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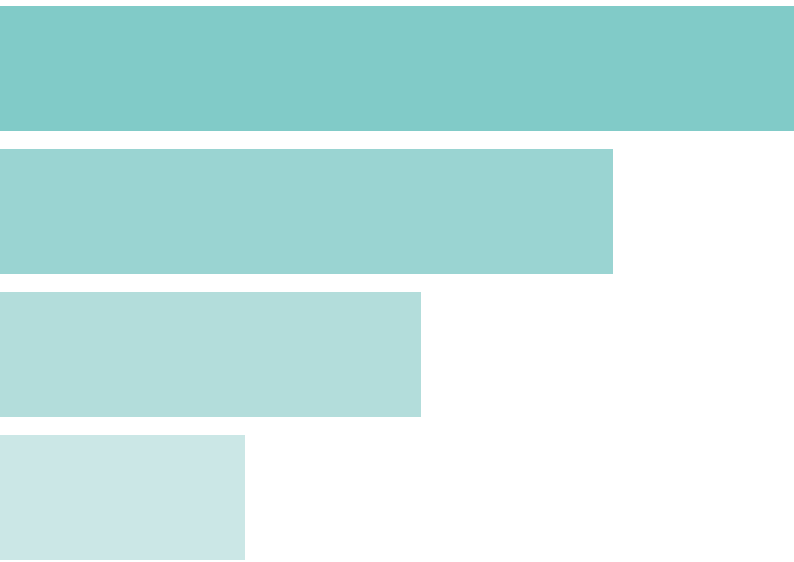
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A WINNING PERSONALITY

The effects of background on personality and earnings

Dr Robert de Vries and
Dr Jason Rentfrow
January 2016



FOREWORD

To get the best jobs, you need the best grades. It's an apparent truism that many take for granted. But is that all that's needed for a successful career in a top-earning profession? What about more intangible qualities that are not taught in the curriculum, such as confidence, aspiration and social skills?

Using data from the BBC's Big Personality Test, this report considers the links between personality, social skills and earnings finding a clear correlation between them. Those with the right social skills generally earn more than others. David Deming's recent Harvard research shows that almost all the job growth in the United States over the last 20 years has come from jobs which require social skills and this is likely to accelerate.

So, what is instilling this greater confidence and enabling careers to flourish? For a variety of reasons, it seems that children from advantaged backgrounds are more likely to develop the personality characteristics that benefit them in the labour market. Such children are more likely to attend high-performing schools (including independent schools), live in homes conducive to learning and receive private tuition. As a result, their advantage goes beyond their greater academic success.

Ensuring a level academic playing field is a huge challenge. The education secretary, Nicky Morgan, has rightly recognised the need for what she calls 'character education'. Through our sister charity, the Education Endowment Foundation, we're currently testing some promising approaches in schools. We need to find ways to ensure that all students gain the ability to present themselves well in interview, and to compete with those from more privileged backgrounds. While good results and a good university are often important, they are not always decisive. While we can't replicate all the networks and other privileges that the best independent schools use to boost self-confidence, we can do more to build the career aspirations of young people and foster the skills and attitudes they need to succeed.

The Sutton Trust sends thousands of students on summer school programmes to the UK's and US's best universities. It is an experience that they might not otherwise have had and gives them the confidence that these kinds of universities are within their reach. In addition, our 'pathway' programmes (to law, medicine and other top professions) inspire and support academically-able young people from disadvantaged backgrounds wishing to pursue careers in the UK's top professions. These programmes build both aspirations and confidence, and we need more such opportunities throughout the system.

Schools have an important role to play. Careers advisers should improve knowledge and awareness of top professional careers amongst less advantaged students, allowing for high, but realisable aspirations. But non-cognitive skills can be developed through every subject, whether it is encouraging good communication, raising aspirations or developing presentation skills. Intervention programmes aimed at improving outcomes for disadvantaged young people have traditionally focused on their academic achievement. Good results matter, but interventions must be more holistic, focusing on developing students' personalities and fostering the confidence to succeed.

Research is at an early stage, and as we learn more about young people's non-cognitive skills and how these affect their future careers, we can develop approaches that really make a difference. I'd like to thank Rob de Vries, lecturer at the University of Kent and a former Sutton Trust research fellow, and Jason Rentfrow, senior lecturer at the University of Cambridge, for their excellent work on this report.

Sir Peter Lampl, Chairman, Sutton Trust and Education Endowment Foundation

EXECUTIVE SUMMARY

Previous research has suggested that, in addition to cognitive skills such as intelligence or a good memory, social or non-cognitive skills such as aspirations, confidence and personality can have an important effect on career success.

- These non-cognitive skills are likely to be related to family background, with the conditions of a more advantaged upbringing being more beneficial in their development. These characteristics may therefore have a substantive role in social mobility.
- In this project, we used two separate approaches to examine the association between family background and characteristics related to personality and aspirations, and between these characteristics and adult career attainment:
 1. A review of the existing evidence from 90 peer-reviewed academic studies
 2. An analysis of information on the non-cognitive characteristics of more than 150,000 UK residents, based on data from the BBC Big Personality Test – the largest survey of this type ever conducted in the UK
- Together, these two sources of information highlighted significant relationships between family background and several key non-cognitive characteristics, and between these characteristics and subsequent career success.
- In terms of personality, the literature review identified **extraversion** (sociability, confidence, assertiveness), **self-esteem**, and a **positive outlook** as particularly beneficial for career success, and an **external locus of control** (a belief that one's successes and failures are outside one's control) to be particularly detrimental.
- Our analysis of the BBC data confirmed the importance of extraversion. We found that highly extraverted people – those who were more confident, sociable or assertive - had a 25% higher chance of being in a high-earning job (over £40,000 per year), with the odds being higher for men than women. We also found that people who scored high for **conscientiousness** (thoroughness, and a preference for planning and order) had approximately a 20% higher chance of having a high-paying job.¹
- Both the literature review and our analysis of the BBC data showed a clear positive relationship between **economic/occupational aspirations** and career success. Again, some of the association observed in the BBC data may be due to the effect of current circumstances on future aspirations. However, long-term studies included in the literature

¹ It is important to note that the BBC analysis is based on data from a single survey which measured both personality and earnings. It is therefore impossible to determine the extent to which the relationships we observe are based on the effect of personality on earnings, as opposed to the effect of earnings on personality. However, previous research has found that personality traits develop early and remain relatively stable over time. The effect of current career circumstances on personality is therefore likely to be less important than the reverse.

review confirmed a strong effect of aspirations on future attainment. These studies also showed this effect to be independent of cognitive ability.

- Personality and aspirations were found to be strongly affected by social background. Our analysis of the BBC data showed that people from more advantaged backgrounds (those whose parents had professional jobs) had significantly higher levels of extraversion and very substantially higher economic aspirations (particularly for men). These findings were largely consistent with the findings of the literature review.
- These results strongly suggest that non-cognitive characteristics like personality and aspirations play an important role in social mobility. For a variety of reasons, children from more advantaged backgrounds appear more likely to develop personality characteristics and aspirations which subsequently benefit them in the labour market. There are likely to be many reasons for this, including the fact that children from lower income backgrounds are more likely to experience stress and instability at home.
- The UK is one of the most economically unequal of the rich countries, and closing many of the gaps we describe will require systemic change beyond the scope of this report. However, with social skills becoming increasingly important in the labour market, efforts must be made to address these disadvantages. Our recommendations for action are given below.

RECOMMENDATIONS

1. Schools should work to improve knowledge and awareness of professional careers among less advantaged students

Career aspirations are often driven by family knowledge and social contacts, which advantages professional families. Schools can help close this gap by providing good careers information and realistic pathways to achieve them – including through selective universities and the best apprenticeships. Schools should also teach interview techniques and help develop the personality characteristics that help students access the best jobs.

2. Schools should use good feedback to improve pupils' social skills

Schools understandably focus on improving students' academic performance. However, they should also consider other personality characteristics, including aspiration and social skills, which this research shows are important in securing the best careers. These skills can be developed by assessment and feedback practices, including encouraging self-confidence and cultivating a sense that students' can improve their results with commitment.

3. Intervention programmes aimed at improving outcomes for disadvantaged young people should be broad-based – focusing on wider skills as well as academic attainment

Evidence from US early-years and adolescent research shows that interventions that provide social support and facilitate socio-emotional development – for example, the Perry Pre-School programme and the Big Brothers/ Sisters of America schemes – improve academic and employment outcomes for disadvantaged students. Academic attainment is still the best predictor of career success, but our results suggest there is much to be gained from an additional focus on developing other skills, such as sociability, confidence and aspiration.

4. Schools and universities should provide students with suitable training in employability skills and interview techniques

One of the ways in which confidence, aspiration and social skills may provide a career advantage is through their relationship to employability skills and interview performance. Schools and universities should have programmes in place to encourage the development of these skills, including direct training and work experience (internships at the university level). These should include video-based interview techniques, where students can review their interview performance with expert support.

5. More research is required on interventions to improve beneficial personality traits

A 2013 review by the Education Endowment Foundation concluded that evidence on the effectiveness of interventions to improve non-academic skills was sparse. The EEF recently conducted a formal call for research on this topic, match funded by the Department for Education. Other research funding bodies should follow their example and fund research in this important area so that in addition to those interventions outlined in this report, others can be identified and implemented.

INTRODUCTION

Levels of social mobility in the UK are poor. A large volume of quantitative research confirms that people from poorer backgrounds are much less likely to end up in high-paying, professional jobs than are their more advantaged peers. The most straightforward explanation for this pattern focuses on education and academic achievement. Children from richer backgrounds are more likely to have a home environment conducive to learning,² and are more likely to attend high-performing schools³ (including private schools) while also being more likely to receive extra tuition outside school.⁴ These advantages are reflected in better average grades throughout their school lives,⁵ and in better access to university (particularly the most elite universities)⁶ and subsequently to a professional career.⁷

While academic attainment and cognitive skills are extremely important in securing a good career, they are unlikely to be the only factor at play. There are good reasons to believe that non-cognitive 'soft' skills and characteristics are also important. Non-cognitive characteristics are separate from cognitive skills like intelligence or a good memory. They include factors like personality, confidence, aspirations and social skills. Many of these characteristics are clearly valued in the workplace and are likely to be important for a successful career.

Non-cognitive characteristics and career success

The likely effect of some non-cognitive characteristics is relatively straightforward. For example, research has consistently shown that having high career aspirations has a positive effect on actual career outcomes.⁸ Similarly, other research has suggested that high self-esteem can have a positive effect on success in the labour market.⁹ However, the effects of other characteristics, like personality, are less clear.

People's personalities are clearly highly complex and difficult to measure objectively. There are therefore a correspondingly large number of differing measures of personality traits. The currently dominant psychological model, the "Big Five", separates overall personality into five broad factors: extraversion (sociability, assertiveness, enthusiasm), agreeableness (altruism, compliance, sympathy), conscientiousness (competence, thoroughness, self-discipline), openness (receptiveness to new experiences, curiosity, imagination) and neuroticism (anxiety, extreme emotional reactions, high levels of self-consciousness). More detail on the Big Five model is given in Box 1 below.

Due to the popularity of the Big Five, it is these non-cognitive characteristics which have been most often studied in relation to career outcomes. Extraversion and conscientiousness are generally

² Bradley et al., 2001

³ Sutton Trust, 2008

⁴ Sutton Trust, 2014

⁵ Social Mobility and Child Poverty Commission, 2014

⁶ Independent Commission on Fees, 2014

⁷ Milburn, 2012

⁸ e.g. Schoon & Polek, 2011; Ashby & Schoon, 2010; Schoon & Parson, 2002

⁹ Dunifon & Duncan, 1998

hypothesised to be beneficial for career success.¹⁰ Extraverted people are assertive, enthusiastic, and outgoing, while conscientious people are efficient, organised, and careful – all characteristics which seem likely to be rewarded in the labour market.

The likely effects of agreeableness and openness are less certain. The high level of warmth, kindness, and compliance displayed by those high in agreeableness may make them good employees, and might therefore be beneficial for career success. Alternatively, being altruistic, trusting and compliant may disadvantage agreeable people when they are competing with more sharp-elbowed colleagues. Similarly, creativity and intellectual curiosity may be positive characteristics of openness. However, they, along with the artistic interests and non-conformist values associated with this trait, may not necessarily translate into high earnings.

