consolidation of the memory trace, but while consolidation was going on the memory trace was not available for retrieval. A low degree of arousal produced little consolidation, but left the memory trace free for retrieval. Hence the prediction that recovery of the memory trace (recall) was a function of the degree of arousal at the time of learning. There is some experimental support for the theory, but it is rather weak (Eysenck and Eysenck, 1985). Why? The authors never considered

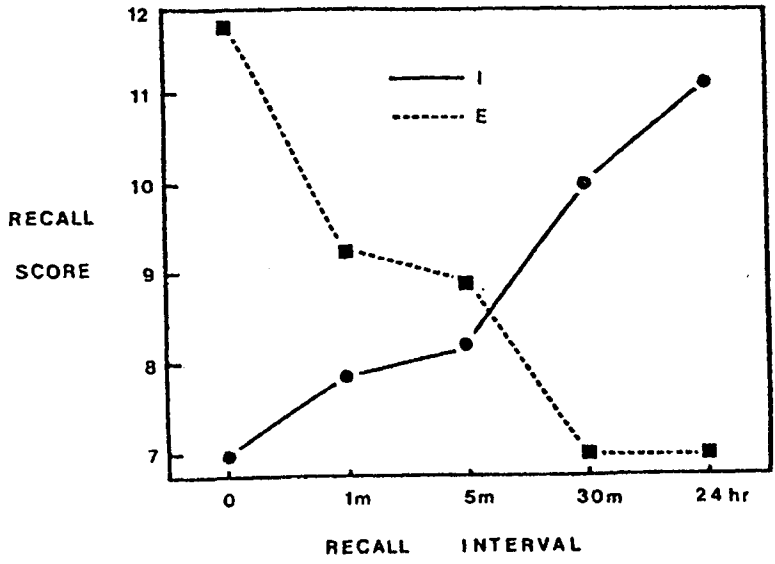

Figure 2. Recall as a function of personality and delay (Howarth and Eysenck, 1988)

individual differences in arousability. According to theory, introverts are more highly arousable than extraverts, and under identical learning conditions should show more action decrement (suppression of retrieval while consolidation is going on) than extraverts. Howarth and Eysenck (1968) have shown that this is so; over time extraverts forget, introverts improve retrieval (Figure 2). This is only one of many illustrations of the simple fact that psychological laws always apply to individuals, and that individuals bring their own cognitive and personality characteristics to the task. To pretend that subjects of experimental, educational, social, and other experiments, behave as if they were monozygotic twins is inherently absurd, and leads to highly undesirable consequences. One example from the educational field will demonstrate this fact.

Before discussing this example, it may be relevant to point out that such interactions as I have posited appear to be much easier to discover in relation to personality than to ability. Several researchers have commented on the absence of such interactions in the cognitive abilities field (Bracht, 1970; Cronbach and Snow, 1969; Gage and Unruck, 1967). It may be that ability × treatment interactions could be more frequently observed if personality were to be included in a triple (ability × treatment × personality) interaction. Obviously, such triple interactions require complex experimental designs, and are only likely to be meaningful if the whole experiment is based on a proper theoretical analysis of the problem.

PERSONALITY AND DISCOVERY VERSUS RECEPTION LEARNING

In the 1950s and '60s, there was much argument concerning a new method of teaching called 'discovery learning', which was contrasted sharply with 'reception learning'. It was argued that youngsters would learn material of all kinds better if

they were asked to discover facts and theories for themselves, rather than having them presented in formal lectures. This new method was embodied (in England) in the so-called Nuffield programmes, largely financed by Lord Nuffield. There never was any empirical demonstration of the alleged superiority of the discovery method, but commercial interests (publishing new textbooks, materials, etc.) won the day, and the new methods were adopted. Gradually, empirical studies began to appear which failed to show any substantial or replicable differences in outcome between these two methods of teaching, and enthusiasm began to wane, although discovery learning is still favoured by some teachers. Internationally, similar debates have been carried out in many countries.

