Early predictors of trait extraversion in adulthood: Findings from a nationally representative sample

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ABSTRACT

In total, 5663 participants provided information on family social background measured at birth; family social life at age 7 years; childhood intelligence, childhood speech difficulties and oral ability assessed at 11 years; leisure activities (parties and sports) measured at age 16 years; optimism and educational qualifications measured at 33 years; occupational levels at 42 years; and trait Extraversion measured at 50 years. Parental social status, childhood social life, childhood intelligence and speech abilities, parties and sports, optimism, education and occupation were all significantly associated with Extraversion accounting for around a tenth of the variance. Structural equation modelling showed that six factors: childhood social life, childhood speech ability, parties and sports, optimism, and occupational levels were significant and independent predictors of trait Extraversion in adulthood for both men and women. Implications and limitations of the study are acknowledged.

1. Introduction

This study examined the correlates of one of the Big Five personality traits, namely Extraversion, which is perhaps the most widely understood and investigated of all personality variables. It forms the basis of nearly all personality theories and questionnaires though there are numerous differences in attempting to explain the origin and mechanism/process by which it operates (Eysenck, 1973, 1992). There also remains a big difference between those who favour a biological vs a social explanation for this, and other personality traits (Cooper, 2010).

Wilt and Revelle (2017) defined Extraversion as the tendency to experience and exhibit positive affect, assertive behaviour, decisive thinking, and desires for social attention. They note that Extraversion, like the other Big Five traits, is based in biology, develops over time according to intrinsic maturation principles, is manifested in characteristic adaptations (i.e. expressed in affective, behavioural, and cognitive tendencies), influence one's objective biography, is reflected in the self-concept, and has both adaptive and maladaptive variants (p. 57).

There has been an emphasis on the many benefits of Extraversion (self-esteem, social support, optimism) though there has been a rigorous attempt to spell out the advantages of being introverted (Cain, 2015). Furthermore, those interested in relationship between "normal" personality traits and the personality disorders have provided much

evidence for the spectrum hypothesis which suggests very high (extreme) scores on the Extraversion-Introversion dimension are related to a wide range of clinical and sub-clinical disorders (Furnham, 2018a).

Trait Extraversion has been associated with a very wide range of mental and physical states. It has been linked with behaviours as varied as crime to consumption, and sexual behaviour to social attitudes (Furnham & Heaven, 1999). For instance, Extraversion has been found to be significantly associated with psychological well-being and mental health in both East and West (Argyle, 2001; Diener, 1984; Furnham & Cheng, 1999) and positively associated with optimism and negatively associated with depression (Cheng & Furnham, 2001, 2003).

Over the years there have been comprehensive and thoughtful reviews of what we know about the trait of Extraversion (Wilt & Revelle, 2009, 2017). They acknowledge that Extraversion predicts normal and abnormal functioning across a wide range of domains from effective functioning, well-being, risk-taking and resilience. From the earliest writings and later research Extraverts have been characterised by being active, assertive, arrogant, boastful, garrulous and talkative (Wilt & Revelle, 2009). There are also a number of issues which the research has looked at such as whether it may be that Extraversion is made of two related but distinguishable facets (i.e. agentic vs affiliative; sociability vs impulsivity).

There have been a number of attempts to give a theoretical account of Extraversion including Eysenck's conditioning then arousal theory as

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well as Gray's reinforcement sensitivity theory (Wilt & Revelle, 2017) but most of the current research is on the biology, development, evolution and genetics of Extraversion (Forsman et al., 2012; Saklofske et al., 2012; Shiner & Caspi, 2003). It has been known for many years that Extraversion is moderately heritable h^2 = 0.45 to 0.50) with little shared environmental influence (Bouchard & Loehlin, 2001). In the past fifteen years, with the development and rigorous scientific investigations using the most advanced tools testing models in behavioural genetics, Plomin and colleagues established that with personality factors such as Neuroticism and Extraversion, 50% of variance can be explained by genetic influences (Plomin, DeFries, Knopik, & Neiderhiser, 2013). However, it is unclear which and how specific environmental and experiential factors influence the development of trait Extraversion in adulthood.

