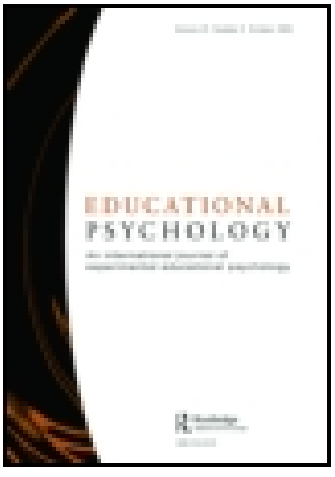

Educational Psychology: An International Journal of Experimental Educational Psychology

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/cedp20

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Published online: 29 Sep 2006.

To cite this article: R. Graham Wilson & Richard Lynn (1990) Personality, Intelligence Components and Foreign Language Attainment, Educational Psychology: An International Journal of Experimental Educational Psychology, 10:1, 57-71, DOI: 10.1080/0144341900100105

To link to this article: http://dx.doi.org/10.1080/0144341900100105

Personality, Intelligence Components and Foreign Language Attainment

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ABSTRACT *Approximately 1200 children from the Irish Republic were tested for various intelligence abilities, attainment in Irish (taught as a second language), personality traits of psychoticism, neuroticism and extroversion and attitude to learning foreign languages. Females had a significantly higher N score and had a significantly more positive attitude towards learning second languages and males had a significantly higher P score. The personality measures were not strongly related to the cognitive measures; anxiety, for example, does not appear to have an adverse effect on performance. There were low but positive correlations between attitude towards foreign language learning and the total score obtained in the Irish test. It is suggested that individuals have a more positive attitude towards subjects they are good at; hence the attitude could be influenced by innate ability. Attitude towards learning foreign languages also had low but significant correlations with some of the other cognitive tests, e.g. the English Spelling and Verbal Fluency tests. The results were very similar for both the primary and secondary school children. Age does not appear to influence personality measures during this period of childhood and adolescence.*

Introduction

Personality and attainment is an area which has attracted a reasonable amount of interest. The issue is rather complicated as it depends on the subject being learned and the teaching methods used amongst other factors. Despite the complex nature of this type of work, a number of findings have generally been reported with regard to personality scores and academic attainment. For example, it has been demonstrated on several occasions that introverts from the age of 13 or 14 years show superior academic attainment to extroverts. This has also been found several times with British university students (e.g. Furneaux, 1957; Lynn, 1959).

Anthony (1977) examined the shift between a positive relationship between extro-

version and attainment in younger children and a negative relationship between the two variables in older children and adults. It is possible that the more able children become more introverted, whereas the less able children become more extroverted. It is also possible that the extroverted children tend to fall behind as academic skills develop and the introverted children make more rapid progress. Anthony, in an examination of data collected by Rushton (1969) from a group of 266 children of above-average intelligence, who were tested at 10–11 years and then retested at 15–16 years, found that both these suggestions were partially correct.

A problem with these findings is that they are correlational in nature, and hence, do not indicate causation. Even if introversion has a causal effect on attainment, it is not clear how this happens. It is possible that the low level of arousal of extroverts makes it difficult to study for lengthy periods. Campbell & Hawley (1982) carried out a study in a university library. Extroverts reported taking more study breaks than introverts and were more concerned with finding study locations that offered socialising opportunities. It is possible that extroverts have more social engagements which compete for their time and, hence, they would spend less time studying than introverts. This would be consistent with the finding that the negative relationship between E and attainment develops in adolescence because it could be assumed that the greater sociability of extroverts would begin to disrupt study habits from early adolescence onwards (Eysenck & Eysenck, 1985). Goh & Moore (1978) did not discover any significant differences between introverts and extroverts in the number of hours spent studying. Banks & Finlayson (1973) found that introverted boys had a greater commitment to homework than extroverted boys.

It has been reported that introverts learn better when they follow a carefully sequenced learning structure and extroverts are more successful when presented with a random arrangement (Leigh & Wilson, 1970; Shadbolt, 1978). Hence, introverts could do better because the educational system tends to be structured and therefore more geared to their needs.

Gray's (1973) work suggests that extroverts should show superior learning when teachers emphasise rewards and praise and introverts should out-perform extroverts when teachers rely on threats of punishment. McCord & Wakefield (1981) reported similar conclusions.

Little work has been carried out relating academic work to psychoticism. Goh & Moore (1978) reported that P correlated negatively with student performance at a vocational institute and for university students taking social studies. The careless and hostile nature of those people with high P scores makes the negative relationship understandable.

Neuroticism is sometimes positively related to attainment. Eysenck (1971) pointed out that N tends to be negatively correlated with attainment in groups that have not been subject to a selection procedure. N was found to be negatively related to performance with pupils from the 11–15 age range (Child, 1964) and children aged about 13 (Entwhistle & Cunningham, 1968). N, however, seems to be positively related to attainment in groups that have survived difficult selection procedures, such as university students. Lynn (1959) found that university students were significantly more neurotic control groups and Furneaux (1957) reported that students who do well at university score higher on N than those who are less successful.