The final Big 5 measure, ‘neuroticism’ has been consistently linked to lower levels of career success.¹¹ As noted in Box 1, neuroticism is associated with emotional instability and depressive and anxious tendencies, and these characteristics have been hypothesised to interfere with career development in a variety of ways.¹² However, while Big 5 neuroticism is not a measure of mental illness, high scores on this trait are positively associated with clinical depression and anxiety.¹³ Sufferers of mental illness face many occupational challenges, sometimes including stigma and discrimination (though of course many succeed in building a successful career in spite of this). It is therefore possible that some of the apparent negative effects of neuroticism are in fact due to the association between this trait and mental health problems. With the data at our disposal we are unable reliably to disentangle these effects.

The implications of an association between mental health and career success are outside the scope of this report, particularly given the fact that interventions to address this issue are likely to be very different to those that would be effective for other non-cognitive characteristics. Analysis of the neuroticism trait has therefore not been included in this report.

¹⁰ E.g. Mueller & Plug, 2004

¹¹ *Ibid*

¹² E.g. Shanahan et al., 2014

¹³ Schmitz et al, 2003

1. The Big Five model of personality

The Big Five model breaks personality down into five non-overlapping traits, each of which covers a range of more specific subsidiary characteristics.

Extraversion covers traits associated with sociability and gregariousness. People with high extraversion scores tend to seek out the company of others and to be enthusiastic, energetic, talkative, and assertive.

- Typical question (positive): "Do you see yourself as someone who generates a lot of enthusiasm?"
- Typical question (negative): "Do you see yourself as someone who is reserved?"

Agreeableness is similar to 'niceness'. It covers traits associated with kindness and compliance. People with high agreeableness scores tend to be helpful, compassionate, trusting, and willing to go along with what others want. Low scorers tend to be antagonistic, competitive, detached, and self-focused.

- Typical question (positive): "Do you see yourself as someone who is generally trusting?"
- Typical question (negative): "Do you see yourself as someone who can be cold?"

Conscientiousness covers traits associated with organisation and industriousness. People with high conscientiousness scores tend to appreciate planning and order, and to be hard-working, efficient, and self-disciplined. People with low scores tend to be spontaneous, careless, and easy-going.

- Typical question (positive): "Do you see yourself as someone who is a reliable worker?"
- Typical question (negative): "Do you see yourself as easily distracted?"

Neuroticism covers traits associated with emotionality and self-esteem. People with high neuroticism scores tend to be anxious, discontented and impulsive. Low scorers tend to be happy, confident and emotionally stable.

- Typical question (positive): "Do you see yourself as someone who can be tense?"
- Typical question (negative): "Do you see yourself as someone who is relaxed?"

Openness (also called openness to experience) covers traits associated with intellectual curiosity, imagination, and a preference for novelty. High scorers tend to be interested in art and new experiences, and to be creative, imaginative, and non-conformist.

- Typical question (positive): "Do you see yourself as someone who is inventive?"
- Typical question (negative): "Do you see yourself as someone who has few artistic interests?"

These traits are not based on a pre-existing theory of personality, but (primarily) on analysis of responses to psychological surveys in which respondents answer questions about their characteristics, interests, and behaviour. Examining how these responses group together yields information about how personality is structured.

Outside the Big 5, a further characteristic commonly studied in relation to career success is *locus of control*. Locus of control describes the extent to which people feel that they are in control of what happens to them. People with a highly *internal* locus of control feel that they are in control of their own lives – they attribute success or failure to their own effort and abilities. By contrast, those with an *external* locus of control tend to attribute success or failure to factors like luck or the actions of others. An external locus of control is generally considered to be detrimental to career success.¹⁴

Non-cognitive characteristics and family background

For non-cognitive characteristics like personality and aspirations to play a role in social mobility, they must relate both to adult career outcomes and family background. Are children from more advantaged backgrounds more likely to develop potentially beneficial non-cognitive characteristics like high extraversion and an internal locus of control?

Compared with the effect of non-cognitive characteristics on labour market outcomes, this question has received relatively little direct attention. However, there are reasons to believe that a more economically advantaged upbringing may promote beneficial non-cognitive development. Most directly, children in more advantaged households are more likely to be exposed to models of high career attainment, encouraging higher aspirations. Previous research has shown that young people often align their aspirations with jobs they are directly familiar with through family members or other direct adult social contacts.¹⁵

Other characteristics of a more advantaged upbringing may also have an effect on personality and aspirations. Children growing up in better off families tend to have less stressful and demanding home lives – for example, they are less likely to be exposed to family conflict and divorce, and less likely to have homes that are crowded or noisy.¹⁶ Outside the home they are also less likely to experience bullying or to fight with other children.¹⁷ More straightforwardly, the experience of higher family status and prestige may also have a direct positive effect on children's wellbeing and confidence.¹⁸ Finally, children's personalities have been shown to be highly correlated with those of their parents.¹⁹ Better off parents may therefore be 'handing down' characteristics which helped them become successful themselves.

These and other mechanisms may help to explain previous research suggesting that people from more advantaged family backgrounds tend, on average, to score higher for extraversion and conscientiousness,²⁰ and to have a more internal locus of control.²¹

It is important to note here that these findings are not an invitation to blame worse off parents for negative outcomes for their children. Many factors which may affect children's non-cognitive

¹⁴ E.g. Groves, 2005

¹⁵ Archer et al., 2013

¹⁶ Evans, 2004

¹⁷ Deater-Deckard et al., 1998

¹⁸ Blanden et al., 2007; Duncan et al., 1994

¹⁹ Groves, 2005; Anger, 2011

²⁰ Shanahan et al., 2014; Furnham & Cheng, 2014

²¹ Blanden et al., 2007

development, such as overcrowding or stress caused by money worries, are a consequence of a lack of financial resources. A more external locus of control may also result from a genuine lack of control experienced by children in more disadvantaged circumstances. It is also worth noting that studies have suggested no effect of socio-economic background on characteristics like altruism,²² which, while potentially neutral in terms of career attainment, are nevertheless valuable for society as a whole.

We should also note that any relationships observed between family background and non-cognitive characteristics are not straightforward and deterministic. Put simply, being from a disadvantaged background does not inevitably mean that someone will be introverted and lack aspirations. Personality and aspirations develop under the influence of many different factors, with socio-economic status by no means the most important. Any differences that may exist are in terms of averages only. There will be many children from poor backgrounds who end up as highly extraverted, confident adults, and many from rich backgrounds who do not. Relationships can also be changed – aspirations can be altered through interventions, stresses and strains associated with lack of money can be ameliorated: social programmes cannot completely level the playing field, but they can do a better job. We return to this topic in more detail in our concluding remarks.

Aims of the report

The overall aim of this study was to discover the potential role of non-cognitive characteristics in social mobility or immobility by examining i) the association between parental socio-economic status and personality and aspirations (are people from more advantaged backgrounds more likely to have certain characteristics?), and ii) the association between these personality and aspirations and adult career attainment (are people with certain characteristics more likely to end up in high-paying jobs?).

We addressed these questions using two approaches:

1. A review of the existing evidence from 90 peer-reviewed academic studies.
2. A new analysis of information on the non-cognitive characteristics of more than 150,000 UK residents, based on data from the BBC Big Personality Survey – the largest survey of this type ever conducted in the UK.

In this report, we focus on earnings as a straightforward measure of adult career success. We recognise that this is a narrow definition which does not acknowledge other forms of attainment. For example, as noted above, more socially or artistically oriented people may be drawn to occupations which don't pay well, but are nevertheless richly rewarding. However, income remains an extremely important component of wellbeing, and we consider it to be of particular interest to those concerned with social mobility.

²² Hitlin, 2006

LITERATURE REVIEW

To summarise the findings of previous research we conducted a review of the academic literature relating to family background, socio-economic status and adult socio-economic attainment. We included research studies published in peer-reviewed academic journals, the primary purpose of which was to examine a) the association between socio-economic background (measured in terms of parents' education, income, or occupation) and non-cognitive characteristics, and or b) the association between non-cognitive characteristics and adult socio-economic attainment (measured in terms of income or occupational or social class).

Search strategy

We searched the Web of Science database²³ for peer-reviewed, English language academic articles published at any time whose listed topics included at least one term relating to non-cognitive characteristics (such as 'personality', 'aspirations', or 'non-cognitive characteristics') **and** at least one term relating to family socio-economic background (such as 'parental income', 'parental education', or 'childhood family income') **or** adult socio-economic attainment (such as 'career success', 'labour market outcomes', or 'earnings'). We further restricted the results to studies published in the areas of psychology, economics, sociology, business, education, or family studies. Full details of the search terms included are given in Appendix A.

Search results

Our Web of Science search returned 736 articles. We inspected the title and abstract of each article and excluded articles whose primary research focus did not meet the criteria defined above (those where the primary research focus was something other than the association between parental SES and non-cognitive skills and/or the association between non-cognitive skills and adult SES). Due to our broad search terms, many of the studies examined were excluded, largely because they measured only academic (rather than occupational) outcomes or aspirations, because they examined only intrinsic career outcomes (such as job satisfaction), or because they examined only peripheral labour market outcomes such as entrepreneurship. A more complete list of the types of study we excluded is given in Appendix B.

In total 643 studies were excluded based on inspection of the abstract and title. A further three relevant studies were excluded as full article texts were not available at the time of writing, leaving 90 relevant articles included in the final review.

We examined the full text of each of the 90 studies identified and recorded the following basic information:

- The research context and population studied – for example was the study conducted in a representative sample of a population, or a particular group?
- The non-cognitive characteristics included in the analysis

²³ Web of Science is a bibliographic database which indexes articles from more than 10,000 academic journals in medicine, science, social science, the humanities, and the arts.

- The relationship identified between parental SES and each characteristic (if this was examined)
- The relationship identified between each characteristic and adult socio-economic attainment (if this was examined)

Full details for each study are given in Appendix C. In the section below we present a summary of the findings.

Literature review findings

Personality – the Big Five

As noted above, Big Five personality traits were the most commonly investigated non-cognitive characteristics in the studies we reviewed. Table 1 gives a summary of the review findings for each Big Five trait. The table includes traits which were not measured as part of the Big Five, but are closely associated. For example, the ‘communion’ trait is conceptually very similar to the Big Five agreeableness trait. It should be noted that the studies included in this summary may use different measures of career outcomes (for example earnings versus social class), and different study populations (for example a large, representative sample of UK residents versus a small sample of graduates from a single US university). This summary should therefore be taken only as a general guide to the pattern of results for each trait.

Table 1. Numbers of primary research studies showing negative, null, or positive relationships between Big 5 (and closely related) personality traits and parental and adult SES

	Relationship to parental SES			Summary	Relationship to adult attainment			Summary
	-	null	+		-	null	+	
Agreeableness	0	1	2	Generally positive	1	14	2	Mixed
<i>B5 Agreeableness</i>	0	0	2		3	13	2	
<i>Altruistic values</i>	0	1	0		-	-	-	
<i>Communion (kind, understanding etc.)</i>	-	-	-		0	1	0	
Conscientiousness	0	0	4	Strongly positive	2	12	1	Mixed
<i>B5 Conscientiousness</i>	0	0	3		4	11	1	
<i>Conscientious perfectionism</i>	-	-	-		3	0	1	
<i>Application</i>	0	0	1		0	0	1	
Extraversion	0	0	3	Strongly positive	2	10	1	Generally positive
<i>B5 Extraversion</i>	0	0	3		8	9	1	
					7			

<i>Myers-Briggs Extraversion</i>	-	-	-		0	1	0	
<i>Myers-Briggs Introversion (inv)</i>	-	-	-		0	0	1	
Openness	1	0	1	Mixed	5	14	6	Generally unrelated
<i>B5 Openness</i>	1	0	1		5	13	6	
<i>Open-mindedness</i>	-	-	-		0	1	0	

Note: Null indicates that a study found no statistically significant association between the trait and parental/adult SES. 'Inv' indicates that a trait has been reversed. For example, introversion reflects the opposite pole of Extraversion. Therefore a study showing a positive effect of introversion is recorded in the table as a negative result for Extraversion.

Table 1 shows that, as many of the authors hypothesised, **extraversion** (reflecting assertiveness, sociability, and positive energy) was generally found to have a beneficial effect on adult socio-economic attainment. Perhaps surprisingly, findings on **conscientiousness** were more mixed. Very few studies found conscientiousness to harm career success. However, only around half found it to be beneficial, with the remainder finding no effect. One possible explanation for this finding is that the positive effects of the hardworking, self-disciplined facet of the conscientious personality might be balanced out by the negative effects of perfectionism or a strong aversion to spontaneity. This may be particularly true in some careers and where they are taken to extremes.