Traditionally, one might have concluded that the absence of major effects demonstrated that style of teaching had no impact on pupil achievement. Alternatively, it might be that for some pupils one method was preferable, for others the other, with the advantages and disadvantages cancelling out. Testing such a possibility, of course, demands having a personality theory that could make relevant predictions; chance choice of the 1000+ concepts that bedevil personality measurement would be unlikely to generate positive results. Leith (1974) proceeded to examine the possibility that the greater readiness of extraverts to become bored by routines but be likely to respond to stimulus variation, and of introverts to be disturbed by changes of set but able to maintain attentiveness to a highly prompted task, would result in a method × personality interaction. Teaching materials for a course in genetics (for naive students) were carefully prepared to give equal amounts of learning and transfer in randomly chosen groups of students; 'the materials were so chosen as to cover a range of personal discovery, tolerance for uncertainty and error-making as well as a difference which may be described as plunging into the deep end or stepping into the shallow end of the pond' (Leith, 1974, p. 15). Two hundred students took part in the experiment, and were tested 1 week, and again 5 weeks after the end of the course, with a series of largely transfer items. Non-anxious subjects were better learners than anxious subjects, but the major finding was a highly significant interaction effect between personality and method; this is illustrated in Figure 3. On both testing occasions introverts and extraverts learned equally well *on average*; thus there is no overall superiority of one method over the other. But extraverts learned much better than introverts with the discovery method, while introverts learned much better than extraverts with the direct teaching ('reception') method. For the second test, the difference in score between extraverts and introverts is 30 versus 18, that is, extraverts do almost twice as well as introverts! This is a tremendous difference. This experiment illustrates very clearly the danger of comparing different methods of teaching without measuring personality at the same time, and looking for different reactions of different personality types to the methods of teaching under examination.

Yet another example is provided by a study in which Leith and Trown (1970) studied the optional placing of rules in school learning tasks. The learning task was a programme on vectors from which rules were abstracted and given either before or after sections of the programme containing practice examples. In general, the evidence favoured superiority of rules following practice, but there was also a significant interaction with personality. Both post- and transfer tests showed that this occurred because the 'rules before' was significantly poorer than the 'rules after' condition for extraverts of both above and below average ability, while there were no

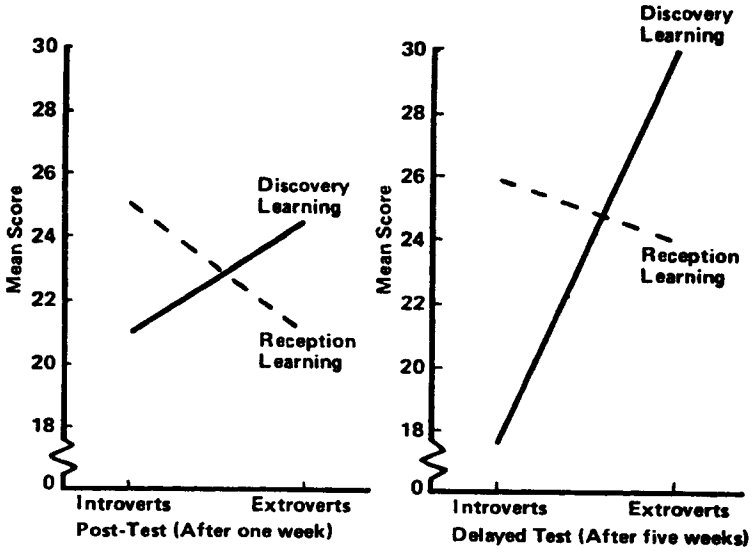

Figure 3. Effects of discovery and reception learning on extraverted and introverted children (Leith, 1974)

significant differences between the treatments for introverts. Tables of results are given by Eysenck (1978).

THE GENERALITY OF PERSONALITY–INSTRUCTION INTERACTION

The interaction between extraversion–introversion and discovery versus reception learning is not the only example of interaction between personality and instruction.

Teacher training is another area in which the introduction of personality concepts can make important contributions. Consider an unpublished study by Leith and Britton (Eysenck, 1978), in which they experimented with the newly developed technique of 'microteaching'. This is a system of teacher training by means of which individual skills of teaching are identified and particular skills are practised by students who receive feedback about their performance. The complexity and stress of fully fledged teaching situations are further reduced by employing small classes (e.g. five pupils) and brief practice sessions (e.g. 5–10 min). Thus the trainee is able to focus on one aspect of teaching at a time in order to gain mastery, defects in teaching performance are revealed in feedback sessions (usually by means of videotape playback), and errors can be overcome through further practise with different microclasses. In the experiment to be discussed, seminars were held with students of education, emphasizing two particular teaching skills—set induction and reinforcement. In addition to these seminars, students participated as pupils in microclasses of four students. They received instruction and, at the end of the 'lesson', completed a schedule which evaluated the teacher's performance. Half of the students, as well as their microclass participation, also had experience of microteaching. They prepared miniature lessons, delivered them in the television-studio classroom, and then,

with the help of the teaching supervisor, analysed the videotape recording of their performance. Following this the 'student–teachers' taught their lesson again with a new class of students. A control group not receiving experience of microteaching completed the design of the experiment, which thus has three randomly selected groups of students: (i) controls, (ii) students receiving microteaching only (microclass), and (iii) students receiving microteaching and also practising microteaching with feedback (microteaching). Complex evaluation methods were used, separating out intellectual (A) and performance (B) aspects of teaching.