It is possible that anxiety in some circumstances can increase performance by increasing motivation, and in others, decrease performance by increasing worry. Spielberger (1966) points out that anxiety facilitates performance on easy tasks but

impairs it on difficult tasks. The difficulty of a task depends on the experience and expertise of the individuals and therefore, anxiety could enhance performance for intelligent university students who find academic tasks relatively easy. Spielberger (1966) tested this by comparing academic attainment of high and low scorers on the Manifest Anxiety Scale with performance on ACE Psychological Examination which is a measure of scholastic aptitude, also regarded as a valid measure of intelligence. It was found that academic attainment was mostly lower in the high anxiety subjects. However, when the brightest subjects were considered, the high anxiety students did have higher scores on the Psychological Examination.

It has been suggested that the impact of N, like extroversion, depends on the teaching methods that are used. Trown & Leith (1975) tested children of approximately 10 years of age and found that children with high anxiety learned better with a supportive teaching strategy and the children with low anxiety learned better with a more exploratory strategy. It is possible that children with high anxiety learn most effectively when they are taught in ways which minimise situational stress.

The evidence indicates that personality does not directly affect academic achievement, but interacts with teaching strategies. If this is the case, it cannot be said that any one personality type is related to superior academic attainment.

Eysenck & Eysenck (1970) published statistics regarding sex differences in the personality traits and developmental trends from the age of 7 to 15. Boys were higher on P and E and girls were higher on N. There was an increase in E for both males and females with age, with the girls showing a more rapid increase. For N, there was an increase in scores for the girls only. The scores for the boys were irregular and did not indicate any trend. There were no obvious age trends for P.

A reasonable amount of work, therefore, has been carried out on personality and attainment and the different teaching strategies that suit different personalities. The present study is concerned with examining the relationship between personality and measures of various cognitive components. The tests of cognitive components differ from tests of attainment in that they are tests of ability rather than knowledge and hence there would be less chance of performance being influenced by teaching strategies. This could indicate if personality has a strong influence on test performance. It is possible that personality could influence performance on tests. For example, people with low N scores may be at an advantage over higher N scorers with similar IQs as they could be more confident and work accurately without wasting time worrying about whether or not they are getting the correct answers and performing well, etc. The Irish test of attainment would be the only test where teaching is involved. Part of the present study is concerned with the relationship between attitude towards a subject and success in it. The study also examines the sex differences in personality, and the change in personality with progression through school and onset of adolescence.

Method

Primary School Children

Sample. Six hundred children (327 boys and 273 girls) took part in the study. They were aged between 9 and 11 years of age and were pupils from primary schools in the Irish Republic in which Irish is taught as a second language to all children.

Tests. The following tests were administered.

(1) The Mill Hill Vocabulary Test.

(2) The Standard Progressive Matrices.

(3) Anagrams. Two minutes were given to complete 20 anagram problems.

(4) PMA Addition Test. Four minutes were given to complete 30 addition sums.

(5) Long-term Memory Test. A short story was read to the children prior to the administration of Test 4. The story was read aloud by the tester and the children followed the story from a copy printed in the test booklets. They were asked to try and remember as much about the story as possible. When the sums were completed, the children were given a multiple choice test on the story. Twelve questions were asked and the children were required to choose the correct answer from a number of alternatives. Two minutes were allowed for this test.

(6) Verbal Fluency. The children were asked to write the names of as many animals as they could think of in two minutes.

(7) PMA Space Relations Test.

(8) Hidden Patterns Test. The children were presented with 120 small diagrams and were asked to indicate whether or not each of the diagrams contained a given pattern. Two minutes were allowed for this test.

(9) PMA Perceptual Speed Test.

(10) Short-term Memory. The children were asked to study a list of 10 first names and 10 surnames and try to remember them. One minute was allowed for memorisation. The correct surnames were provided in the answer booklets and the children were given two minutes to insert the correct Christian name (from memory).

(11) Word Endings. The children were asked to write as many words as they could think of in two minutes which ended in 'ay'. This is a word fluency test taken from Ekstrom *et al.* (1976).

(12) Schonell Spelling Test. The children were asked to spell 40 words.

(13) Drumcondra Irish Test was administered on a different testing session according to the instructions in the accompanying manual. It is composed of 4 subtests: Vocabulary, Comprehension, Usage and Spelling. These are scored separately and also summed to give a total score.

(14) The children were then asked to complete a questionnaire to assess their attitudes towards learning Irish. This involved reading 11 statements about Irish and marking them 'yes' or 'no' depending on whether or not they agreed with the statements.

(15) The final part of this testing session involved the administration of a shortened version of the Junior Eysenck Personality Questionnaire. Thirty-six questions were used, 12 for each of the three personality dimensions.

Results

Table I gives the raw mean scores and the age standardised means for males and females and *t*-values for the sex differences.