The results for **agreeableness** were also mixed. However, unlike conscientiousness, very few studies found agreeableness to be beneficial. The balance was instead between studies showing a detrimental effect and those finding no association. As we noted in the introduction, this skew towards negative findings might be due to the facet of agreeableness associated with modesty and compliance. Humbly performing one's duties without complaint may make one a good employee, but an aversion to conflict and competition may also hinder promotion. A sympathetic and altruistic nature may also encourage highly agreeable people to pursue more socially focused careers, for example in the caring professions or in the non-profit sector, which may offer fewer financial rewards. Given this, it is important to reiterate that the measuring career success by earning potential is only one potential measure.

Finally, **openness** was generally found to be unrelated to adult socio-economic attainment, though some studies did find a positive - and others a negative - effect. As with agreeableness, this may be a case in which different facets of openness may have opposing effects, or may be advantageous or detrimental only for certain career paths. For example, intellectual curiosity and creativity may help some highly open individuals succeed academically and in some professions; whereas for others an artistic persuasion or an aversion to conformity may lead towards occupations with low potential financial returns, for example in the arts.

As Table 1 shows, many fewer studies have directly investigated the potential effect of social background on Big Five personality characteristics. The few available studies have tended to find that people from more advantaged backgrounds have higher average levels of agreeableness, conscientiousness and extraversion. Researchers have pointed to the relative comfort, predictability

and reduced conflict associated with a better off home as a potential explanation. A sense of unpredictability or lack of control may negatively affect children’s perception of the value of planning and self-discipline;²⁴ while stress and interpersonal conflict may hinder the development of trust, confidence, and positive emotionality.²⁵ Only two studies examined the association parental socio-economic status and openness, with one showing a positive and the other a negative effect.

So what do these results suggest for the role of the Big Five in social mobility? First, there is a relatively strong indication that extraversion is an important characteristic. People from more advantaged backgrounds are more likely to be more extraverted – more confident and assertive – and seem likely to have more successful careers as a result.

The existing evidence for the other characteristics is less clear. There is a suggestion that agreeableness may hold children from better off homes back. Here, an advantaged background may contribute to higher scores on this trait, which in turn may be detrimental to their future earnings.

Aspirations

Table 2 shows that the literature review findings for aspirations were more straightforward than for personality. All 12 of the studies investigating the association between general or occupational aspirations and socio-economic attainment found a significant positive relationship. All eight of the relevant studies also found that people from more advantaged backgrounds tended to have significantly higher aspirations.

Table 2. Numbers of primary research studies showing negative, null, or positive relationships between aspirations and parental and adult attainment

	Relationship to parental SES				Relationship to adult attainment			
	-	null	+	Summary	-	null	+	Summary
Occupational aspirations	0	0	7	Strongly positive	0	0	10	Strongly positive
General ambition	0	0	1	Strongly positive	0	0	2	Strongly positive
Leadership aspirations	-	-	-	-	0	0	2	Strongly positive
Childrearing aspirations	-	-	-	-	0	1	1	Mixed
Social aspirations	-	-	-	-	1	0	0	Strongly negative
Future planning	-	-	-	-	0	0	2	Strongly positive

²⁴ *Ibid*

²⁵ Conger & Donnellan (2007)

These results strongly suggest that aspirations play a direct role in social immobility – a possibility that some of the included studies investigated directly. Schoon and Polek (2011) used data from two British birth cohorts (one group born in 1958, and the other in 1970) to examine the relationship between social background and aspirations at age 16, and the effect of these aspirations on subsequent career attainment. They found that children whose parents had higher status jobs were significantly more likely to aspire to a professional career themselves. In the 1970 cohort, the effect of social background on aspirations was even stronger than that of cognitive ability. In other words the effect of being bright and doing well at school on your aspirations was weaker than the effect of having professional parents. Schoon and Polek cite several possible reasons for this including children from more advantaged homes having greater access to professional role models, occupational knowledge, and educational opportunities. For both cohorts, high aspirations were strongly beneficial for career attainment. Teenagers with professional aspirations were significantly more likely to go on to higher education, and to be in professional employment by their mid-thirties – regardless of their social background or cognitive ability.

These results accord with the findings of the two studies on future planning, both of which show the benefits of having a defined future career plan. This is an important part of career aspirations which may also be held back by a lack of exposure to role models and poor occupational knowledge.

Only a small number of studies investigated other types of aspiration. However, the single study of pro-social aspirations (an ambition to help others) found it to have a detrimental effect on socio-economic attainment. This is consistent with some of the negative results found for the agreeableness trait in showing that a self-effacing mindset may reduce earnings potential. In our analysis we examined both occupational and social aspirations, along with aspirations in a number of other areas such as relationships, and these are reported below.

Other non-cognitive characteristics

Many of the studies included in our review examined non-cognitive characteristics outside the Big Five and aspirations. We identified 51 additional characteristics measured in these articles, with the majority only being investigated by one or two studies. We therefore do not report the results in a table, but we summarise the main results below (again, for full details see Appendix B).

The most commonly investigated other characteristics were locus of control (one's sense of control over successes and failures) and characteristics related to self-esteem. An external locus of control was almost universally found to have a detrimental effect on career attainment (15 of 17 studies). For example, Heineck and Anger (2010) examined data on personality and wages in a representative sample of German adults and found that it correlated with lower wages for both men and women. They hypothesise that people with an external locus of control may be less likely to work hard and less likely to try to improve their skills and behaviour, as they do not really believe that this will improve their lives. A negative association between career achievement and internal locus of control could be explained by an effect of current work conditions on personality, rather than the reverse. Lower income jobs tend to afford their employees less control over their work, and to

reward them less for their efforts,²⁶ and this may foster a more external locus of control. However, a number of the studies included in the literature review followed individuals over time, showing that a pre-existing external locus of control was detrimental for subsequent career attainment.

Locus of control may therefore have a role to play in social mobility. Only two studies examined the association between social background and locus of control; with one finding a more external locus among those from less advantaged backgrounds, and the other finding the opposite. However, the latter study was conducted with a very restricted sample of low income women from the US, and its findings may not be strongly generalizable.

Alongside a more internal locus of control – feeling you are in control of events – self-esteem appears to be robustly beneficial for career success, with 14 of 15 studies finding a positive effect. Researchers suggest that self-esteem can help in a number of ways. People may apply for jobs consistent with their image of themselves – so people who feel that they are highly able will be more likely to aim for high status careers.²⁷ Additionally, self-esteem may predict effort and application,²⁸ with a negative self-image potentially leading to the feeling that things are not worth trying. Self-esteem also appears to be positively related to family economic status, making it another factor which may impede social mobility.²⁹

Additional factors which studies in the review found to be beneficial for career attainment were activity or energy, dominance (including firmness and decisiveness), autonomy (independence), a desire for challenge, emotional intelligence, and a positive outlook. Factors which appeared to have a negative effect were aggression and poor self-control. Very few of these characteristics were also investigated with respect to social background, with the exception of activity or energy which was found to be positively affected by parental affluence.

Summary

Table 3 lists all of the non-cognitive characteristics found by the review to have a substantive relationship with parental socio-economic status, adult attainment, or both. This table yields three important conclusions.

- First, non-cognitive characteristics appear to be an important independent contributor to career success (the majority of the studies included in the review took into account differences in other factors like cognitive ability when estimating the effect of non-cognitive characteristics).
- Second, where studies have been conducted, they tend to show that these characteristics *are* affected by social background.

²⁶ Hausser et al., 2010

²⁷ Kammeyer-Mueller et al., 2008

²⁸ Drago, 2011

²⁹ Blanden et al., 2007

- Third, in several cases, the characteristics which are more common among those from more advantaged backgrounds are also those which appear to be beneficial to career success. These factors are therefore likely to play a role in social mobility.

Table 3. Summary of literature review findings for each key characteristic

	Relationship to parental SES	Relationship to adult attainment
Big Five		
Agreeableness	Positive	Mixed
Conscientiousness	Positive	Mixed
Extraversion	Positive	Positive
Aspirations		
Occupational aspirations (inc. general ambition & leadership aspirations)	Positive	Positive
Social aspirations	N/A	Negative
Future planning	N/A	Positive
Other characteristics		
External locus of control	Mixed	Negative
Self-esteem	Positive	Positive
Activity/energy	Positive	Positive
Dominance	N/A	Positive
Autonomy	N/A	Positive
Desire for challenge	N/A	Positive
Emotional intelligence	N/A	Positive
Positive outlook	N/A	Positive
Self-control	N/A	Positive
Aggression	N/A	Negative

In the next section, we report an examination of non-cognitive characteristics in a very large sample of the UK population, focusing on aspirations and the Big Five. This analysis provides more concrete data for the UK on the association between these factors and social background, and their association with adult career attainment.

In 2009, the BBC launched the Big Personality Test as part of its Lab UK programme. BBC Lab UK is designed to leverage the BBC's reach to produce large scale social science data for use by academic researchers. The Big Personality Test invited people in the UK to contribute information on their lifestyle, personalities, relationships, and backgrounds to help answer the question "Do our personalities shape our lives or do our lives shape our personalities?"³⁰ The overall test was designed by Professor Michael Lamb of Cambridge University and one of the authors of this report, Dr Jason Rentfrow, also from Cambridge University.

The Big Personality test was advertised widely on BBC Television and Radio, and on the BBC website. It attracted a very large number of participants, making it an ideal testbed for examining non-cognitive characteristics in the UK population. The survey includes measures of two relevant types of characteristic: the Big Five personality traits, and a measure of major life goals (aspirations). Based on the results of previous literature we expected that:

1. People from higher socio-economic status backgrounds would tend to have higher occupational aspirations and higher levels of extraversion, agreeableness, and conscientiousness.
2. Extraversion and occupational aspirations would have a positive relationship with people's career attainment, whereas pro-social aspirations (aspiring to help others) would have a negative effect

The methodology and results of the analysis are reported below.

Methodology

Design of the survey

The Big Personality Test was an online survey hosted on the BBC's Lab UK website. To take part, participants clicked on a link on the website. Before proceeding, respondents were asked to obtain a BBC ID if they did not already have one. This was used to exclude repeat responders – the survey could not be completed twice with the same BBC ID. The survey consisted of eight sections covering demographics, education and work, personal relationships, personality and aspirations, health, and childhood experiences.

Sample characteristics

For this study, we extracted data collected from November 2009 (the launch of the survey) onwards. The most recent data was from April 2011. We restricted our analysis to people of working age (18-64) currently resident in the UK (England, Scotland, Wales, and Northern Ireland). 468,564 respondents met these criteria.³¹

³⁰ <http://www.bbc.co.uk/labuk/articles/personality/>

³¹ For comparison, the second largest survey in the UK that includes measures of personality is Understanding Society, which includes around 50,000 adult participants.

We further restricted our sample to people who were currently working full-time or who reported being unemployed and looking for work (excluding those who may be voluntarily out of the labour market or working at a reduced income, including students, retirees, part-time workers, and people looking after the home or family). This was intended to give the clearest possible picture of the association between non-cognitive characteristics and actual career attainment. 254,790 respondents met these criteria.

We further excluded any respondents who did not provide data on their gender, aspirations, personality, education level, parents' occupation at age 14, or current income. Finally, we also excluded respondents who chose 'none' when asked about their parents' occupations. This option was intended for people whose parents were unemployed. However, an unusually large number of respondents chose this option. Further investigation also revealed that the respondents choosing 'none' tended to be better educated and had higher incomes than the sample average. This suggested that this category was not functioning as intended, and we determined that the safest option would be to exclude these respondents from the analysis. More information on this measure is given in the 'Measures' section below.

After exclusions the final analysis sample comprised 153,432 respondents. Table 4 gives the overall demographic characteristics of this sample, compared with those of a representative sample of the full-time economically active UK population (weighted estimates for full-time workers or unemployed people aged 18-64 from the 2012-13 Family Resources Survey). This table shows that, in common with other internet samples,³² the BBC sample strongly over-represents women, and moderately over-represents younger people and those on higher incomes.