On the scales used, extraverts and introverts showed quite different results. Both did poorly in the control group, where conventional instruction was given, and both did well in the microteaching condition. The results for extraverts and introverts, respectively, are 17.83 and 19.38 for the controls, and 23.23 and 26.16 for the microteaching group; the two evaluation indices gave similar results to those first given, and are therefore not given in detail. For participation in the microclass, however, extraverts showed a powerful positive effect (26.00), while the introverts showed no effect at all (score 18.78). Thus the most effective way of employing this very expensive method of teacher training would seem to be one in which introverts are used as microteachers, and extraverts as microstudents only; this would optimize results, and, if the results of this study can be generalized, improve efficiency for both groups by something like 40 per cent. Obviously, replication is required, and extension to other areas of instruction can at the moment only be based on extrapolation without a firm basis; nevertheless, the main point remains that personality interacts with teaching method to a very significant extent.

The interaction effect may be used to act as a therapeutic agent when properly analysed. Leith (1974) studied the effects of pairing children, like or unlike each other with respect to neuroticism, in a learning situation. Quite extraordinary improvements over 'same' pairings were shown by the 'opposite' pairs. 'Unlike' pairs spent 49 per cent less time in antagonistic activities and 121 per cent more time making for orientation, information, and continuation than 'like' pairs. 'Unlike' pairs achieved 74 per cent more in the post-test and 98 per cent more in the transfer test than some anxiety pairs. When extraversion–introversion was the basis of pairing, homogeneous pairs worked better than heterogeneous pairs, regardless of whether the pair was made up of two extraverts or two introverts.

Pairing of heterogeneous children, one of them anxious, the other not, would be one way of actually combating the negative effects of anxiety; another way is suggested in an experiment by Trown and Leith (1975). Almost 500 boys and girls took part in the experiment which contrasted the effects of 'supportive' and of 'explorative' strategies in mathematics teaching in four junior schools, the mean age of the children being 10 years and 6 months.

In the case of the supportive strategy, the sequence employed, over each of the 12 sections of learning material, was that of teacher-provided statement of organizing principle, followed by related pupil activity with mathematical models, and subsequent restatement of principle by the teacher. Such statements were both spoken and written on the blackboard. The same activities with models were used in the exploratory strategy, but this time at the beginning of each section of the learning sequence. Each statement of principle by the teacher was now delayed until pupils had been given the opportunity to perceive the relationship themselves and had been encouraged to attempt an appropriate generalization.

Table 1. Strategy–anxiety interaction (by sex). Mean scores for retained learning

	Boys (N per cell = 40)		Girls (N per cell = 40)		All pupils (N per cell = 40)	
	Low anx.	High anx.	Low anx.	High anx.	Low anx.	High anx.
Supportive	15.98	15.26	16.63	17.73	16.30	16.49
Exploratory	20.30	12.33	18.30	14.25	19.30	13.29

Results are shown in Table 1. Anxiety level distinguished between those who were able to profit greatly from the learner-centred exploratory approach and those whom it clearly handicapped. The teacher-centred supportive strategy, on the other hand, was almost equally effective at each level of anxiety. Overall differences (i.e. neglecting the personality interaction) between strategies were minimal, thus neglect of the personality dimension would have led to the quite erroneous conclusion that strategies were identical in their effects. It may be noted that in this experiment there was an ability effect (in the expected direction) but no ability–treatment interaction. The results of the experiment, as the authors emphasize, are very germane to an evaluation of the Nuffield mathematics scheme, suggesting that this may improve the performance of some (non-anxious) children, and make worse the performance of other (anxious) children. Such a conclusion cannot of course be based on the results of a single experiment, and cannot be extrapolated to other subjects, but it does suggest the importance of proper experimental investigations of interaction effects.