It can be seen that there is a significant female superiority on the Vocabulary, Anagram, Addition, Long-term Memory, Verbal Fluency, Short-term Memory, Spelling, the Irish sub-tests and total scores. The females also expressed a significantly more favourable attitude towards learning Irish and other foreign languages, and had a significantly higher N score. The boys had a higher P score. The boys did not score significantly better on any of the cognitive tests. These results support the findings

TABLE I. Means, standard deviations, age standardised means, standard deviations and *t*-values for boys and girls

				Age standardised		
Test	Sex	Mean	(SD)	Mean	(SD)	*t*-value
Vocabulary	M	12.31	(4.60)	−0.11	(1.10)	−3.04**
	F	12.99	(3.88)	0.13	(0.85)	
Reasoning	M	28.73	(9.08)	0.03	(1.00)	0.72
	F	27.68	(8.87)	−0.03	(1.00)	
Anagrams	M	8.28	4.38)	−0.14	(1.00)	−3.68***
	F	9.17	(4.55)	0.16	(0.98)	
Addition	M	21.71	(5.84)	−0.09	(1.09)	−2.52*
	F	22.13	(5.21)	0.11	(0.87)	
Long-term Memory	M	8.27	(4.66)	−0.16	(1.01)	−4.29***
	F	9.30	(4.71)	0.19	(0.96)	
Verbal Fluency	M	14.29	(5.40)	−0.11	(0.97)	−3.05**
	F	15.20	(5.85)	0.14	(1.02)	
Space Relations	M	11.64	(4.51)	0.05	(1.01)	1.45
	F	10.77	(4.45)	−0.06	(0.98)	
Hidden Patterns	M	25.94	(13.03)	0.00	(0.96)	0.02
	F	24.62	(14.79)	−0.00	(1.05)	
Perceptual Speed	M	19.54	(7.88)	−0.07	(0.98)	−1.94
	F	20.04	(8.00)	0.09	(1.02)	
Short-term Memory	M	5.58	(2.82)	−0.12	(0.97)	−3.27**
	F	6.09	(2.88)	0.14	(1.01)	
Word Endings	M	7.94	(3.79)	−0.05	(0.99)	−1.20
	F	8.11	(3.96)	0.05	(1.01)	
Spelling	M	16.00	(11.09)	−0.20	(1.03)	−5.48***
	F	19.95	(10.43)	0.24	(0.91)	
Irish Vocabulary	M	17.17	(6.07)	−0.26	(0.95)	−7.28***
	F	20.53	(6.82)	0.31	(0.97)	
Irish Comprehension	M	10.78	(4.71)	−0.28	(0.91)	−7.96***
	F	13.77	(5.69)	0.34	(1.00)	
Irish Usage	M	17.01	(4.75)	−0.19	(0.96)	−5.33***
	F	18.97	(5.13)	0.23	(0.99)	
Irish Spelling	M	14.62	(5.82)	−0.20	(0.98)	−5.36***
	F	16.68	(5.87)	0.23	(0.98)	
Irish total	M	59.39	(16.97)	−0.29	(0.92)	−8.18***
	F	69.96	(19.88)	0.35	(0.98)	
Psychoticism	M	3.84	(2.15)	0.29	(1.03)	8.07***
	F	2.51	(1.75)	−0.36	(0.83)	
Extroversion	M	9.72	(1.89)	−0.04	(0.97)	−1.12
	F	9.90	(2.00)	0.05	(1.03)	
Neuroticism	M	5.21	(2.94)	−0.15	(1.01)	−3.89***
	F	6.17	(2.82)	0.18	(0.96)	
Irish Questionnaire	M	3.25	(2.42)	−0.19	(0.98)	−5.20***
	F	4.35	(2.41)	0.23	(0.98)	

* Statistically significant difference at the 5% level; ** 1% level; *** 0.1% level.

that females have a significant superiority on verbal tests as the most significant values of *t* are found on the tests of verbal ability and the Irish sub-tests. There is no evidence that males are significantly better at spatial tests.

The correlation matrix of the cognitive tests was factored by principal components analysis. There were three factors with eigenvalues greater than unity. These were

rotated by oblimin to distribute the variance over the three factors. The results are contained in Table II.

TABLE II. Factor loadings of tests on the rotated factors (primary stage)

	Factor		
Test	1	2	3
Vocabulary	0.70*	0.14	0.02
Reasoning (matrices)	0.17	0.65*	−0.01
Anagrams	0.49*	0.14	0.22
PMA Addition	0.30	0.21	0.31
Long-term Memory	0.60*	0.22	0.06
Verbal Fluency	0.60*	0.03	0.18
PMA Space Relations	0.02	0.81*	0.07
Hidden Patterns	0.00	0.67*	−0.15
PMA Perceptual Speed	0.07	0.60*	0.19
Short-term Memory	0.74*	−0.10	−0.13
Word Endings	0.64*	0.04	−0.05
Schonell Spelling	0.76*	−0.07	0.21
Irish Vocabulary	0.17	0.05	0.74*
Irish Comprehension	0.04	−0.02	0.83*
Irish Usage	0.12	−0.01	0.83*
Irish Spelling	0.41	0.01	0.51*

It can be seen from the three rotated factors that the verbal tests load highly on Factor 1 indicating that this is a verbal factor. The spatial tests load highly on Factor 2 and the Irish sub-tests load on Factor 3. This indicates that there is a separate ability involved in determining success at foreign language learning which is distinct from verbal ability. The correlations between the factors indicate that the factors are related. The verbal factor correlates 0.46 with the language factor and 0.42 with the spatial factor. The language factor correlates 0.29 with the spatial factor.