There is general agreement that Extraversion could be considered a temperament which is systematically related to a wide range of behaviours, cognitions and emotions which lead to the development of adult trait Extraversion. Thus, behaviours in childhood and adolescence could be considered as a manifestation of (and proxy for) temperament Extraversion which develops into adult trait Extraversion. As Wilt and Revelle (2009) note temperament could be thought of as a precursor of personality in a more simplified state; that it appears early in development in specific behaviours. They favour the analogy of a snowball: if personality was a snowball, temperament would be its hard ice core.

In this study, we examined a set of socio-economic and psychological factors in childhood and adulthood available in a large, nationally representative sample in the UK, exploring factors affecting trait Extraversion in adulthood. Of the many variables available we choose those that may be thought of as temperament indicators which could be thought of as early proxy measures of adult Extraversion. It is part of a systematic program of research looking at the social origins of personality (Furnham & Cheng, 2014a, 2014b, 2016, 2017). As far as we know there has been no other longitudinal study that has had this sort and amount of psychological and demographic data that could be used to examine the origins of trait Extraversion.

We had the option of exploring an important longitudinal data base and selecting various psychological and sociological variables that have been shown to relate to adult personality (Furnham & Cheng, 2017). Our aims was to select behaviours assessed at ages 7, 11, 16, 33 and 42 years and to see to what extent they correlated with Extraversion measured at age 50 years. Based on the literature on Extraversion we had various hypotheses:

H:1. Childhood social life such as meeting other children outside the house would be significantly and positively correlated with Extraversion in adulthood. One of the most abiding characteristic of extraverts is their sociability which is often manifest earlier in life. Many studies have shown that adult Extraversion is associated with a high motivation for social contact, intimacy and interdependence (Wilt & Revelle, 2009).

H:2. Childhood speech ability (i.e. communication success) would be significantly associated with Extraversion. It is suggested that need for social contacts drives speech ability in children and adolescence.

H:3. Parties and sports would be significantly and positively associated with Extraversion. Again, this is related to the sociability concept which predicts that attendance at social events is a good proxy for Extraversion.

H:4. Optimism would be significantly and positively associated with adult Extraversion. Another strong correlate of adult Extraversion is happiness and well-being which may be manifest in young people as optimism. Further, it could be argued that as Extraverts are more sensitive to reward than Intraverts, they should condition faster to rewarding stimuli and thus experience more positive affect (Wilt & Revelle, 2017).

H:5. Occupational levels of the participants would be significantly and positively associated with Extraversion. There is a literature on personality and occupational success which suggests a small but significant association between Extraversion and work success (Furnham, 2018b).

The data set had a number of other variables like intelligence, parental social class and education which we chose to examine though we did not develop any hypotheses. Given the large number of participants we decided to test to robustness of the findings by also doing the analyses for males and females separately and did not expect, on theoretical grounds, to detect any meaningful differences.

2. Method

2.1. Participants

The National Child Development Study 1958 is a large-scale longitudinal study of the 17,415 individuals who were born in Great Britain in a week in March 1958 (Ferri, Bynner, & Wadsworth, 2003). There were nine follow-ups. At age 11 years 14,134 children completed tests of cognitive ability (response = 87%) and teachers provided information on 13,754 children's speech ability (response = 85%). At age 16 years, 11,628 cohort members completed a measure on leisure activities (response = 83%). At 33 years, 11,142 participants provided information on their educational qualifications obtained (response = 72%) and 10,393 on optimism (response 67%). At 42 years 9592 participants provided information on their occupational levels (response = 62%). At 50 years, 8532 participants completed a questionnaire on personality traits (response = 69%). The dependent variable in this study was measured at age 50 years in 2008. The analytic sample comprises 5,663 cohort members (49% females) for whom complete relevant data were collected. Bias due to attrition of the sample during childhood has been shown to be minimal (Davie, Butler, & Goldstein, 1972; Fogelman, 1976).