This last experiment, harking back again to the discovery method, shows how complex the interaction with personality can be, involving both extraversion and neuroticism. Leith (1974) himself commented that 'The evidence presented above does not lead to definitive conclusions which can be applied immediately with confidence in classrooms. It can be claimed, however, that the repeated findings of interactions between personality (as measured by neuroticism and extraversion scales) and instructional methods (defined in terms of both global differences and experimentally manipulable variations) require that educationists pay serious attention to the need for adapting learning situations to learners. It is probably a reflection on our teaching methods in schools, colleges and universities that general surveys of what characterizes good students have brought out that introverts are frequently higher in academic achievement' (p. 22).

Clearly there is much room here for further research. It seems sad that little is in fact being done; a survey of the past 20 volumes of the British and American Journals of Educational Psychology reveals hardly any relevant studies.

PERSONALITY AND SCHOLASTIC ACHIEVEMENT

Both neuroticism and introversion are related to scholastic achievement, and both show a curvilinear relation with age. Leith and Davis (1972), looking at the correlation between scholastic achievement and neuroticism in groups of 12–13 years old, 13–14 years old, and at student level, found that for the youngest children there

was a positive correlation, for the older ones no correlation, and for the students a negative correlation. A possible reason may be the increasing stress as education becomes more strict and formalized, and highly emotional children may react negatively to this stress. Following the Hull–Spence theory of anxiety as a drive variable (Eysenck, 1973), neuroticism in young children might have a positive effect because of its motivational aspects. It seems likely that neuroticism would interact with ability, in the sense that more able children would benefit from the drive properties of neuroticism, without suffering the effects of anxiety, while duller children would experience anxiety because of constant threat of failure. Much remains to be done in this field before we can be certain about the nature of the relationship.

In a similar manner, high extraversion scorers seem to be handicapped as compared with low extraversion scorers as far as secondary school and university education are concerned. In primary school high extraversion scorers seem to do well, and even better than low extraversion scorers (Elliott, 1972; Entwistle, 1972; Eysenck and Cookson, 1969; Wilson, 1972). The cause of this reversal from primary to secondary school is not precisely known, but it seems possible that it is related in part to the change from the free-and-easy atmosphere at primary school, which accords well with the extraverted, and possibly the anxious temperament, to the more formal atmosphere at secondary school and university, which agrees better with the introverted temperament (Banks and Finlayson, 1973). In partial support of this suggestion may be cited a study in which children were tested at a school which combined primary and secondary classes under the same roof, and in which both were equally formal; here correlations with personality were similar for both the younger and the older children (Whitlock, 1969).

An interesting alternative theory for the reversal of the extraversion–attainment correlation has been suggested by Anthony (1973). There is good evidence that the time-course of the development of extraversion shows an increase up to the age of 13 or 14 years, followed by a decrease into middle-age and beyond. Ability, on the other hand (as shown by conventional IQ scores) apparently continues to increase until the twenties. These two different developmental courses would, according to Anthony, produce the observed cross-over relationships. Speaking of the personality development, he says 'that a child who is consistently early in this development would at first be more extraverted than his age-mates, but he would reach his peak sooner than they, and in later years would be less extraverted (more introverted) than his age-mates. Similarly, a consistently late developer would in early years be more introverted than his age-mates, but in descending, late, from the peak, he would in these later years be more extraverted than his age-mates. The occurrence of early and late peaks in the development of a measured characteristic tends to invert the rank order of individuals in the characteristics, i.e. it tends to reduce the re-test reliability over the period where the peaks are occurring. This would account for the low re-test (stability) correlations in Eysenckian extraversion mentioned by Entwistle (1972, p. 146).'

Anthony (1973) then invites us to suppose that, at any given time, a person who is ahead of his age-mates in the development of extraversion is also likely to be ahead in the development of ability, and that, similarly, a person who is behind in the development of extraversion is also likely to be behind in the development of ability. This is purely a supposition, though a natural one, which will enable us to make

sense of the correlations between extraversion and ability. It follows, then, that in early childhood, the child who is ahead in these developments will be high in ability and high in extraversion, whereas the child who is behind will be low on both, and therefore there will be a positive correlation between extraversion and ability, but as a group of children approach the age of thirteen, some among them who are ahead reach their peak of extraversion early and start 'downhill' towards introversion, while they are still increasing in ability, for the peak of ability is still many years ahead. Since those ahead are still the most able but not now the most extraverted, the correlation is weakened. As the average children pass over their extraversion peaks, the correlation becomes zero, and when, after fourteen, most of the group is decreasing in extraversion, the children who are ahead are the least extraverted but the most able, while the children behind are the most extraverted but the least able, that is to say, the correlation between extraversion and ability in these (hypothetical) children is now negative.