Table 4. Comparisons of the analysis sample of the BBC dataset (n=153,432) to the full-time economically active UK population aged 18-64. UK population figures are weighted estimates from the 2012-13 Family Resources Survey (n=19,520)

	BBC data	UK population
Ages		
<i>18-24</i>	11.2%	13.4%
<i>25-34</i>	31.8%	24.0%
<i>35-49</i>	40.3%	37.1%
<i>50-64</i>	16.8%	25.5%
Male gender	42.4%	54.5%
UK Country		
<i>England</i>	85.2%	84.4%
<i>Scotland</i>	8.2%	8.4%
<i>Wales</i>	4.4%	4.5%
<i>Northern Ireland</i>	2.2%	2.7%
Ethnicity		
Asian/Asian British	2.2%	5.74%
Black/Black British	1.0%	2.61%

³² Gosling et al., 2004

Mixed	1.7%	1.02%
White	93.6%	89.51%
Other ethnicity	1.6%	1.13%
<i>Income</i>		
up to 9.99k	3.9%	16.2%
10k-19.99k	16.6%	30.5%
20k-29.99k	21.4%	23.9%
30k-39.99k	16.5%	13.4%
40k-49.99k	13.7%	6.7%
50k+	28.0%	9.2%

Sample weighting

All figures reported from this point were weighted to match the weighted estimates from the Family Resources Survey in terms of age, gender, and income bracket.

Measures

Parental socio-economic status and adult socio-economic attainment

Concerning their social background, respondents were given a list of types of occupation and asked which best described the sort of the work the main breadwinner in their household did when the respondent was 14 years old. Options comprised higher administrative and professional occupations (such as company director, doctor, lawyer), clerical occupations (such as secretarial work, office administration), sales occupations (such as sales manager), service occupations (such as restaurant manager), skilled work (such as foreman, plumber), semi-skilled work (such as bricklayer), unskilled work (such as labourer, call-centre worker), and farm work (such as farmer, farm labourer). There were also options for 'none', 'don't know', and 'other'.³³ For the purposes of our analysis, we derived a binary variable indicating whether the main breadwinner in the household was in a professional or higher administrative occupation when the respondent was 14.

As a measure of adult socio-economic attainment, we derived a binary variable indicating high income based on respondents' reported current gross annual personal income. We defined respondents as having a high income if they reported an income of more than £40,000 per year. This is substantially higher than the UK median gross personal income, and was also higher than the median income category in the BBC survey itself (£20-30,000).

³³ As noted above, the 'None' option did not appear to be functioning to indicate unemployment. Despite the 'Don't Know' and 'Other' options, respondents may instead have chosen 'None' to indicate that none of the options applied to their parents' job. We therefore excluded these respondents from further analysis.

Personality and aspirations

The BBC survey measured the Big Five personality traits using the 44-item version of the Big Five Inventory (BFI).³⁴ Each of the BFI's 44 questions asks respondents to give a 1-5 score indicating their agreement that a particular statement applies to them. Example statements include: "I see myself as someone who is talkative" (extraversion), "I see myself as someone who is considerate and kind to almost everyone" (agreeableness), "I see myself as someone who does a thorough job" (conscientiousness), and "I see myself as someone who values artistic, aesthetic experiences" (openness).³⁵ A score for each of the five traits is calculated as the average agreement score for all relevant statements (reversing the scores for negatively worded items).³⁶ The BFI is considered to be a well validated and reliable test of the Big Five personality characteristics.³⁷

Aspirations were measured using an adapted version of Roberts et al.'s (2004) measure of life goals. The original measure consisted of 21 individual goal items, measuring aspirations in seven domains: economic (aspiring to a high status career), aesthetic (aspiring to create good artistic work), Social (aspiring to help others), relationship (aspiring to have children and to have good family relationships), political (aspiring to be influential in public affairs), hedonistic (aspiring to have fun), and religious (aspiring to participate in religious activities). Respondents used a five-point scale to indicate the extent to which each goal was important to them. For our study, we re-analysed these items using a technique called principal components analysis (PCA)³⁸ to determine how they were inter-related. We found that the items were a better fit to six, rather than seven, domains, with the political responses fitting within the social domain.³⁹ Again, overall scores for each domain were calculated as the average score across relevant items.

Analyses

We used regression methods to examine the following associations:

1. The association between parental occupation and personality and aspiration scores
2. The association between personality and aspiration scores and the likelihood of having a high current income

We also used mediation methods to determine the extent to which the association between parental occupation and current income could be explained by differences in personality and aspirations. Full details of the relevant analyses are given in the analyses and results section below.

³⁴ John et al., 1991

³⁵ The full 44 item inventory can be found here:

<http://fetzer.org/sites/default/files/images/stories/pdf/selfmeasures/Personality.pdf>

³⁶ In the final study sample, alpha reliabilities for Extraversion (0.86), Agreeableness (0.76), Conscientiousness (0.82), Neuroticism (0.84), and Openness (0.79) were all high.

³⁷ Gosling et al., 2003

³⁸ With orthogonal rotation

³⁹ In the final study sample alpha reliabilities for the Economic (0.72), Aesthetic (0.77), Social (0.78), Hedonistic (0.72), and Religious (0.77) domains were all high. The reliability for the relationship domain was low (0.50). However, as we considered this to be an important area of aspiration, we decided to include it in the analyses.

Analyses and results

Descriptive statistics

Table 5. Mean personality and aspiration scores (on a scale of 1-5) for women (n=88,358) and men (n=65,074)

	Women	Men
Personality		
Extraversion	3.25	3.11
Agreeableness	3.82	3.64
Conscientiousness	3.77	3.57
Openness	3.59	3.75
Aspirations		
Economic	2.78	2.96
Aesthetic	2.03	2.10
Social	2.78	2.57
Hedonistic	3.99	3.99
Religious	1.98	1.77
Relationship	4.18	3.94

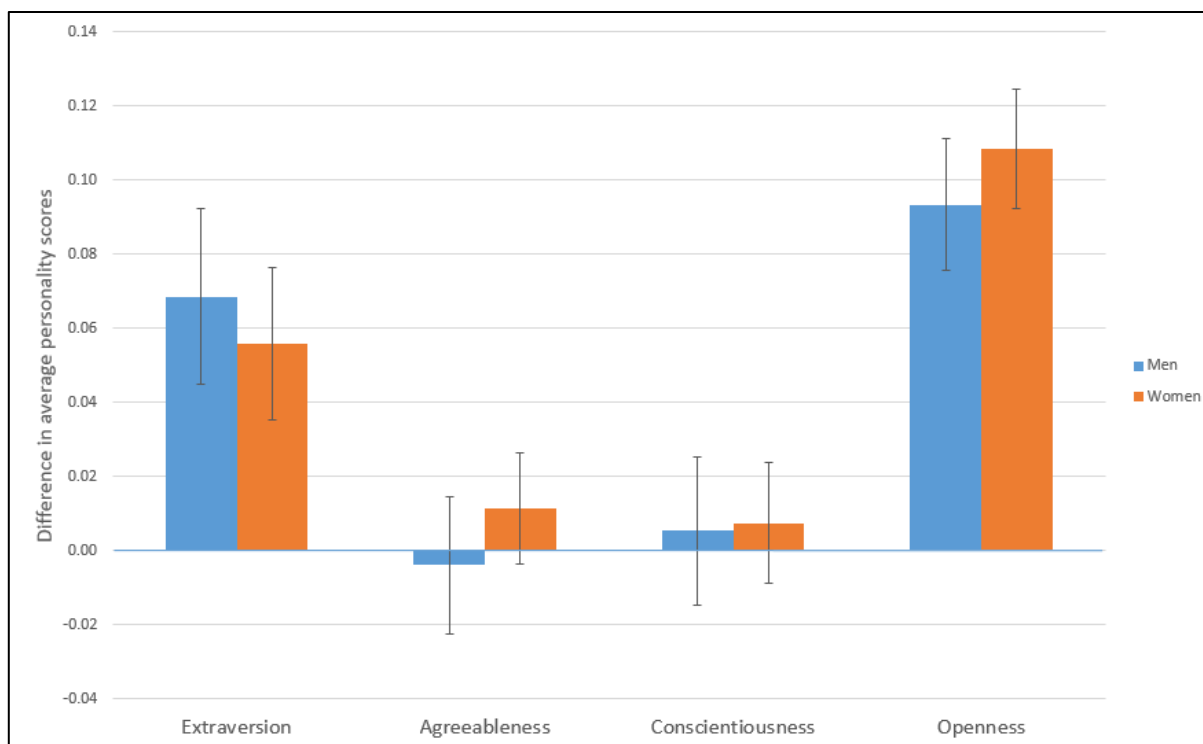
Table 5 gives average personality and aspiration scores for men and women in our sample. As this table shows, women score slightly higher than men on all five personality characteristics with the exception of openness. Table 5 also shows that, men and women both aspired to have fun, and to have children and good family relationships. They placed these aspirations above a high status career or wanting to help others. But the latter were more important than a desire to engage in religious or artistic activities. So, aspirations were highest in the hedonistic and relationship domains, followed by economic and social aspirations. Religious and aesthetic were the weakest aspiration domains. Men exhibited higher economic, and lower social aspirations than women. They also reported lower aspirations in the religious and relationship domains.

Associations between parental SES and non-cognitive characteristics

The first step of our analysis was to estimate associations between family background and personality and aspiration scores. These estimates were calculated separately for men and women using linear regression models adjusting for age. Adjusting for age means that we accounted for the possibility that age might have a relationship with personality and aspirations, and that, due to changes in the labour market, older respondents might also be less likely to have parents who were in professional employment.

Figure 1 gives the results of these analyses for the Big Five personality characteristics. The bars represent the difference in average personality scores between respondents whose parents were in professional versus non-professional employment. A positive result indicates that people from more advantaged backgrounds had a higher average score for that particular trait, and vice-versa.

Figure 1. Effect of professional family background on men (n=65,074) and women's (n=88,358) personality scores



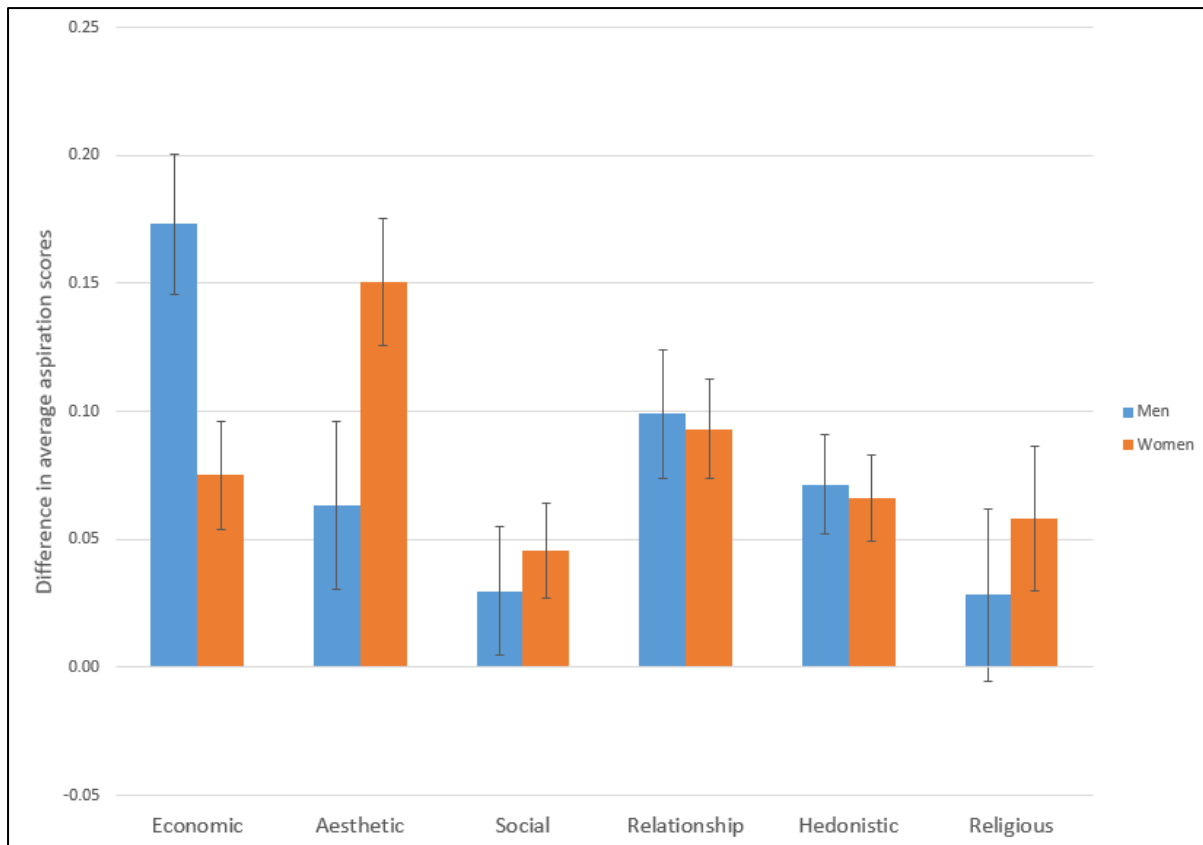
Results are from separate linear regression models with adjustment for age. Error bars are 95% confidence intervals

The results in Figure 1 run somewhat contrary to the findings of the literature review. In this very large BBC sample, we found no statistically significant association between parental occupation and either agreeableness or conscientiousness. However, we did find that respondents from professional backgrounds scored significantly higher for extraversion and openness. The magnitude of these differences may appear to be quite small. For example, men from professional backgrounds scored about 0.07 points higher for Extraversion than men from non-professional backgrounds, a difference of only around 2.3%. However, this is fairly typical for studies of personality, where average scores for many social groups tend to cluster quite closely around the mid-point of the scale. For example, the agreeableness advantage for women, one of the larger and more robust findings in the personality literature, represents a difference of only around 0.20 points, or 5% (3.82 versus 3.64).