2.2. Measures

1. *Family social status* includes information on parental social class and parental education. Parental social class at birth was measured by the Registrar General's measure of social class (RGSC). RGSC is defined according to occupational status (Marsh, 1986). Where the father was absent, the social class (RGSC) of the mother's father was used. RGSC was coded on a 6-point scale: I professional; II managerial/technical; IIIN skilled non-manual; IIIM skilled manual; IV semi-skilled; and V unskilled occupations (Leete & Fox, 1977). Scores were reversed in the following analyses. Parental education is measured by the age parents had left their full-time education.
2. *Family social life* was measured when cohort members were at age 7 years. Mothers answered a single-item question on how often they took their children to meet other children outside their houses (Not at all = 0, Very little = 1, Quite often = 2, Every day = 3).
3. *Childhood intelligence* was assessed at age 11 in school using a general ability test (Douglas, 1964) consisting of 40 verbal and 40 non-verbal items.
4. *Childhood speech ability* contains two single-item measures rated by school teachers when cohort members were at age 11 years: speech difficulties (Not at all = 0, Somewhat = 1, Certainly applies = 2) and oral ability (Very limited = 1, Below average = 2, Average = 3, Above average = 4, Exceptional = 5).
5. *Leisure activities* were two measures reported by cohort members at age 16 years. Going to friends' parties was a 2-item measure and Sports was a 3-item measure with the same response (No chance = 0, Hardly ever = 1, Sometimes = 2, Often = 3). Alpha for Parties = 0.62 and alpha for Sports = 0.61.
6. *Optimism* was a measure with three indicators accessed at age

33 years. Never get what I want of life/Usually do (1 = Never get what I want, 2 = Usually get what I want); Usually have control over life/Usually don't (1 = have no real effect, 2 = Usually have control); Satisfaction with way life has turned out so far (1 = Life's just too much, 2 = I can run my life).

7. *Educational qualifications*. This was measured at age 33 years. Responses are coded to the six-point scale of National Vocational Qualifications levels (NVQ) ranging from 'none' to 'university degree or equivalent '.

8. *Occupational levels*. This was measured at age 42 years. Responses are coded according to the RGSC described above, using a 6-point classification mentioned above.

9. *Personality trait Extraversion* was assessed at age 50 years, from the International Personality Item Pool (IPIP) (Goldberg, 1999). Responses (5-point, from "Strongly Agree" to "Strongly Disagree") It is comprised of 10 items. Examples are "I am the life of the party", "I feel comfortable around people", "I don't like to draw attention to myself (R)". Cronbach's alpha coefficient was 0.82 for Extraversion, 0.83 for sub-factor Sociability and 0.76 for sub-factor Attention Seeking.

3. Results

3.1. Factor analysis

Many researchers have suggested that trait Extraversion has identifiable, but separate facets or factors that can yield a more detailed granular analysis which helps explain the psychological processes better. Hence a Principal Component Analysis on the 10 items of Extraversion was conducted, and two subscales were extracted with eigenvalues greater than one accounting for 43.7% of variance. The two sub-factors were Sociability (6-item) and Attention Seeking (4-items). IBM SPSS Statistics version 22 was used for correlation and factor analyses.

3.2. Correlational analysis

Table 1 shows the correlation matrix of means and SDs of all variables examined in the study. The two Extraversion sub-factors were inter-correlated ($r = 0.66$). Extraversion factors were modestly but significantly associated with parental education and childhood social life (meeting other kids outside house), childhood speech difficulties, parties and sports in teenagers, optimism, education and occupation in adulthood ($p < .05$ to $p < .001$). Thus Hypotheses H:1–H:5 were supported. The strongest predictor of Extraversion was parties followed by optimism and occupation.

Gender was significantly and positively associated with Sociability but negatively associated with Attention Seeking.

3.3. Structural equation modelling

Structural equation modelling (SEM) was used to assess the links between gender, family social status, childhood intelligence, education, occupation, and personality trait Extraversion. Paths in the models are designed to correspond with the time sequence in which the variables occurred. The SEM model testing was carried out using the structural equation modelling program AMOS 18 (Arbuckle, 2009). FIML is preferable to maximum likelihood estimation based on complete data (the listwise deletion (LD) approach) since FIML estimates tend to show less bias and are more reliable than LD estimates even when the data deviate from missing at random and are non-ignorable (Arbuckle, 1996).