Correlations were obtained for the personality measures with each of the cognitive factors. The correlations were in most cases non-significant and even the significant correlations were quite low. The Language Questionnaire result correlated 0.29 with the language factor which would be expected as this result also had a low but positive correlation with the Irish total score. The P score correlates −0.26 with the Language Questionnaire. E correlates −0.24 with N.

Secondary School Children

Sample. Taking part in this stage of the experiment were 278 males and 321 females. The same battery of cognitive tests was administered to pupils in the first three years of secondary school in the Irish Republic. These pupils were tested with more advanced Drumcondra Irish Tests and more advanced spellings. The tests were administered in exactly the same way as they were with the primary school children. The results were very similar.

Results

Table III contains the raw means and standard deviations, the age standardised means, standard deviations and *t*-test results. The age-standardised scores from the manual were used for the analysis of the Irish sub-tests and total score.

TABLE III. Means, standard deviations, age standardised means, standard deviations and *t*-values for boys and girls

				Age standardised		
Test	Sex	Mean	(SD)	Mean	(SD)	*t*-value
Vocabulary	M	18.39	(4.95)	−0.09	(1.11)	−2.05*
	F	18.98	(4.18)	0.08	(0.89)	
Reasoning	M	38.57	(8.68)	−0.10	(1.03)	−2.30*
	F	39.88	(8.25)	0.09	(0.96)	
Anagrams	M	13.39	(4.82)	−0.22	(1.08)	−5.17***
	F	15.05	(4.17)	0.19	(0.88)	
Addition	M	26.38	(4.44)	−0.15	(1.08)	−3.35**
	F	27.41	3.62)	0.13	(0.90)	
Long-term Memory	M	12.76	(3.77)	−0.16	(1.14)	−3.78***
	F	13.77	(2.79)	0.14	(0.84)	
Verbal Fluency	M	20.76	(6.93)	−0.14	(1.04)	−3.28**
	F	22.30	(6.59)	0.12	(0.95)	
Space Relations	M	17.09	(4.10)	0.03	(1.01)	0.71
	F	16.76	(4.09)	−0.03	(0.99)	
Hidden Patterns	M	66.92	(84.10)	−0.02	(1.03)	−2.17*
	F	69.82	(78.91)	0.02	(0.97)	
Perceptual Speed	M	28.73	(7.44)	−0.16	(1.05)	−3.62***
	F	30.67	(6.81)	0.14	(0.94)	
Short-term Memory	M	6.54	(2.87)	−0.26	(1.06)	−6.11***
	F	7.84	(2.37)	0.23	(0.88)	
Word Endings	M	12.45	(5.43)	−0.19	(1.03)	−4.39***
	F	14.11	(5.05)	0.17	(0.94)	
Spellings	M	13.02	(10.58)	−0.24	(1.07)	−5.65***
	F	17.08	(8.97)	0.21	(0.88)	
Irish Vocabulary	M	—	—	86.60	(13.99)	−6.98***
	F	—	—	94.40	(13.24)	
Irish Comprehension	M	—	—	87.69	(12.71)	−6.53***
	F	—	—	94.64	(13.12)	
Irish Usage	M	—	—	85.78	(13.05)	−7.82***
	F	—	—	94.22	(13.05)	
Irish Spelling	M	—	—	91.40	(14.60)	−7.11***
	F	—	—	99.66	(13.69)	
Irish total	M	—	—	351.47	(47.66)	−8.14***
	F	—	—	383.00	(46.47)	
Psychoticism	M	3.16	(2.35)	0.39	(1.13)	9.25***
	F	1.64	(1.56)	−0.33	(0.73)	
Extroversion	M	10.18	(1.94)	−0.07	(1.06)	−1.60
	F	10.41	(1.76)	0.06	(0.95)	
Neuroticism	M	4.77	(2.90)	−0.23	(0.93)	−5.23***
	F	6.04	(3.18)	0.19	(1.01)	
Irish Questionnaire	M	2.51	(2.18)	−0.43	(0.91)	−10.60***
	F	4.44	(2.21)	0.37	(0.92)	

*Statistically significant difference at the 5% level; **1% level; ***0.1% level.

It can be seen that there are significant differences in favour of the females in all the cognitive tests except the Space Relations Test where no significant sex difference was found. The females also had a significantly higher N score and a significantly more favourable attitude towards learning Irish (indicated by the results of the Language Questionnaire). The most significant value of t was found with the results of the Language Questionnaire ($t = -10.60$). The only test where there was a significant male superiority was P where t was 9.25. These results are similar to those found in the primary school study.

Table IV gives the loadings of the tests on the three rotated factors.

TABLE IV. Factor loadings of tests on the rotated factors (secondary stage)

	Factor		
Test	1	2	3
Vocabulary	0.56*	0.11	0.26
Reasoning	0.22	0.04	0.71*
Anagrams	0.20	0.57*	0.03
PMA Addition	0.29	0.17	0.27
Long-term Memory	0.23	0.31	0.26
Verbal Fluency	0.18	0.69*	−0.04
Space Relations	0.06	−0.18	0.88*
Hidden Patterns	−0.25	0.51*	0.38
Perceptual Speed	−0.05	0.33	0.51*
Short-term Memory	−0.01	0.73*	−0.06
Word Endings	0.12	0.77*	−0.07
Spellings	0.71*	0.16	0.06
Irish Vocabulary	0.90*	−0.02	−0.01
Irish Comprehension	0.90*	−0.05	0.01
Irish Usage	0.82*	0.04	−0.01
Irish Spelling	0.83*	0.06	−0.01

Three significant factors are obtained. The Irish sub-tests load highly on Factor 1, the verbal tests load highly on Factor 2 and the spatial tests load highly on Factor 3. The three factors are positively correlated as before. Language correlates 0.44 with the verbal and 0.32 with the spatial factor. The verbal and spatial factors correlate 0.45. Hence, again, the abilities are related although they appear to be separate primaries.