Anthony (1973) goes on to review the literature in order to support the hypothesis just outlined; he shows that there is indeed considerable empirical support, but we shall not here discuss the details of this support. Of more interest is a later analysis carried out by Anthony (1977) in an attempt to come to even closer grips with the factors determining the interaction between personality and achievement–ability as a function of age. He used data from a longitudinal study of 266 children tested at 10–11 and again at 15–16 years of age.

'The crude idea that the more able children become introverted while less able children become extraverted, may be reformulated as the idea that ability is correlated with decrease in extraversion. A second alternative may similarly be reformulated in terms of extraversion being correlated with decrease in ability. Is it that the more able children become introverted while the less able children become extraverted or, alternatively, is it that the extraverts fall behind in the development of ability while the introverts make faster progress?' (p. 193).

These alternative hypotheses become testable, using an ingenious formula devised by Anthony (1977), and this he applied to the data, separating out scores on intelligence and on school attainment tests. Two conclusions emerge from his analyses. (i) The more intelligent children, and those able in English, tended to become relatively more introverted than the less intelligent and the less able in English. (ii) The more extraverted children tended to become less able in English and mathematics than the introverted children. 'Previously the change in extraversion–ability correlations could be hypothetically attributable to either of the two kinds of transformation envisaged in the introduction, whereas it is concluded here that both kinds of transformation are significantly involved.' (Anthony, 1977, p. 194). The results suggest that the prevalence of one or other kind of transformation depends on the kind of ability which is tested. The correlation between introversion and the increasing relative success in academic examinations is plausible, since such success is presumably facilitated by private study which is an introverted type of behaviour (Banks and Finlayson, 1973). The correlation between intelligence and decreasing extraversion, on the one hand, may be attributed to the earliness versus lateness of development in the 10–16 year age group.

The correlations between personality and scholastic achievement are more marked in the higher reaches of secondary education, and at university, than in the lower reaches of secondary education; the reason probably is simply that differences in IQ,

which would obscure the effects of personality, are less marked there. At university personality may give better predictions of scholastic achievement than does IQ—simply because selection has reduced the range of IQ among students (Wankowski, 1973). Correlations in different studies differ quite markedly; this is expected in view of different parameters in different studies (IQ range, mode of teaching, motivation, social class, etc.). Nevertheless N is nearly always a disadvantage, and introversion an advantage, as far as scholastic achievement is concerned. This seems obvious on commonsense grounds; the high N scorer worries about his work, suffers from examination anxiety, and lets his 'nerves' interfere with his studies. The extravert socializes, instead of concentrating on his work, seeks non-academic outlets (sport, sex) for his energies, and has difficulty in concentrating (extraverts score poorly on tests of vigilance in the laboratory).

PERSONALITY AND LEARNING STYLE

In recent years, the type of research discussed above has been identified with the notion of 'learning style' (Honey and Mumford, 1992). The 'Learning Style Questionnaire' (LSQ) of these authors describes four such major styles, namely 'Activist' (A), 'Theorist' (T), 'Reflector' (R), and 'Pragmatist' (Pr). These styles are based on a learning style model developed by Kolb (1984), according to which learning is seen as a continuous cycle in which a person has a learning experience, reviews the experience, concludes from that experience, and plans the next step. A person's preference for one or another of the stages of the learning cycle translates in strengths and weaknesses of the learning style. Learning style is important in teaching because it helps teachers to understand how students learn (Butler, 1988). Green, Snell and Parimanath (1990) urged the use of learning style as part of a preassessment package for students.

Some formulations of learning style can best be formulated in terms of personality (Murray-Harvey, 1994), and Shadbolt (1978) demonstrated that introverts and neurotics performed better with structured teaching methods compared with unstructured teaching methods. Drummond and Stoddard (1992) noted the overlap between a learning style instrument and the 'Myers–Briggs Type Indicator'. More formal investigations of the LSQ–personality correlations have been reported by Furnham (1992) and Jackson and Lawty-Jones (1996). Furnham (1992) found that high E scorers were high on A and P, while low E scorers were high on R. P was moderately correlated with A and T. It is not unexpected that extraverts on the EPQ scales (Eysenck and Eysenck, 1975) should prefer an activist learning style and have pragmatist preferences, while introverts would be reflective. High P scorers also prefer activism, but their preference for a theorist position is perhaps unexpected, and may be related to the Personality–Creativity relation (Eysenck, 1995). Correlations were so high that Furnham questioned whether learning style preferences needed to be measured at all, and that parsimony suggested that personality tests could be used directly to examine learning preferences.