The loadings of the five latent variables of family social status, childhood intelligence, childhood speech ability, optimism indicators, and the outcome variable Extraversion were shown in Table 2.

Figs. 1 and 2 show the standardised path coefficients of the structural equation model for males and females. The solid lines indicate

Table 1
Pearson correlations among variables used in the study.

Variables	Mean SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Extraversion	29.49 (6.61)	–																		
2. Sociability	21.11 (4.82)	0.93	–																	
3. Attention seeking	11.33 (3.32)	0.88	0.66	–																
4. Gender	0.49 (0.50)	0.08	0.14	−0.05	–															
5. Parental social class	3.27 (1.23)	0.03	0.02	0.04	−0.01	–														
6. Paternal education	15.48 (1.95)	0.05	0.03	0.06	0.02	0.47	–													
7. Maternal education	15.49 (1.55)	0.04	0.03	0.05	0.04	0.34	0.51	–												
8. Meeting other kids	2.72 (0.61)	0.05	0.05	0.04	−0.03	−0.07	−0.05	−0.06	–											
9. Verbal scores	24.05 (8.71)	0.04	0.04	0.04	0.12	0.25	0.23	0.20	−0.06	–										
10. Non-verbal scores	22.52 (7.06)	0.01	−0.01	0.03	0.02	0.26	0.23	0.19	−0.05	0.78	–									
11. Speech difficulties	0.08 (0.29)	−0.06	−0.07	−0.04	−0.12	−0.07	−0.06	−0.05	−0.01	−0.20	−0.15	–								
12. Oral ability	3.16 (0.72)	0.10	0.10	0.08	0.10	0.26	0.24	0.22	−0.05	0.53	0.44	−0.31	–							
13. Parties	5.57 (1.89)	0.19	0.19	0.14	0.20	−0.09	−0.05	−0.08	0.06	−0.08	−0.03	−0.03	−0.04	–						
14. Sports	3.81 (1.46)	0.09	0.06	0.10	−0.23	0.03	0.05	0.03	0.07	−0.07	0.02	0.01	0.01	0.05	–					
15. Optimism indicator 1 get what one wants of life	1.80 (0.40)	0.11	0.11	0.08	0.02	0.06	0.06	0.06	0.02	0.11	0.11	−0.06	0.10	0.04	0.02	–				
16. Optimism indicator 2 have control over life	1.90 (0.30)	0.07	0.06	0.06	0.01	0.01	0.07	0.06	0.01	0.09	0.09	−0.06	0.10	0.01	0.04	0.40	–			
17. Optimism indicator 3 way life has turned out	1.95 (0.22)	0.07	0.06	0.08	−0.06	0.02	−0.01	0.03	−0.05	0.04	0.04	−0.01	0.03	0.02	0.04	0.34	0.34	–		
18. Educational qualifications	2.72 (1.44)	0.07	0.04	0.09	−0.08	0.31	0.30	0.26	−0.05	0.46	0.44	−0.12	0.40	−0.17	−0.06	0.15	0.14	0.06	–	
19. Occupational levels	4.05 (1.21)	0.11	0.08	0.12	−0.04	0.22	0.20	0.18	−0.04	0.32	0.32	−0.12	0.31	0.05	0.02	0.14	0.13	0.07	0.49	–

Note: Variables were scored such that a higher score indicated being female, higher scores on extraversion and sub-factors, a more professional occupation for the parent and higher age parents left school, meeting other kids more often, higher verbal and non-verbal cognitive ability scores, more speech difficulties and higher oral ability, being more optimistic in life, highest educational qualification, and more professional occupation for cohort members. The outcome measures were in bold.

Table 2
Measurement of the latent variables and SEM of Extraversion by gender.