The correlations obtained for the personality measures with each of the cognitive factors were similar to those found at the primary stage of the research. The correlations again, were in most cases non-significant or very low. The Language Questionnaire correlated 0.25 with the language factor which is consistent with the small correlation of this measure with the Irish total score. P correlates −0.28 with the Language Questionnaire. E correlates −0.20 with N.

Table V contains the correlations of all the cognitive tests with the personality measures for both primary and secondary school children.

It can be seen that the Language Questionnaire correlates moderately with the Irish sub-tests and total score for both primary and secondary stages of the research. The correlations range from 0.22 to 0.36. The correlation with the Irish total is 0.35 primary stage and 0.36 at the secondary stage. The Language Questionnaire also correlates moderately with the English spelling test (0.22 and 0.27 for primary and

TABLE V. Correlations of all tests with personality measures for the primary and secondary stages of the research

	School	P	E	N	I
Vocabulary	P	−0.20	0.18	−0.01	0.16
	S	−0.09	0.06	−0.05	0.16
Reasoning	P	−0.14	0.11	0.02	0.04
	S	−0.07	0.12	−0.07	0.07
Anagrams	P	−0.14	0.16	0.00	0.15
	S	−0.11	0.12	0.05	0.25
PMA Addition	P	−0.21	0.14	−0.06	0.14
	S	−0.09	0.11	−0.03	0.13
Long-term Memory	P	−0.22	0.13	0.01	0.19
	S	−0.12	0.11	−0.04	0.13
Verbal Fluency	P	−0.21	0.16	0.04	0.22
	S	−0.12	0.14	−0.05	0.22
Space Relations	P	−0.04	0.05	−0.03	0.03
	S	−0.05	−0.01	−0.08	0.00
Hidden Patterns	P	−0.09	0.04	−0.04	0.06
	S	−0.06	0.03	−0.02	0.13
Perceptual Speed	P	−0.20	0.10	−0.01	0.14
	S	−0.14	0.14	−0.00	0.19
Short-term Memory	P	−0.19	0.14	0.05	0.10
	S	−0.13	0.15	−0.00	0.23
Word Endings	P	−0.11	0.10	−0.01	0.15
	S	−0.11	0.16	−0.04	0.16
Spellings	P	−0.28	0.18	0.00	0.22
	S	−0.14	0.04	−0.04	0.27
Irish Vocabulary	P	−0.17	0.09	0.05	0.32
	S	−0.11	0.01	−0.01	0.34
Irish Comprehension	P	−0.19	0.08	−0.02	0.31
	S	−0.08	0.05	−0.03	0.35
Irish Usage	P	−0.08	0.06	0.06	0.30
	S	−0.16	−0.00	−0.01	0.29
Irish Spelling	P	−0.27	0.17	0.05	0.22
	S	−0.16	0.05	−0.03	0.30
Irish total	P	−0.23	0.13	0.04	0.35
	S	−0.15	0.03	−0.02	0.36

secondary stages respectively). Extroverson and N do not correlate moderately with any of the cognitive tests. The correlations of P with the cognitive variables are also quite low but are all negative. This is what could be expected considering the irresponsible nature of individuals with high P scores. The negative correlations of P with the cognitive tests appear to be slightly greater at the primary stage of the experiment. Vocabulary, Addition, Long-term Memory, Verbal Fluency, Perceptual Speed, Spellings, Irish Spelling and Irish total all correlate between −0.20 and −0.28 at the primary stage. The highest correlation with P at the secondary stage was 0.16.

Graphs containing the mean scores on the personality measures for males and females for the six classes studied in the experiment are presented on Figs 1 to 4. Classes 1 to 3 represent the primary stage of the experiment and classes 3 to 6 represent the secondary stage. Regression lines are included which give an indication of any development trends.