Figure 2 gives the results of our analyses of aspirations. As can be seen from this figure, aspirations in almost all domains are significantly higher for respondents from more advantaged backgrounds. This is particularly true for men's economic aspirations and women's aesthetic aspirations. It is notable that in both areas, the gender difference is quite large. The effect of having professional parents on men's economic aspirations is more than twice as large as its effect on women's (and vice-versa for aesthetic aspirations). By contrast, the positive effects of family background on

relationship and social aspirations are similar for both genders. The effect of family background is weakest for social and religious aspirations (in fact for men, religious aspirations do not differ significantly by background).

Figure 2. Effect of professional family background on men’s (n=65,074) and women’s (n=88,358) aspiration scores



Results are from separate linear regression models with adjustment for age. Error bars are 95% confidence intervals

As with personality, to understand the magnitude of the observed differences, it is informative to compare them with gender differences. In this sample, men’s economic aspiration scores are higher than women’s by 0.18 points (6.5%). By comparison, men from professional backgrounds score 0.17 (5.8%) points higher for economic aspirations than do men from non-professional backgrounds and women from more advantaged background score 0.15 points (7.5%) higher than their less advantaged counterparts for aesthetic aspirations.

The primary analyses reported here concern personality and aspirations. However, the BBC survey also included a single question measuring self-esteem (“Do you see yourself as someone who has high self-esteem?” – again measured on a 1-5 scale). The majority of respondents (58.6%) did not respond to this question, and we therefore chose not to include it in our main analyses. However, we did examine these figures separately in this reduced sample of respondents (N=65,337). These

analyses showed that people from professional backgrounds had significantly higher average levels of self-esteem – though there were pronounced gender differences. Women from more advantaged backgrounds scored on average 0.13 points (4.6%) higher for self-esteem than those from less advantaged backgrounds; whereas men from more advantaged backgrounds scored on average 0.25 points (8.3%) higher.

Associations between non-cognitive characteristics and adult socio-economic attainment

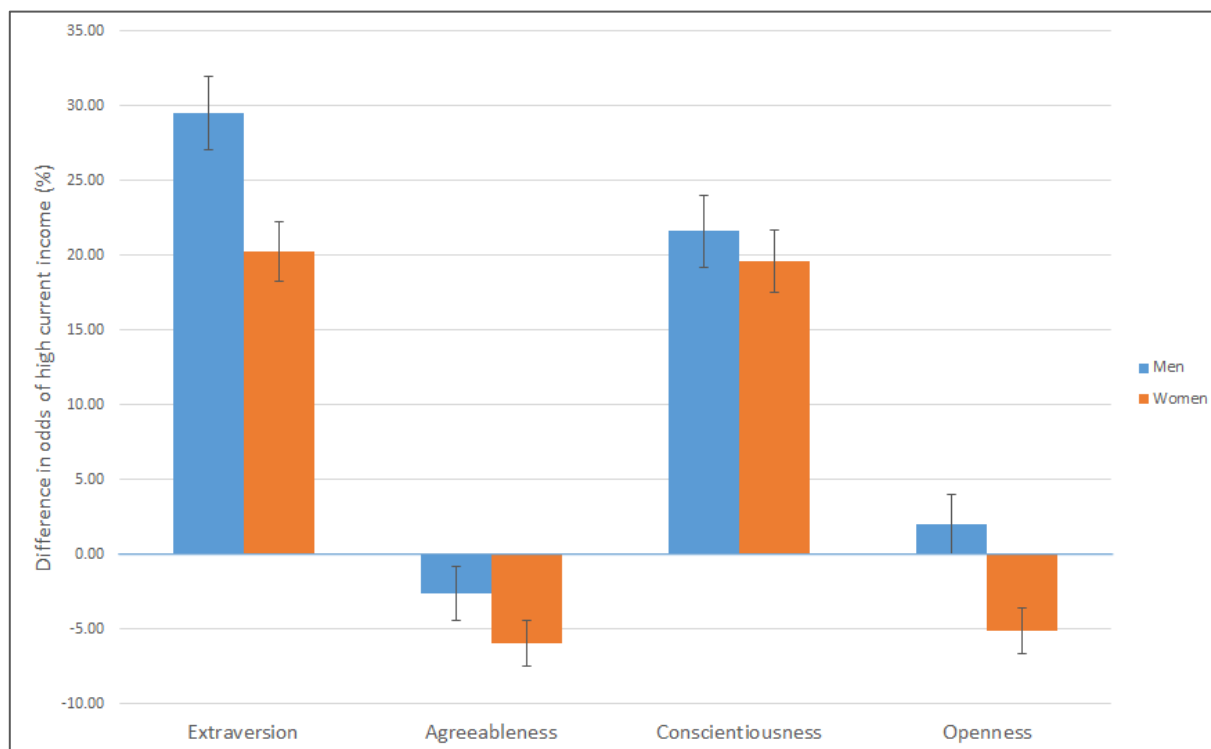
The second step in our analysis was to examine the association between personality and aspiration scores and adult attainment, as measured by attaining a high income. We estimated these associations using separate logistic regression models for each characteristic (again adjusting for age). Both adult attainment and certain non-cognitive characteristics (as shown above) are affected by parental background. This would produce an association between these characteristics even if there were no effect of non-cognitive characteristics on adult income. We therefore also adjusted for parental occupation (professional versus non-professional) in these analyses.

The regression models yield the association between each characteristic and the increase (or decrease) in the **odds** that a respondent reports a high income (above £40,000 per year). For the purposes of these analyses we converted personality and aspiration scores to **z-scores**. The bars in Figures 3 and 4 therefore represent the percentage increase (or decrease) in the odds of earning a high income predicted by a **one standard deviation** increase in a given characteristic.⁴⁰

Figure 3 gives the results for personality. Consistent with the results of the literature review, we found that men and women with higher extraversion scores were significantly more likely to earn a high income. For men, an increase of one standard deviation in extraversion was associated with a 30% increase in the odds of earning a high income. For women, this figure was 20%. Contrary to the mixed results of the literature review, we also found conscientiousness to be positively associated with income. Men and women with a higher level of conscientiousness had around 20% higher odds of reporting incomes above £40,000.

⁴⁰ The standard deviation is a measure of the variability of scores. Around 68% of people will fall within one standard deviation of the mean for a normally distributed score, and around 95% of people will fall within two standard deviations. For example, for Agreeableness, the mean score for men is 3.64 and the standard deviation is 0.63, meaning that around 68% of people have Agreeableness scores between 3.01 and 4.27. Scores measured in standard deviations (z-scores) are more appropriate for this analysis because a single point score difference is far too large to be informative. In other words, knowing that a 1 point increase in Extraversion predicts 60% higher odds of earning a high income is not informative because a 1 point difference is much larger than most real-world inter-individual differences. Standard deviations for each measure are given in Appendix D.

Figure 3. Effect of standardised personality scores on odds of high current income for men (n=65,074) and women (n=88,358)



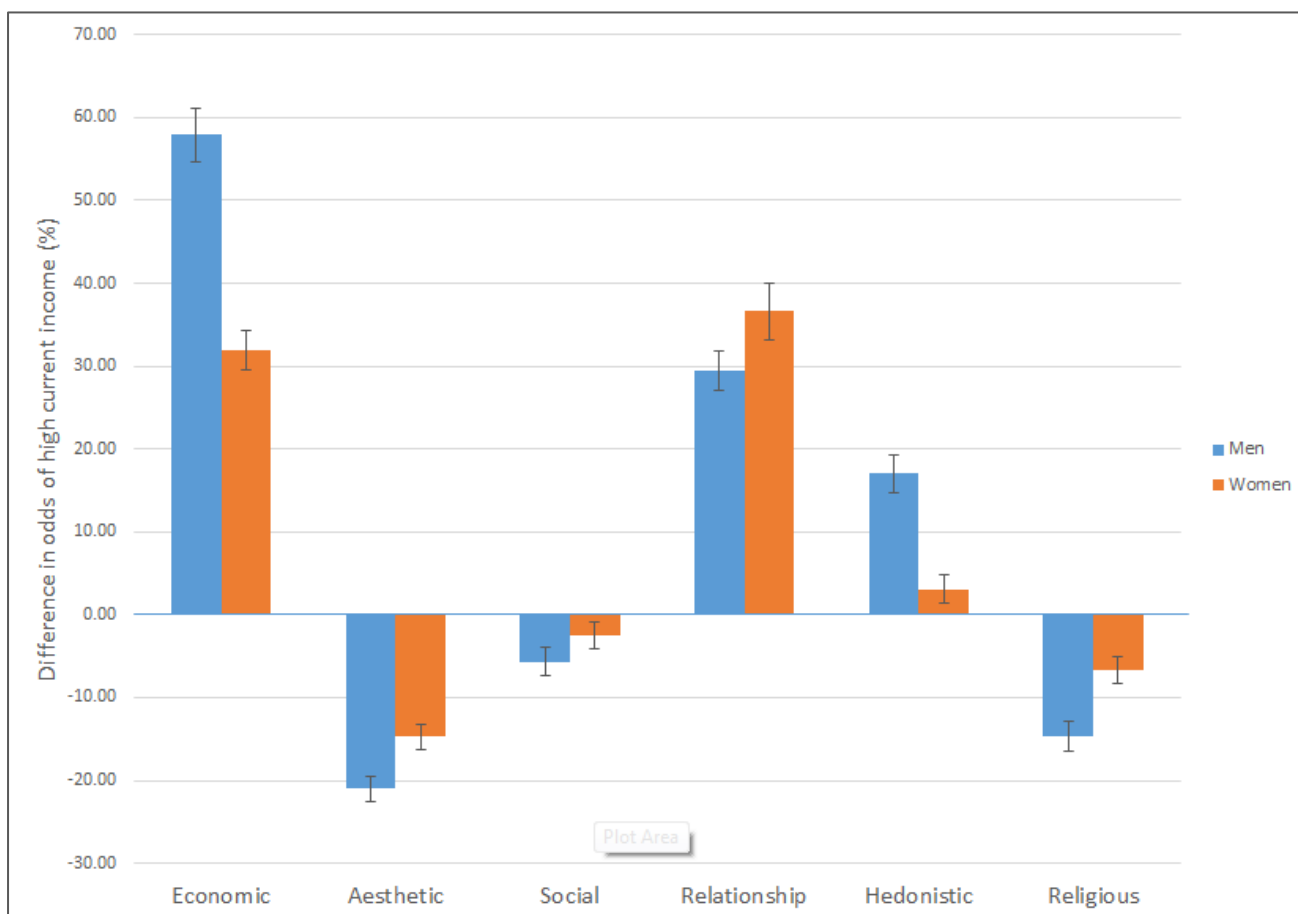
Results are from separate logistic regression models with adjustment for age and parental occupation. Figures indicate the % increase in odds due to a one standard deviation increase in a personality factor (e.g. a figure of 30 indicates that a one SD increase in the corresponding personality factor increases the odds that a person will have high current income by 30%). Error bars are 95% confidence intervals

The apparent effects of openness and agreeableness were substantially weaker. A higher level of agreeableness was related to a reduced likelihood of earning a high income for both men and women (though more so for women); whereas the effects of openness appeared positive for men and negative for women. All of these results were statistically significant. However, the magnitude of the effects was very small in comparison to the effects of the other Big Five characteristics.