Variables	Males			Females		
	Unstandardized estimate	Standard error	Standardised estimate	Unstandardized estimate	Standard error	Standardised estimate
Parental social class loadings						
RGSC	1.000		0.631	1.000		0.598
Father's education	1.924	0.082***	0.773	2.167	0.100***	0.775
Mather's education	1.211	0.054***	0.635	1.378	0.066***	0.628
Childhood intelligence loadings						
Verbal	1.000		0.924	1.000		0.952
Non-verbal	0.729	0.016***	0.838	0.714	0.016***	0.818
Childhood Speech Ability loadings						
Speech difficulties	1.000		−0.355	1.000		−0.372
Oral ability	5.767	0.494***	0.965	5.808	0.771***	0.943
Optimism loadings						
Get what one wants of life	1.000		0.645	1.000		0.653
Have control over life	0.315	0.023***	0.449	0.564	0.031***	0.600
Way life has turned out	0.698	0.050***	0.612	0.742	0.041***	0.644
Extraversion loadings						
Sociability	1.000		0.819	1.000		0.838
Attention Seeking	0.702	0.049***	0.847	0.670	0.049***	0.791
Predicting extraversion						
Meeting kids outside house	0.180	0.130*	0.037	0.390	0.138**	0.061
Childhood Speech Ability (latent)	2.232	0.776**	−0.069	5.808	0.771***	0.086
Parties	0.508	0.064***	0.194	0.540	0.071***	0.184
Sports	0.204	0.052***	0.094	0.196	0.051***	0.092
Optimism (latent)	1.542	0.443***	0.104	1.865	0.434***	0.121
Education	−0.016	0.074	−0.006	0.067	0.077	0.024
Occupation	0.332	0.083***	0.103	0.201	0.086***	0.060

Note: **$p < .01$; ***$p < .001$.

that the corresponding path coefficients were statistically significant and dashed line indicates that the path coefficients were non-significant. Measurement errors for each observable variable were included in the model (not shown in the diagram).

The χ^2 statistic is overly sensitive when sample sizes are large or the observed variables are non-normally distributed. The root mean square error of approximation (RMSEA) gives a measure of the discrepancy in fit per degrees of freedom (< 0.05 indicates a good fit). The indices of

Chi-square=319.5
df=98
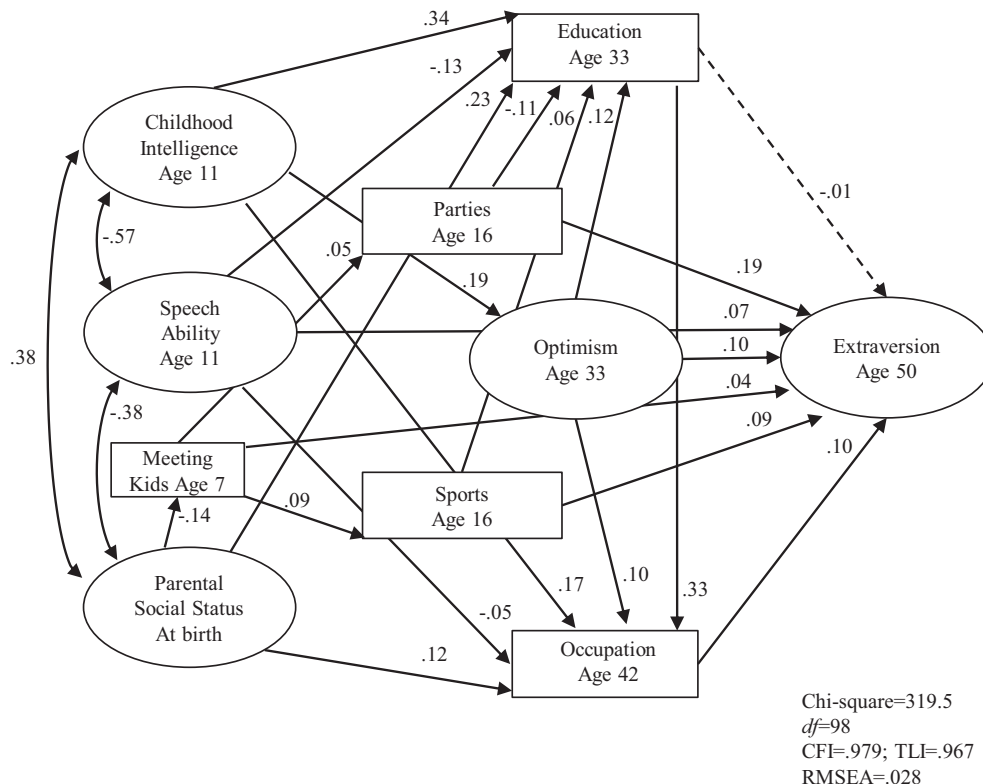CFI=.979; TLI=.967
RMSEA=.028