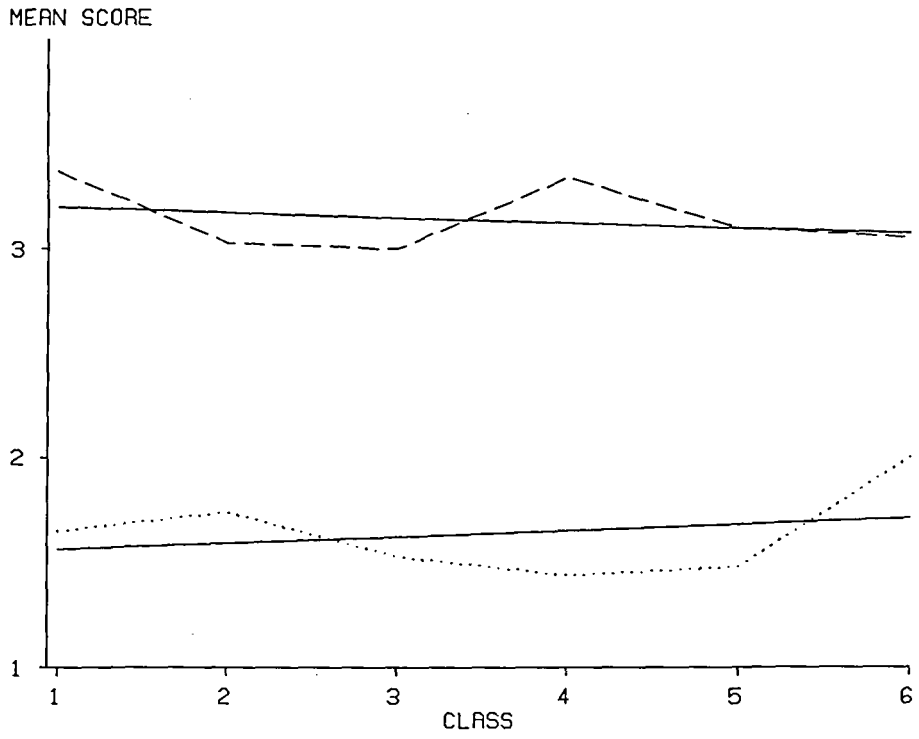

FIG. 1. Mean scores for psychoticism. (---) Male; (. . .) female.

It can be seen from the graphs that the males have a consistently higher P score than the females which is consistent with the highly significant *t*-value observed in both the primary and secondary stages of the research. The females have a consistently higher N score and consistently express a more favourable attitude towards learning foreign languages. The values of *t* for both these measures were significant. These results are similar to those reported by Eysenck & Eysenck (1970). A difference is observed with the E score. The females in the present experiment had higher mean scores for E than the males although the difference is not significant. Eysenck & Eysenck (1970) found the males to have higher scores than the females. Despite this difference, both male and female scores increased with age which is in agreement with Eysenck and the female increase was slightly greater which is also consistent with Eysenck's findings. A regression was carried out to determine the amount of variance on the personality measures that can be attributed to class. In other words the regression indicates if there is a significant change in personality with age and if so, the magnitude of change. A significant change was observed with E. For males this difference was significant ($p<0.05$). Although significant, class only accounts for 1% of the variance in E which is very minimal. For females, the change is also significant ($p<0.001$) but still class only accounts for 2% of the variance. Another difference was found with N Eysenck discovered that there was an increase in score for the females only and for boys the scores were irregular, not indicating any trend. The findings of the present study are that class accounts for none of the variance in the N score for either males or females. The only other significant age trend was found with the Language Questionnaire. A significant downward trend was observed for males on this measure ($p<0.001$). Again class only accounted for 1% of the variance. The higher male score for P at all classes

is consistent with Eysenck's findings. The regression therefore, reveals a number of significant personality changes as the children get older but the amount of variance explained by class does not amount to more than 2% which indicates that personality does not change with age during this period of childhood and adolescence. The significant results are probably the result of the large sample used in the study.

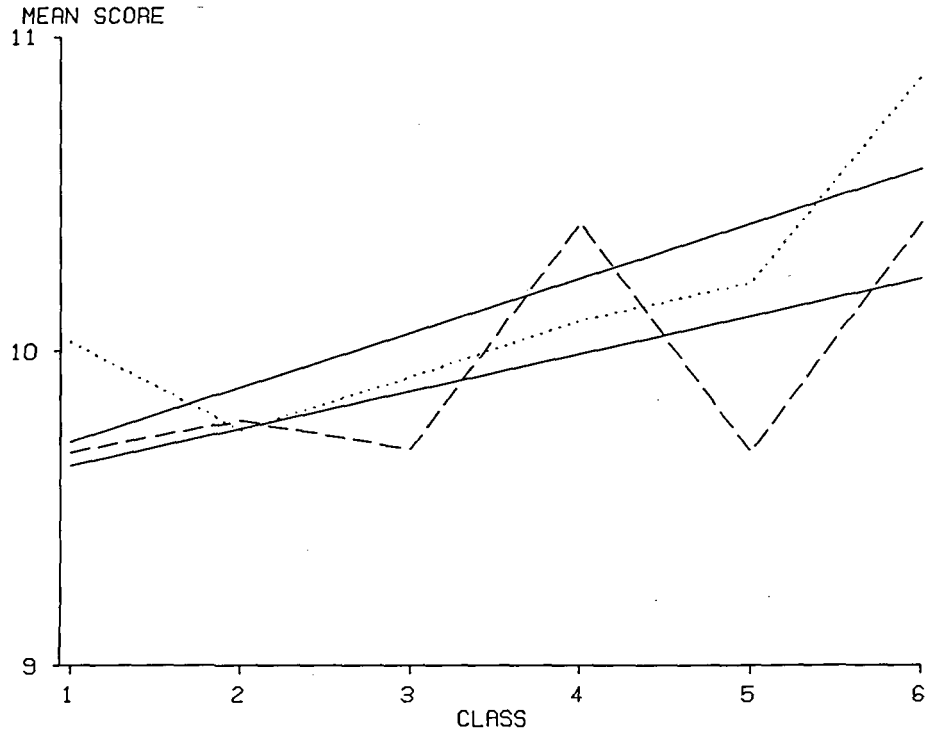

FIG. 2. Mean scores for extroversion. (---) Male; (. . .) female.