Results reported by Jackson and Lawty-Jones (1996) are very similar to Furnham's. Table 2 gives the observed correlations for 167 subjects between E, N, P, and L, on the one hand, and A, R, T, and Pr on the other. Clearly, the learning styles are far from independent; T and Pr correlate 0.55, and R and T correlate 0.53. A and R correlate

Table 2. The correlation matrix of personality traits and learning styles. (From Jackson and Lawty-Jones, 1996.) $N = 167$

	E[a]	N[b]	P[c]	L[d]	A[e]	R[f]	T[g]
N	−0.15						
P	0.01	0.06					
A	0.59**	0.05	0.36**	−0.29**			
R	−0.23**	−0.05	−0.29**	0.21**	−0.44**		
T	−0.10	0.04	−0.30**	0.23**	−0.29**	0.53**	
Pr[h]	0.17*	−0.08	−0.13	0.08	0.08	0.21**	0.55**

*$p < 0.05$ (two tailed).
**$p < 0.01$ (two tailed).
[a]Extraversion.
[b]Neuroticism.
[c]Psychoticism.
[d]Lie scale.
[e]Activist.
[f]Reflector.
[g]Theorist.
[h]Pragmatist.

−0.44. E and P correlate with A (0.59 and 0.86), E correlates negatively with R (−0.23), as does P (−0.29), but additionally P correlates negatively with T (−0.30), which is in a different direction from the correlations observed by Furnham, leaving the question open of whether there is any correlation between these variables. L, as usual, shows a pattern of correlation opposite in sign to P, as expected.

We may conclude that personality is causally involved with learning styles, but clearly considerable improvements in the LSQ are needed to make it a more incisive instrument. In particular, the high correlation found among some of the components suggest the need for considerable revisions.

SUMMARY AND SUGGESTIONS

This is a brief summary of some predicted and validated relations between personality and education, concentrating on the interaction between personality, particularly neuroticism and extraversion, and scholastic achievement, and the interaction between personality and teaching method. There has not been much interest in these topics in recent years, and I feel that this is very unfortunate. Society owes its children the promise of an education that will bring them up to the topmost level their ability enables them to reach; it is common knowledge that in the United Kingdom and the United States, at least, a high proportion of children emerge from the educational process illiterate and innumerate, unable to take their place in society, without the skills needed to join the workforce, and condemned to a life of unemployment and crime. Anything that can ameliorate that sad state should be welcome, and should invite concentrated research to investigate its possible usefulness in improving our methods of education.

The research reviewed here suggests that there are two major ways in which the results might improve the educational process. Both involve the interaction between teacher and pupils. Teachers are taught methods of teaching, such as the discovery

method or the reception method, and the preferred method is then used in dealing with all children. Yet, clearly a method that is optimal for one child may be mumpsimus for another, depending on the child's personality. How can we improve upon this situation? Clearly, the first step is to replicate and extend the research done; an altogether broader background of factual information is needed before any practical steps can be undertaken. Given such a large body of knowledge, teachers should be taught the facts concerning the nature of personality, its relation to teaching method, and the possibilities of measurement. Finally, all children should be administered personality tests to enable teachers to gain some information about the personalities of the children they teach.

Even at university level such information can be most useful. Furnham and Medhurst (1995) have shown how the seminar behaviour of students is governed by their personality attitudes, and how they in turn relate to actual academic outcome. Knowledge of these relations is surely the first step in changing conditions to make them more conducive to learning for those at present discriminated against by methods and arrangements not in line with their personalities. This already takes us into the discussion of our second topic, namely the relation between personality and the general atmosphere of the learning situation. Introverts seem to do better in a disciplined, highly controlled situation, extraverts in a more open, permissive type of situation. There has always been a debate in educational circles between disciplinarian and laisser faire adherents, but along the lines of absolute superiority of one or the other. The research here briefly indicated suggests that both sides are right as far as some types of child are concerned, and wrong as far as other types of child are concerned.

If I am right in what has been said so far, we ought next to consider the best way in which this knowledge can be introduced into the classroom. This clearly will be a difficult task, and must be left to experts in education; no doubt much empirical work might be required to arrive at a satisfactory conclusion. What I think is indisputable is the simple fact that children differ profoundly in their personalities; that these differences are relevant to their reaction to different methods of teaching; and that facts of this kind should be studied, made widely known, and inform our system of education at every level.

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