Fig. 1. Predicting Extraversion path model (males = 2885).
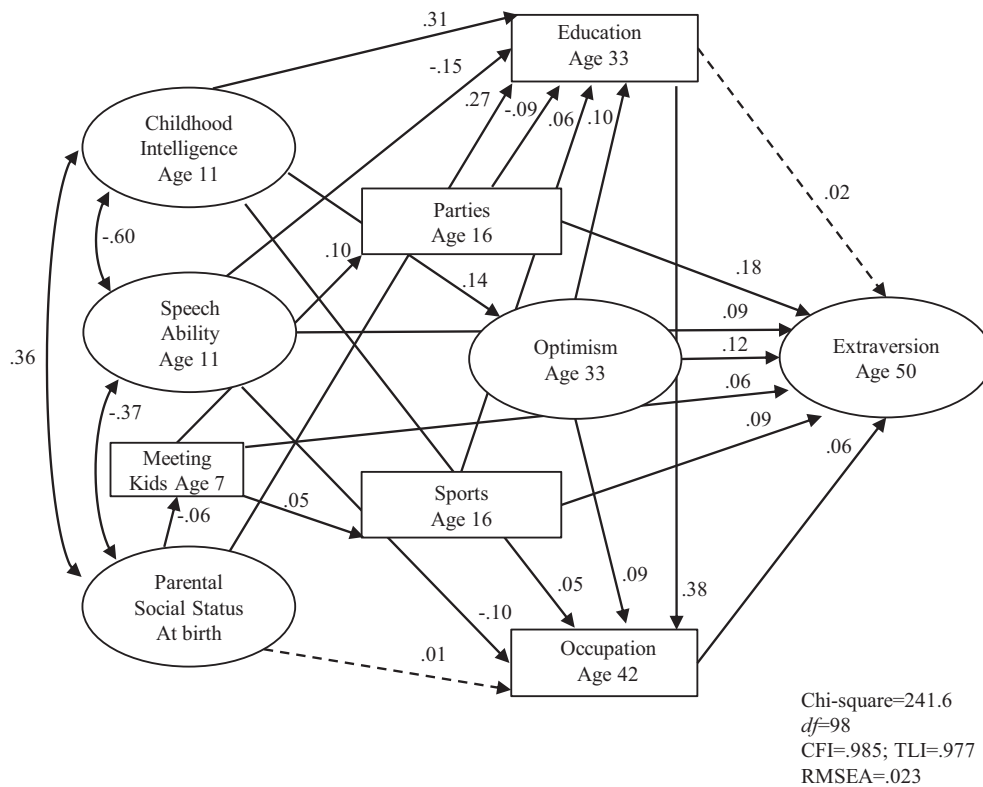
Fig. 2. Predicting Extraversion path model (females = 2778).

choices are the Comparative Fit Index (CFI), and the Tucker Lewis Index (or Non-normed Fit Index) where values above 0.95 indicate a very good fit (Bentler, 1990).

Fig. 1 shows that childhood social life and speech ability, parties and sports in teenagers, optimism and occupation were significant and direct predictors of Extraversion at age 50 years for men. The model showed a good fit. Chi-square was 319.5 (df = 98, p < .001), the CFI was 0.979, the TLI was 0.967, and the RMSEA was 0.028. The model explains 9% of the total variance of Extraversion in adulthood for the male sample.

Fig. 1 shows that childhood social life and speech ability, parties and sports in teenagers, optimism and occupation were significant and direct predictors of Extraversion at age 50 years for women. The model also showed a good fit. Chi-square was 241.6 (df = 98, p < .001), the CFI was 0.985, the TLI was 0.977, and the RMSEA was 0.023. The model explains 9% of the total variance of Extraversion in adulthood for the female sample.