Discussion

The first observations that can be noted from the results is that the females expressed a significantly more favourable attitude towards learning Irish and other foreign languages and had a significantly higher N score. The males had a significantly higher P score. No significant sex difference was observed for the E scores.

The oblique factor rotation reveals the existence of a separate language ability. The four Irish sub-tests load highly on one factor, verbal tests load on another and the spatial tests load on a third factor. The factors correlate moderately with each other indicating that they are related. This is consistent with the widely held finding that general intelligence is composed of a number of specific abilities such as verbal and spatial ability. The correlations between the cognitive factors are what would be expected when examining separate abilities which are influenced by an overall level of intelligence. The correlations of the personality measures with the Verbal, Spatial and Language congnitive factors were all quite low or non-existent. The E score was not significantly related to attainment at the primary or secondary stage of the experiment. Hence, there is no support for the finding that there is a positive relationship between

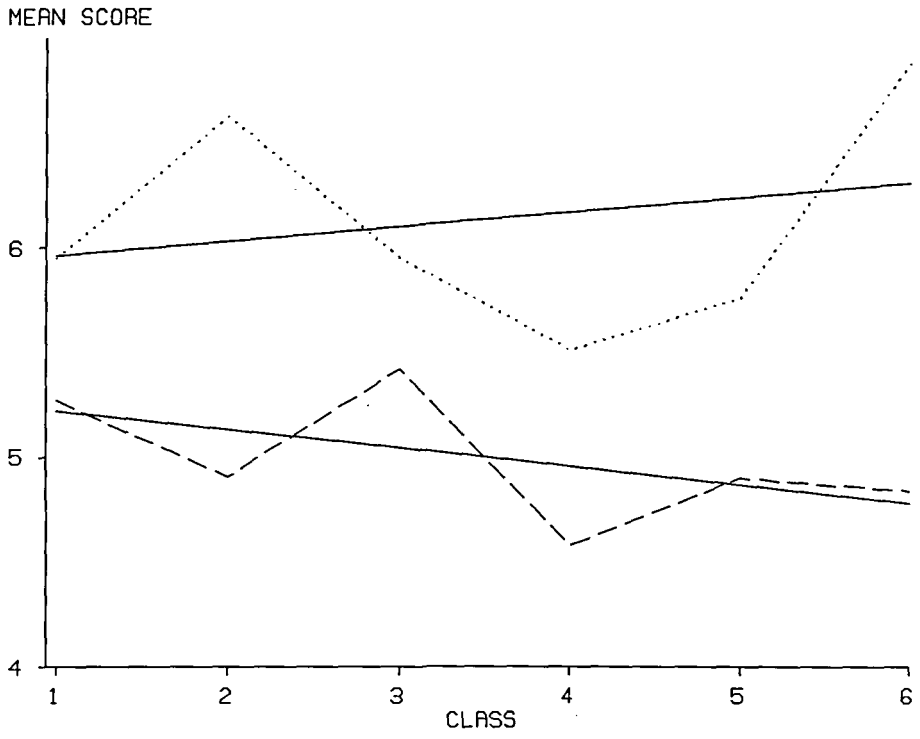

FIG. 3. Mean scores for neuroticism. (---) Male; (. . .) female.

E and attainment at the primary age range and negative relationship at the secondary stage. Low, but positive correlations were obtained between the Language Questionnaire and Language Factor.

These results were observed for both primary and secondary school pupils. The Language Questionnaire also correlated positively with the Irish Total score at the primary and secondary stage of the experiment. It would appear therefore, that *attitude* towards learning foreign languages is related to *success* at learning a foreign language. This was also found in a study carried out in England and Wales by the Ministry of Education (Burstall, 1974). Some researchers, however, for example Ekstrand (1980), criticised this study and, hence, further investigation was desirable. It cannot be inferred from the correlations whether success leads to more positive attitudes or whether positive attitudes facilitate success. There are good grounds for suggesting that attitude could be determined by innate ability which in turn is determined by the genetic make-up. Environmentalists claim that experiences determine how one develops, that is, environmental influences are largely responsible for the development of intellect, etc. Scar & McCartney (1983) present an argument which is quite feasible as it takes into account the role of genes and environment. They suggest that genotypes determine the environments that are experienced by individuals and that individuals actively seek their own environments. For example, individuals who have ability in a subject would be more likely to attend it and place themselves in environments where they have the opportunity of developing the talent. It is possible that people who have ability in subjects would find them relatively easy to learn and meaningful. As a result of this it is not difficult to imagine why people find subjects they are good at enjoyable and interesting. For example, it is unlikely that a person who is tone deaf would enjoy