It should be noted here that these results, and the results for aspirations reported below, are based on adult data from a single survey measuring earnings and non-cognitive characteristics contemporaneously. We have expressed the results in terms of the apparent effect of personality or aspirations on income. However, it is equally possible for these associations to arise due to the reverse effect. For example, the positive association between extraversion and earnings may be due to a) the beneficial effect of extraversion on career attainment, b) a positive effect of attainment on extraversion, or c) a mixture of the two. This issue of reverse causation is discussed in more detail below.

Figure 4 shows the results for aspirations. As suggested by the results of the literature review, the most dramatic association was observed for economic aspirations. Men with economic aspirations scores one standard deviation higher had close to 60% higher odds of reporting a high income. However, for women this association was considerably weaker – with higher economic aspirations predicting only a 32% increased odds of high income. In fact, for women income was slightly more positively associated with relationship than economic aspirations.

Figure 4. Effect of standardised aspiration scores on odds of high current income for men (n=65,074) and women (n=88,358)



Results are from separate logistic regression models with adjustment for age and parental occupation. Figures indicate the % increase in odds due to a one standard deviation increase in an aspiration factor (e.g. a figure of 60 indicates that a one SD increase in the corresponding aspiration factor increases the odds that a person will have high current income by 60%). Error bars are 95% confidence intervals

Also consistent with (some) previous studies, social aspirations – doing good in the community – were negatively associated with income, though the magnitude of this association was quite small. More strongly negatively associated with income were religious and (particularly) aesthetic aspirations. As noted in the introduction, this may indicate the reduced earnings of people drawn towards a career in the arts.

Finally, hedonistic aspirations – the desire to have fun - were, perhaps surprisingly, positively associated with high income. This may be a consequence of reverse causation, with people on a high current income better able to aspire to have fun in the future.

As noted above, we also examined the effects of self-esteem. These results showed that men with self-esteem scores one standard deviation higher (SD=1.29) had 50% higher odds of having a high income. For women this figure was 38%.

Differences in the effect of personality and aspirations according to parental background

It is possible that the effects of personality and aspirations on earnings differ depending on social background. For example, economic aspirations may be more beneficial for people from more advantaged backgrounds who are in a better position to make these aspirations a reality. We tested this possibility by re-running the models reported above, additionally accounting for the statistical interaction between parental occupation and each personality and aspiration characteristic.

We found that for both men and women, the association between openness and earnings differed substantially by social background. For men, the apparent positive effect of openness was only present for those from non-professional backgrounds, with higher levels of openness conferring no advantage for men from professional backgrounds. For women, for whom the apparent overall effect of openness was negative, this negative effect was significantly stronger for those from professional backgrounds. For women from non-professional family backgrounds a one standard deviation increase in openness was associated with a 3% reduction in the odds of earning a high income. For women from professional backgrounds, this figure was 14%. The effects of all other personality characteristics did not differ by social background.

In terms of men's aspirations, only the effect of relationship aspirations differed according to parental background, with the apparent positive effect of relationship aspirations being significantly stronger for those whose parents were in professional occupations. For men from non-professional family backgrounds, having high relationship aspirations predicted a 27% increase in the odds of earning a high income. However, for men from professional backgrounds this figure was 43%. This difference was not present for women. However, the apparent negative effects of aesthetic and social (helping others) aspirations were significantly stronger for women from professional backgrounds. For women whose parents were in non-professional occupations, high aesthetic and social aspirations decreased the odds of earning a high income by 13% and 2%, respectively. For women from professional family backgrounds, these figures were 20% and 7%, respectively. These differences may reflect an earnings penalty for women from advantaged backgrounds who choose a career in an artistic or caring profession.

The role of education in the association between non-cognitive characteristics and adult socio-economic attainment

So far we have discussed the potential effect of personality and aspirations on income largely in direct terms – for example the effect of conscientiousness on job performance. However, a large

part of any beneficial (or detrimental) effect of non-cognitive characteristics on adult income may be through educational attainment. For example, conscientiousness may improve income prospects by increasing the likelihood of going on to higher education, as a number of previous studies have shown.⁴¹

To examine this possibility, we used a mediation analysis⁴² procedure to estimate the proportion of the association between each non-cognitive characteristic and income that could be explained by educational attainment (as measured by whether or not the respondent had achieved a university degree). The results of this analysis are given in Table 6.

These results show that, for both men and women, educational attainment explained only around one tenth of the association between Big Five personality characteristics and income. For men, aspirations had a similar impact. However, for women, education played a larger role in explaining the association between economic and hedonistic aspirations and income. Notably, for women, around 40% of the apparent effect of economic aspirations on income was explained by educational achievement.

Here we should note an important caveat to these results. Mediation analysis of the type we used here assumes that the mediating variable (in this case, educational attainment) and the outcome variable (income) are causally subsequent to the predictor variable (personality or aspirations). In other words we have assumed that non-cognitive characteristics affect educational attainment and income, but not the other way around. This assumption is problematic in that (as noted above) it is clearly possible for the experience of education (for example the experience of going to university) or of having a high income to affect these characteristics. We would argue that, given that Big Five personality characteristics develop early, and are relatively stable over time,⁴³ the dominant direction of causation is likely to be *from* personality *to* education and income, rather than vice-versa. However, aspirations are likely to be substantially more malleable. We discuss this issue in more detail below.

The role of non-cognitive characteristics in social mobility

As discussed above, where characteristics are related to both family background and adult socio-economic attainment, they may have a role to play in social mobility. Our analysis identified five characteristics which meet these criteria:

- Extraversion is positively related to both parental occupational status and adult income for both genders.
- Openness is positively related to both parental occupational status and adult income, though the latter only weakly and only among men.

⁴¹ E.g. Shanahan et al., 2014

⁴² Baron & Kenny, 1986

⁴³ Costa Jr., & McCrae, 1997

- Economic, relationship, and hedonistic aspirations were positively related to both parental occupational status and adult income.

We first estimated the overall association between parental occupation and adult income. We then carried out the same type of mediation analysis as described above in order to estimate the proportion of this association that could be explained by non-cognitive characteristics. Before describing the results, it should again be noted that these analyses assume that the causal sequences goes from the predictor (parental occupation) through the mediator (non-cognitive characteristics) to the outcome (income). In this case it is clear that the predictor is causally prior to the other two variables. A respondent's adult income cannot affect their parents' earlier occupation, and it is unlikely that their personality or aspirations could have a substantive effect either. However, as before it is possible that adult income could have an effect on non-cognitive characteristics.

In our sample, men from more professional backgrounds had twice the odds of having a high adult income. For women, the increase in odds was 75%. This is consistent with previous studies which have found that men derive a stronger career benefit from a more advantaged family background.⁴⁴ Table 7 shows the proportion of this association that could be explained by each non-cognitive characteristic separately.

Table 7. Proportion of association between family background and current income that is explained by personality or aspiration scores (n=153,432)

	Women	Men
Personality		
Extraversion	4.9%	7.1%
Agreeableness	N/A	N/A
Conscientiousness	N/A	N/A
Openness	N/A	0.8%
Aspirations		
Economic	9.13%	26.8%
Aesthetic	N/A	N/A
Social	N/A	N/A
Hedonistic	1.0%	4.7%
Religious	N/A	N/A
Relationship	13.1%	10.7%

N/A indicates that the characteristic was not analysed either because it was unrelated to parental SES or income, or because it was negatively related one while being positively related to the other.

These results show that, for men, around 5-10% of the association between family background and current circumstances can be explained by differences in extraversion and conscientiousness. For women, these effects are somewhat weaker (between 3-5%). The role of aspirations, particularly economic aspirations, appears to be somewhat stronger. Just over a quarter of the association between men's parental occupation and their current income can be explained by economic

⁴⁴ Schoon & Polek, 2011

aspirations. This figure is considerably lower for women at around 10%. In addition to economic aspirations, relationship aspirations (the desire to have children and to have a good relationship with one's family) appear to have a substantial role, explaining around 10% of the persistence of socio-economic attainment for both genders. However, it should again be noted that the figures for aspirations are likely to be somewhat inflated by the reverse effect of current circumstances on reported life-goals.

Although these personality and aspiration characteristics have been designed to be separable, there may nevertheless be some overlap between them. For example, social aspirations may be correlated with a high level of Agreeableness. The total proportion of the persistence of socio-economic status which is explained by personality and aspirations cannot therefore be calculated by simply adding together the proportions explained by the separate factors. We instead estimated these quantities by adding the personality and aspiration factors to the mediation model simultaneously.

First, we estimated the role of all of the relevant Big Five characteristics together. This showed that, for men, 11.8% of the association between parental occupation and current income could be explained by personality factors. In other words, around a tenth of the earnings advantage of men from professional backgrounds could be explained by differences in personality characteristics. For women this figure was 6.1%.

Next, we estimated the combined effect of aspirations in all relevant domains. We found that, for men, these could explain 30.7% of the total association between parental and current SES. For women, this was 19.1%.

Finally, we estimated the combined effect of all relevant personality and non-cognitive characteristics together. This showed that 34.9% of the association between parental and current socio-economic status for men could be explained by non-cognitive characteristics. For women this figure was 21.7%.

Robustness checks

In the analyses reported above, we used high income as a measure of respondents' career attainment. In order to test the robustness of our results, we tested the effect of using a measure of occupational class as an alternative measure. We recorded whether respondents reported being in a professional or higher administrative job at the time of the survey, and replicated our analyses using this measure in place of our measure of high income.

In examining the effects of personality, we found that the apparent positive effect of conscientiousness remained the same. The positive effect of extraversion also remained, although for men this effect was slightly weaker for occupational class than for income. There were, however, notable differences in the apparent effects of agreeableness and openness on career attainment. These factors were only weakly related to income (and in the case of agreeableness, negatively related). However, associations with occupational class were moderately positive for both

factors. This may be a result of these factors improving access to professional occupations which may nevertheless be relatively low-paid (for example those in education or the arts).

Examining the association between aspirations and occupational class, we found that the effects of relationship and hedonistic aspirations remained the same. The apparent positive effect of economic aspirations also remained substantial. However, this effect was weaker for men than the apparent effect on income, removing the gender divide in the effects of economic aspirations. By contrast, the effect of aspirations in aesthetic, social, and religious domains became more positive for both men and women (though aesthetic aspirations still did not have a significant positive effect for men). Consistent with the results for the agreeableness and openness personality traits, this suggests that non-economic aspirations may improve access to professional employment, but potentially in relatively low-paid sectors. For example, social aspirations may push people towards careers in the caring or teaching professions, which offer professional level employment, but are poorly compensated relative to other types of professional employment.

This conclusion is supported by average personality scores for different types of occupation. The highest average extraversion and economic aspiration scores are found among respondents working in business, sales, and consultancy, or in executive roles; whereas the highest Agreeableness and social aspiration scores are found among those working in education and healthcare. Similarly, respondents working in the media have the highest openness and aesthetic aspiration scores.

Summary of results

The key results of our analysis of the BBC data are summarised in Table 8. Our results suggest that the most important non-cognitive characteristics for achieving economic success are likely to be a high level of extraversion and conscientiousness, and high economic and relationship aspirations. With the exception of conscientiousness (which is related to career success, but not to family background), scores for all of these characteristics are also significantly higher for people from more advantaged backgrounds. This suggests that they play a substantive role in the persistence of economic advantage from one generation to the next. In separate analyses with a smaller sub-sample, we also found that self-esteem was strongly positively related to both social background and adult career attainment.

One notable finding from our analysis is that some non-cognitive characteristics may in fact work against the persistence of high attainment. People from more advantaged backgrounds have higher openness scores and higher social aspirations. We found openness to be negatively associated with income for women, and social aspirations to be negatively associated with income for both genders. However, these effects are considerably weaker than those favouring the inheritance of economic advantage.

Other notable results from the analysis are that there are pronounced gender differences in the role of some non-cognitive characteristics. The results for personality factors were broadly similar for men and women. However, the apparently beneficial effect of extraversion on earnings was

stronger for men. It is possible that the positive effects of extraversion may be diluted for highly confident and assertive women, who may experience negative consequences for deviating from traditional gender roles emphasizing.⁴⁵

Gender differences in the results for aspirations and self-esteem were more dramatic, particularly for economic aspirations. Family background had a much stronger positive effect on men's occupational aspirations and self-esteem than on women's. The effect on economic aspirations may be due to the greater socialisation of girls into life-goals less focused on high income and prestige, such as having a family or pursuing a creative or caring profession.⁴⁶ Boys, with fewer available social roles to pursue, may focus more narrowly on highly paid careers as a means to match their parents' status attainment. The subsequent association between economic aspirations and actual economic attainment was also much stronger for men than women. Potentially due to women's overall wage disadvantage, this suggests that men's high economic aspirations may translate more directly into greater earnings.