4. Discussion

The findings of the study shows that six factors, namely childhood social life (whether and how often children were meeting children outside their house), childhood speech ability (whether children had any speech difficulties and children's oral ability), parties and sports participation in teenage years, optimism and occupation, were all systematically related to Extraversion at age 50 years. As predicted all hypotheses were supported: children who had more frequent meetings with other children, who had good oral ability and no speech difficulties, who often went to friends' parties and had more sports activities in teenagers, cohort members who had higher scores on optimism and had higher levels of occupation tended to score higher on Extraversion. The strongest correlate was party attendance at aged 16 years.

Structural equation models show that the patterns are very similar for men and for women. For both samples the strongest predictor for Extraversion is going to friends' parties at age 16 years. While it is

understandable that parties and sports were independent predictors of Extraversion 34 years later at age 50 years, it is also likely that extra-verts go to parties more often and have more frequent sports activities.

It should be noted that although going to friends' parties and taking part in sports activities were both significant predictors of Extraversion, these two factors are distinct constructs and are associated with different variables. For example, sports was a significant and positive predictor of educational qualifications 17 years later at age 33 years (path coefficient = 0.09 for both men and women, p < .001) whereas parties was a significant but negative predictor of the same variable (path coefficient = −0.11 for men and − 0.09 for women, p < .001).

It is interesting to note the modest, but significantly positive association between childhood intelligence and adult Extraversion. The relationship between personality and intelligence suggests the two are modestly related but that the relationship changes over time such that Extraversion is positively associated with intelligence in childhood but negatively in adulthood. The data in this study show that the relationship between childhood intelligence and adult Extraversion is mediated through occupation and optimism.

How to explain the association between occupation at aged 42 years and Extraversion eight years later? Attraction-Selection-Socialisation-Attrition theory suggests that people select occupations in line with their (personality) preferences and values, which then get modified through socialisation on the job. Hence the Introvert may be turned into the socialised-Extravert because of the job requirements. This process occurs particularly with people at senior levels where numerous social events require Extraverted behaviour (Furnham, 2018a).

One central question is whether these results speak to the nature-nurture debate with respect to Extraversion. Thus it could be argued that early signs of sociability, like meeting other children, going to parties and oral ability are manifestations of a biological traits which is explicable in terms of need for arousal, sociability and impulsivity. On the other hand it could be argued that these experiences shape Extraversion in adulthood. Clearly the earlier the marker the more confidence one might have in a biological/nature explanation.

The relatively low correlations found here could be cited as evidence that Extraversion is mostly unrelated to social variables measured earlier in life. In all 9% of the variance is explained by nine such predictors. Alternatively, it is possible to suggest the results support the nurture concept by marvelling that 9% of the variance is explained in a statistically significant structural equation model. Clearly, the same data could be used to support either position which is not unreasonable given that the heritability of Extraversion h^2 is around 0.50. Obviously, the question could have been answered more clearly had we had a good measure of Extraversion in childhood, adolescence and early adulthood. Other data of this sort, which has examined other traits like Neuroticism suggests more evidence of the nature, rather than nurture, explanation of the origins of traits (Furnham & Cheng, 2015).

There are various questions which our data could not answer. For instance, to what extent did the children choose to go to parties or were "taken along" by their parents who thought it might be good for them. Presumably the more they enjoyed parties the more eager they were to go to others. Further it would have been interesting to know more about the children's speech difficulties.

Like all studies this had limitations. Personality was only measured once at age 50 years. While the scale used in this study is psychometrically robust and reliable there are many other measures which may yield slightly different results depending on how much items tap into different facets (Wilt & Revelle, 2009). Longitudinal data with personality traits measured in earlier age (see around 10–20 of age) would be desirable to ascertain changes over time. Equally it would have been very desirable to have had a measure of the participants' parent's personality scores. More importantly many of the variables (i.e. speech ability/difficulty) were measured by single items and although the scores seemed logically related to other variables it would always be better to have a better validated psychometric measure with a good alpha.

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