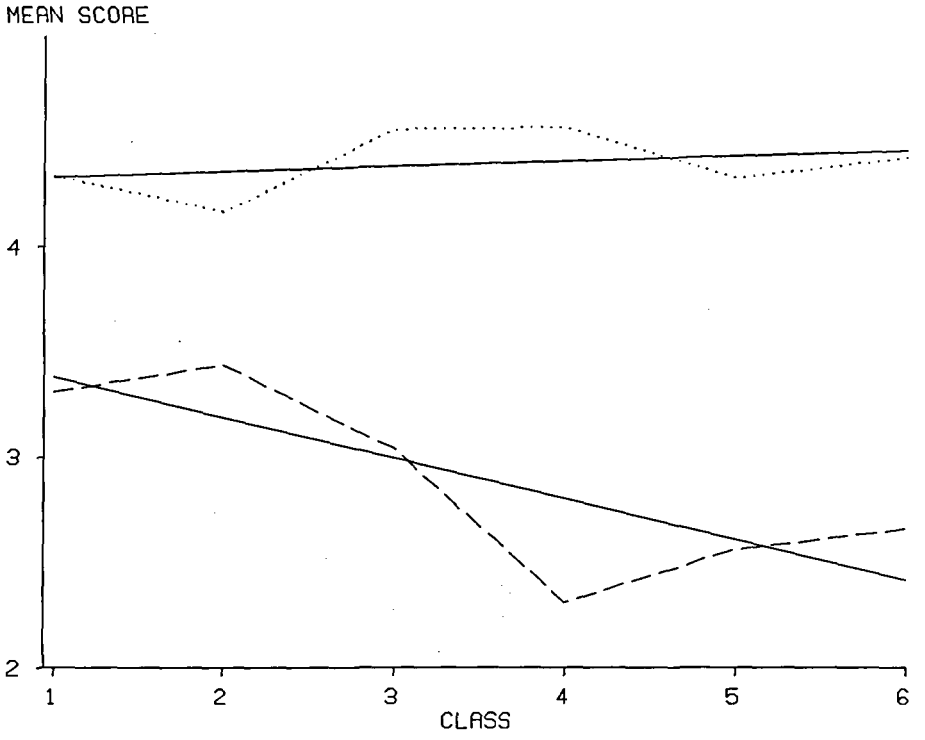

FIG. 4. Mean scores for foreign language questionnaire. (---) Male; (. . .) female.

music lessons as he could not hear the music properly and hence, it would not be meaningful to him. Academic success would be met with reinforcement from parents and teachers, etc. and there would be the additional reinforcement of obtaining good examination results. It is difficult to imagine why individuals would pursue courses of study they do not have much aptitude for as it would be difficult for them to understand; they would tend not to do as well as their peers and would obtain less reinforcement. Consequently, they would probably dislike the subject. It is possible therefore, that attitude towards learning Irish and other foreign languages correlates positively with attainment in Irish as a result of children having a positive attitude towards a subject they are good at. It is interesting that the female children expressed a significantly more favourable attitude towards languages and also scored significantly better on the Irish attainment test. Both findings could be due to females having superior language ability. This is an area which would be worth investigating in greater detail.

The correlations of the personality measures with the measures of cognitive abilities indicate that there is little relationship between personality and performance on tests of ability. The Language Questionnaire correlated significantly with the measure of Irish attainment, but the correlations with the tests of ability were lower. N and E did not correlate significantly with any of the tests used in the study. This finding is interesting as it indicates that personality has little influence on tests of intelligence and ability. For example, individuals with high N scores who tend to be 'worriers' may not have their performance seriously impaired by anxiety, etc. However, it should be noted that other factors could be involved in developing an anxiety state during testing sessions. For example, tests such as the 11+, GCSE and A level examinations, etc.

could involve more anxiety as success at these have greater implications for individuals and, hence, there is more at stake. It would be easier for individuals prone to anxiety attacks, to get 'worked up' in these examinations and perform less well than they should. The tests involved in the present study involved minimum anxiety as they had very little implications for the children's future and the children were aware that they themselves and their teachers would be the only people who would be given the results.

The small negative correlations between P and N and between P and the Language Questionnaire are understandable considering the incompetent, careless nature of individuals with high P scores. The higher P scores found with males would appear to be partially responsible for them reporting more negative attitudes towards learning foreign languages which in turn could be related to the lower scores on the Irish test. The small negative relationship between P and scores on the Irish test is consistent with this suggestion. However, the Language Questionnaire has the highest correlation with the Irish total indicating that it is the personality measure which relates most to success at learning Irish.

The results reveal that males have higher P scores throughout the primary and secondary stages of the study. The E scores increased for both males and females. The females had a slightly higher mean score than the males in all but one of the classes included in the study. This is contrary to findings reported by Eysenck & Eysenck (1970) where males had higher E scores. It should be noted, however, that the sex difference for E was not significant and hence, a strong contradiction cannot be made. At all classes, females and higher N scores. The female scores tended to increase slightly and the male scores decreased steadily with age. The females also consistently expressed a more favourable attitude towards learning foreign languages. There was a very slight increase in female scores on the Language Questionnaire as the children got older, that is, the attitude became slightly more favourable. Even though the graphs indicate increases and decreases in some of the personality measures with age, the regression indicates that class accounts for practically none of the variance on these scores and hence, these changes are very slight. This indicates that there is very little change in personality with age throughout the age range included in the study. The only significant differences found with the personality measures are the female superiority on the Language Questionnaire and N and the male superiority on P. There is is no evidence of a significant personality change with the approach of adolescence.

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