Advantages and limitations

The advantage of this analysis over previous investigations of non-cognitive characteristics is the size of the sample. Our analysis was based on an unprecedentedly large sample of the UK population and therefore yields more robust estimates of the associations under study than previous research. It also allows us to identify the nature of even small effects such as the apparently detrimental effect of agreeableness on earnings.

The main limitation of the study is that the data are from a single point in time. Respondents filled out the survey on their personality, aspirations, and income only once, as adults. It is therefore entirely possible that some portion of each association we observed is due to the effect of earnings (or a related factor such as education) on personality and aspirations, rather than the reverse. These effects are impossible to adequately disentangle with these data. As we have noted, this is less problematic for personality characteristics, which are relatively stable over time, but more problematic for aspirations. As such, though the direction of the effect of aspirations on income (for example the negative effect of social aspirations) is likely to be accurate, our figures for the magnitude of these effects are likely to be overestimates.

⁴⁵ Rudman & Glick, 2001

⁴⁶ Lupart, Cannon, & Telfer, 2004

OVERALL CONCLUSIONS

From our review of previous studies and our analysis of the BBC data, several key points emerge. The first is that non-cognitive characteristics are likely to play a genuinely substantive role in career success. Both our analysis and the balance of previous research agree that personality characteristics and aspirations can have a beneficial effect on adult career attainment. In terms of personality, the literature identified extraversion, self-esteem, and a positive outlook as particularly beneficial for economic success, and an external locus of control as particularly detrimental. Our BBC survey confirms the importance of Extraversion (and potentially self-esteem), but also clarifies findings on conscientiousness. Previous studies had produced mixed results, with some studies showing conscientiousness to be beneficial, but others finding no effect.

In our unprecedentedly large UK sample, we found conscientiousness to be significantly beneficial. Indeed, we found that people who scored high for conscientiousness had around 20% higher odds of having a high income (above £40,000). Similarly, highly extraverted people had 20-30% higher odds of being high earning. Some of these differences might be due to the influence of adult circumstances on personality. For example, having a high-powered job might encourage a more conscientious personality. However, as we discuss above, personality characteristics develop early and are relatively stable over time, meaning that the effects of adult circumstances are likely to be less important than the effects of personality on job success.

It appears that being extraverted and conscientious is beneficial for attaining a high-paying career. Some of this benefit may derive from the effect of these characteristics on educational choices and achievement. For example, all other things being equal, highly conscientious people may concentrate more in school and achieve better grades. Other effects may be more direct. Highly extraverted people are confident, sociable, and assertive, which may help in promoting positive interactions with others, whether this is in terms of job interviews, networking, or interactions with colleagues (though it is important to note that this benefit appears to be much stronger for men). Similarly, it is easy to see how a high level of conscientiousness, reflecting a preference for planning, self-discipline, and thoroughness, would be beneficial in the labour market.

In terms of aspirations, the literature review clearly showed economic and occupational aspirations to be an important predictor of future success. Something also supported by our analysis of the BBC data – though in this case it is probable that our results are strongly affected by the effect of adult circumstances on aspirations (for example, those on a professional career path reporting economic goals consistent with their current circumstances). Nevertheless, many of the studies included in our review account for this possibility by tracking respondents over time – investigating the association between their aspirations as teenagers and their subsequent attainment as adults. These studies have also consistently shown a beneficial effect of high economic aspirations.

Taken on their own, the finding that personality and aspirations can help with career success might be encouraging for social mobility. Previous research has shown that the gap in academic attainment between children from more and less advantaged households is large and opens up very

early.⁴⁷ Non-cognitive characteristics like personality could potentially help those from less advantaged backgrounds to catch-up in terms of later economic achievement. However, our findings show that people from professional families also have an advantage in terms of economically beneficial non-cognitive characteristics. We found that having parents who had a professional job was associated with significantly higher levels of Extraversion and very substantially higher economic aspirations (particularly for men). In a separate analysis we also found a positive effect of a professional social background on self-esteem.

We do not wish to give the impression that financial success is the be-all and end-all of life or that children should be encouraged only to develop those characteristics which will yield the best economic return. As we have noted, altruistic social aspirations or an artistic spirit may lead young people down career paths which, while less financially lucrative, are nevertheless richly meaningful and rewarding. However, income is still important, and the strong extent to which financial success is predicted by social background should not be ignored. And as this project has shown, some of this association is likely to be based on non-cognitive development.

As we noted in the introduction, there are several characteristics of a more advantaged upbringing which might explain non-cognitive differences. First, in terms of economic aspirations, higher achieving parents, family members, and family friends provide models to aspire towards. Previous research has shown that children often align their aspirations directly with jobs with which they are personally familiar, i.e. jobs held by their parents, wider family, or other social contacts (for example parents of friends).⁴⁸

In terms of personality, the effects of family background are likely to be less straightforward. Parenting and attachment relationships may play a role.⁴⁹ However, the differing conditions in which children from more and less advantaged homes grow up are likely to be very important. On average, children in richer homes experience less stress, economic instability and family conflict than do children in poorer households.⁵⁰ Much of this difference is likely to be due to differences in financial resources. A lack of money opens poorer households up to stresses and strains to which more advantaged families are not exposed. Money worries are also one of the important and persistent causes of argument and conflict between parents.⁵¹ A more stable and comfortable environment, facilitated by a higher income, is likely to lead children from more advantaged homes to be more socially confident (more extraverted). It is however notable that we found people from more advantaged backgrounds to be no more agreeable or conscientious than those from less advantaged backgrounds.

These results suggest that rather than acting to promote social mobility, certain non-cognitive characteristics are in fact another factor contributing to the inter-generational persistence of

⁴⁷ Social Mobility and Child Poverty Commission, 2014

⁴⁸ Archer et al., 2013

⁴⁹ Moullin et al., 2014

⁵⁰ Attar et al., 1994; Deater-Deckard et al., 1998

⁵¹ Goldberg, 1987; Papp et al., 2009

economic advantage. This is not to say that they are the most important factor – educational attainment, in terms of grades and progression to university, is still likely to play the most important role. It is also not to say that the pathway from parental advantage through personality and aspirations to subsequent career success is in any way deterministic. Growing up in an advantaged home certainly does not guarantee that you will be a confident, extraverted adult; just as growing up in a less advantaged one does not guarantee the opposite. What we observe from the literature review and BBC analysis are simply differences in averages over large numbers of people. Nevertheless, these differences are likely to make it more probable that children from advantaged backgrounds will retain their economic advantage into adulthood.

Despite being a stated priority of several successive governments, reducing the gap in educational attainment has seen relatively slow progress. Addressing the non-cognitive skills gap is also likely to be challenging. However, there are several steps that could be taken to achieve this goal. Our key recommendations are given at the beginning of this report.

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APPENDICES

Appendix A – literature search details

Database:	Web of Science
Date of search:	25/06/2015
Search string:	TOPIC: [{"non-cognitive characteristics" OR "non-cognitive skills" OR "non-cognitive traits" OR "psychological traits" OR "personality" OR "aspirations" OR "psychological capital"}] AND [{"parental education" OR "parental income" OR "parental social class" OR "parental occupation" OR "parental socioeconomic status" OR "parental socioeconomic position" OR "family background" OR "childhood social class" OR "childhood socioeconomic status" OR "childhood socioeconomic position" OR "childhood family income" OR "family social background" OR "socioeconomic background" OR earnings OR wages OR "occupational success" OR "occupational attainment" OR "occupational outcomes" OR "socioeconomic success" OR "socioeconomic attainment" OR "socioeconomic outcomes" OR "career success" OR "career outcomes" OR "social status attainment" OR "labour market rewards" OR "labour market success" OR "labour market outcomes" OR "labour market returns" OR "economic returns"}]
Timespan:	All years
Language:	English
Document types:	Article
Web of Science categories:	Psychology applied or economics or psychology multidisciplinary or psychology social or sociology or psychology developmental or behavioural sciences or education educational research or business or psychology or social sciences interdisciplinary or family studies or psychology educational or multidisciplinary sciences or social issues
Research areas:	(PSYCHOLOGY OR BUSINESS ECONOMICS OR BEHAVIORAL SCIENCES OR SOCIOLOGY OR EDUCATION EDUCATIONAL RESEARCH OR SOCIAL SCIENCES OTHER TOPICS OR FAMILY STUDIES OR SOCIAL ISSUES)
Web of Science indexes:	SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH
Number of results:	736

Appendix B – types of study excluded from the literature review

- Intervention studies – studies examining the effect on an intervention on non-cognitive development
- Genetic studies – studies examining associations between genes and non-cognitive characteristics
- Studies in which educational attainment was the only measure of adult socio-economic attainment
- Studies examining only non-labour market outcomes, such as life satisfaction
- Studies examining only intrinsic measures career success, such as job satisfaction
- Studies examining non-cognitive characteristics only as a moderators of other effects, such as studies analysing the effect of education on career outcomes for people with different personality types
- Studies examining only the effect of factors other than parental SES, such as school class size, on non-cognitive skills
- Studies examining only the effect of mental health on socio-economic attainment
- Studies examining the effect of non-cognitive characteristics only on peripheral labour market outcomes such as networking or entrepreneurship
- Studies examining only the effect of parental aspirations on children’s outcomes
- Studies examining only the effect of mentoring
- Studies examining educational aspirations only
- Studies examining only the effect of non-cognitive characteristics on sexual/reproductive, criminal, or drug behaviour
- Studies examining only the effect of non-cognitive characteristics on job-search behaviour
- Studies examining only protean career orientation as a non-cognitive skill
- Studies examining only aspirations for specific careers, such as a career in medicine or science
- Studies including no measures of non-cognitive skills
- Articles including no empirical research, such as reviews and editorials

Appendix C – Details of studies included in literature review (by date of publication)

	Context	Traits	Relationship to parental SES	Relationship to adult SES	Notes
Hirschi & Jaensch (2015)	Young German graduates	Narcissism		Positive	
Amdurer et al. (2014)	MBA graduates from single US university	Emotional intelligence		Positive	
		Social intelligence		Null	
Garcia & Costa (2014)	Early career graduates from single Spanish university	Emotional intelligence		Positive	
		Extraversion		Null	
		Agreeableness		Null	
		Conscientiousness		Null	
		Neuroticism		Negative	
		Openness		Negative	
Furnham & Cheng (2014)	NCDS	Conscientiousness	Positive	Positive	
Shanahan et al. (2014)	US National Longitudinal Study of Adolescent Health	Extraversion	Positive	Positive	
		Agreeableness	Positive	Positive	
		Conscientiousness	Positive	Null	
		Neuroticism	Negative	Negative	
		Openness	Positive	Positive	
John & Thomsen (2014)	German Socio-economic panel	Extraversion		Null	
		Agreeableness		Generally negative	Varies by occupation
		Conscientiousness		Variable	
		Neuroticism		Null	
		Openness		Variable	
		Reciprocity		Variable	
		External LOC		Generally negative	Varies by occupation
Cheng & Furnham (2014)	NCDS	Extraversion	Positive	Positive	
		Extraversion	Positive	Null	

		Conscientiousness	Positive	Positive
		Neuroticism	Positive	Null
		Openness	Negative	Null
de Haro et al. (2014)	Early career graduates from single Spanish university	Emotional intelligence		Positive
Evers & Sieverding (2014)	German medical school graduates	Agency		Positive
		Communion		Null
Converse et al. (2014)	NLSY	Self-control		Positive
Ganzach & Pazy (2014)	NLSY	Core self-evaluation		Negative
Zacher (2014)	Employees in Australia	Extraversion		Positive
		Agreeableness		Positive
		Conscientiousness		Positive
		Neuroticism		Negative
		Openness		Negative
		Core self-evaluation		Positive
		Career adaptability		Positive
van der Horst et al. (2014)	Dutch parents	Occupational aspirations		Positive
		Childrearing aspirations		Positive
				Men only
Nandi & Nicoletti (2014)	BHPS	Extraversion		Positive
		Agreeableness		Negative
		Conscientiousness		Null
		Neuroticism		Negative
		Openness		Positive
Eren & Ozbeklik (2013)	National Educational Longitudinal Study (US) – young men	Composite of self-esteem & internal LOC		Positive
Bihagen et al. (2013)	Swedish registry data men 33-44	Social maturity (extraversion, sociability, taking responsibility, independence)	Positive	Positive
		Psychological energy (perseverance, focus)	Positive	Positive
		Intensity (activate without external pressure,	Positive	Positive

		intensity of free-time activities)		
		Emotional stability	Positive	Positive
de Haro et al. (2013)	Early career graduates from single Spanish university	Extraversion		Null
		Agreeableness		Null
		Conscientiousness		Null
		Neuroticism		Negative
		Openness		Negative
Furnham & Cheng (2013)	NCDS	Extraversion		Null
		Agreeableness		Null
		Conscientiousness	Positive	Men only
		Neuroticism	Negative	Women only
		Openness		Null
Guan et al. (2013)	Chinese employees	External LOC		Negative
Fletcher (2013)	US National Longitudinal Study of Adolescent Health	Extraversion		Positive
		Agreeableness		Negative
		Conscientiousness		Positive
		Neuroticism		Negative
		Openness		Null
Wille et al. (2013)	Belgian graduates	Antisocial tendencies		Null
		Narcissism		Null
		Borderline tendencies		Negative
		Schizotypal tendencies		Negative
		Obsessive-compulsive tendencies		Null
		Avoidant tendencies		Negative
de Araujo & Lagos (2013)	NLSY	Self-esteem		Positive
		External LOC		Negative
van Dierendonck & van der Gaast (2013)	Netherlands business school alumni	Goal orientation		Positive
Mundt & French (2013)	National Longitudinal Survey of Adolescent Health	Sociability		Positive
Viinikainen & Kokko	Finnish Jyväskylä Longitudinal Study of	Extraversion		Null

(2012)	Personality and Social Development				
		Agreeableness		Null	
		Conscientiousness		Null	
		Neuroticism		Null	
		Openness		Positive	
Cheng & Furnham (2012)	NCDS	Extraversion		Positive	
		Agreeableness		Null	
		Conscientiousness		Positive	
		Neuroticism		Null	
		Openness		Positive	
Judge & Kammeyer-Mueller (2012)	People who were high ability children (Terman life-cycle study)	General ambition	Positive	Positive	
Bjorklund et al. (2012)	Swedish register	Non-cognitive skills (ability to cope with military service)	Positive	Positive	
Sorjonen et al. (2012)	Swedish register	Emotional capacity (combined measure of social maturity, emotional control, psychological energy)		Positive	
Judge et al. (2012)	NLSY	Agreeableness		Negative	
Converse et al. (2012)	NLSY	Self-control		Positive	
Nyhus & Pons (2012)	Dutch DNB household survey	Extraversion		Null	
		Agreeableness		Negative	Women only
		Conscientiousness		Null	
		Neuroticism		Null	
		External LOC		Null	
		Future orientation		Positive	Men only
Sabates et al. (2011)	BCS70	Occupational aspirations		Positive	
		Uncertainty re: future occupation		Negative	
Cochran et al. (2011)	NLSY	Occupational aspirations	Positive	Positive	
Linz & Semykina (2011)	Employees in Kazakhstan, Kyrgyzstan, Armenia, Serbia, & Russia	Challenge orientation		Positive	Not in Kyrgyzstan, Kazakhstan or

				Russia
		External LOC	Negative	Not in Kyrgyzstan or Kazakhstan
Andersson & Bergman (2011)	Swedish panel study	Task persistence	Positive	
Drago (2011)	NLSY	Self-esteem	Positive	
Hall & Farkas (2011)	NLSY	Combined measure of self-esteem, internal LOC, educational aspirations & expectations	Positive	
Schoon & Polek (2011)	BCS70	Occupational aspirations	Positive	
O'Connell & Sheikh (2011)	NCDS	Extraversion	Positive	
		Agreeableness	Negative	
		Conscientiousness	Positive	
		Neuroticism	Positive	
		Openness	Positive	
Spurk & Abele (2011)	Master's graduates from German universities	Extraversion	Null	
		Agreeableness	Negative	
		Conscientiousness	Null	
		Neuroticism	Negative	
		Openness	Null	
Keller (2011)	Hungarian panel study	Self-confidence	Positive	
Lindqvist & Vestman (2011)	Swedish register	Non-cognitive skills (ability to cope with military service)	Positive	
Cobb-Clark & Tan (2011)	Household Income and Labour Dynamics in Australia survey	Extraversion	Generally Null	
		Agreeableness	Generally negative	
		Conscientiousness	Generally Null	
		Neuroticism	Generally Null	
		Openness	Generally Null	

		External LOC		Generally negative	
Hanes & Norlin (2011)	Swedish register	Non-cognitive skills (ability to cope with military service)		Positive	
Ashby & Schoon (2010)	BCS70	Educational aspirations	Positive	Positive	
		Occupational aspirations	Positive	Positive	
Stumpp et al. (2010)	German employees	Core self-evaluation		Positive	
Heineck & Anger (2010)	German Socio-economic panel	Extraversion		Positive	Men only
		Agreeableness		Negative	
		Conscientiousness		Positive	Men only
		Neuroticism		Null	
		Openness		Mixed	Positive for women, negative for men
		External LOC		Negative	
		Reciprocity		Positive	
Semykina & Linz (2010)	Employees in Russia, Armenia & Kazakhstan	External LOC		Negative	Russia & Armenia only
Bergner et al. (2010)	Managers in technical sector companies (country unspecified)	Extraversion		Positive	
		Agreeableness		Null	
		Conscientiousness		Positive	
		Neuroticism		Null	
		Openness		Null	
		Assertiveness		Positive	
		Leadership motivation		Positive	
		Social sensitivity		Null	
		Conscientious perfectionism		Null	
		Achievement motivation		Positive	
Keller (2010)	Hungarian panel study	Self-confidence		Positive	
Mohanty (2009)	NLSY	Positive attitude		Positive	
Zhang & Arvey (2009)	Minnesota Twin Registry (men)	Social potency		Positive	
		Achievement motivation		Null	

		Stress reaction		Null	
Hintsanen et al. (2009)	Cardiovascular Risk in Young Finns Study	Negative emotionality		Negative	
		Activity		Positive	
		Sociability		Positive	
von Stumm et al. (2009)	BCS70	External LOC		Negative	
Dubow et al. (2009)	Columbia County Longitudinal Study (US)	Educational aspirations	Positive	Positive	
		Occupational aspirations	Positive	Positive	
Sutin et al. (2009)		Extraversion		Positive	
		Agreeableness		Null	
		Conscientiousness		Positive	
		Neuroticism		Negative	
		Openness		Null	
Linz & Semykina (2009)	Employees in Russia, Armenia & Kazakhstan	External LOC		Negative	
		Challenge orientation		Positive	Armenia only
Palifka (2009)	Graduates in Mexico	Open-mindedness		Null	
		Creativity		Null	
		Vision		Null	
		Risk-taking		Null	
		Responsibility		Null	
		Occupational aspirations		Null	
Rode et al. (2008)	Recent graduates from single US university	Extraversion		Positive	
		Agreeableness		Negative	
		Conscientiousness		Null	
		Neuroticism		Null	
		Openness		Null	
Kammeyer-Mueller et al. (2008)	NLSY	Self-esteem		Positive	
O'Connell & Sheikh (2007)	NCDS	Future planning		Positive	Women only
		Sociability		Negative	Men only
		Belief in education		Positive	Men only
		Occupational aspirations		Null	
		Leadership motivation		Positive	Women only

		Social aspirations		Negative	Men only
Moutafi et al. (2007)	Managers from UK companies	Extraversion		Positive	
		Agreeableness		Null	
		Conscientiousness		Positive	
		Neuroticism		Negative	
		Openness		Null	
		MB Extraversion		Null	
		MB Introversion		Negative	
		MB Sensing		Negative	
		MB intuition		Positive	
		MB thinking		Positive	
		MB feeling		Null	
Judge & Hurst (2007)	NLSY	Core self-evaluation		Positive	
Semykina & Linz (2007)	Employees in Russia	External LOC		Negative	Women only
		Challenge orientation		Null	
Blanden et al. (2007)	BCS70	Antisocial tendencies	Negative	Negative	
		Neuroticism	Null	Positive	
		Application	Positive	Positive	
		Extraversion	Positive	Positive	
		Hyperactivity	Negative	Positive	
		Anxiety	Negative	Negative	
		External LOC	Negative	Negative	
		Self-esteem	Positive	Positive	
Smithikrai (2007)	Employees from 7 occupations, Thailand	Extraversion		Positive	
		Agreeableness		Null	
		Conscientiousness		Positive	
		Neuroticism		Negative	
		Openness		Null	
Dubow et al. (2006)	Finnish Jyväskylä Longitudinal Study of Personality and Social Development & Columbia county longitudinal study	Aggression in childhood		Negative	
		Sociability		Null	
Gelissen & de Graaf	Dutch family survey	Extraversion		Positive	Men only

(2006)		Agreeableness	Null	
		Conscientiousness	Negative	Women only
		Neuroticism	Negative	
		Openness	Negative	Women only
Jackson (2006)	NCDS	Aggression in childhood	Null	
		Withdrawal in childhood	Negative	
Jansen & Vinkenburg (2006)	Recruits for management roles in Netherlands Postal and Telecoms Services	Interpersonal effectiveness	Positive	
		Firmness	Positive	
		General ambition	Positive	
Hitlin (2006)	Students at US university	Altruistic values	Null	
		Self-oriented values	Null	
		Occupational aspirations	Positive	
Groves (2005)	NLSY & NCDS women	External LOC	Negative	
		Aggression in childhood	Negative	
		Withdrawal in childhood	Negative	
Nyhus & Pons (2005)	Dutch Household Survey	Neuroticism	Negative	
		Extraversion	Negative	Women only
		Autonomy	Null	
		Agreeableness	Negative	Women only
		Conscientiousness	Null	
Bozionelos (2004)	White collar employees in UK	Extraversion	Negative	
		Agreeableness	Negative	
		Conscientiousness	Negative	
		Neuroticism	Negative	
		Openness	Null	
Kinnunen et al. (2003)	Employees in Finland	Self-esteem	Positive	
Diener et al. (2002)	Graduates in US	Cheerfulness	Positive	
Schoon & Parsons (2002)	BCS70	Educational aspirations	Positive	Positive
		Occupational aspirations	Positive	Positive

Seibert et al. (2001)	Graduates from single US university	Proactive personality	Positive	
Edwards et al. (2001)	NLSY	External LOC	Negative	
		Self-esteem	Positive	
Seibert & Kraimer (2001)	Employees in US	Extraversion	Positive	
		Agreeableness	Null	
		Conscientiousness	Null	
		Neuroticism	Negative	
		Openness	Negative	
Boudreau & Boswell (2001)	American and European executives	Extraversion	Positive	Europeans only
		Agreeableness	Negative	
		Conscientiousness	Null	
		Neuroticism	Negative	Americans only
		Openness	Null	
Judge et al. (1999)		Neuroticism	Negative	
		Extraversion	Null	
		Openness	Positive	
		Agreeableness	Null	
		Conscientiousness	Positive	
Dunifon & Duncan (1998)	PSID (early adulthood)	Challenge orientation	Positive	
		External LOC	Negative	
Goldsmith et al. (1997)	NLSY	Self-esteem	Positive	
		External LOC	Negative	
Marini & Fan (1997)	NLSY	Occupational aspirations	Positive	
		Fertility aspirations	Null	
		Gender-role attitudes	Null	
Marjoribanks (1997)	Australian young adults	Occupational aspirations	Positive	
Wilson et al. (1993)	Appalachian women from low income families	External LOC	Positive	Null
		Occupational aspirations	Positive	Positive
Jacobs et al. (1991)	NLSY Men	Occupational aspirations	Positive	
Marjoribanks (1989)	Australian young adults	Occupational aspirations	Positive	

Notes: NCDS=National Child Development Study (1958 British birth cohort study); NLSY=National Longitudinal Study of Youth (US cohort study); BHPS=British Household Panel Study (UK panel study); BCS70=1970 British birth cohort study; Swedish register=Swedish national database; PSID=Panel Study of Income Dynamics (US panel study); MB traits=Myers-Briggs personality traits; LOC=Locus of Control

Appendix D – standard deviations for non-cognitive characteristics

	Women	Men
Personality		
Extraversion	0.83	0.83
Agreeableness	0.61	0.63
Conscientiousness	0.67	0.69
Openness	0.65	0.62
Aspirations		
Economic	0.87	0.91
Aesthetic	0.95	1.03
Social	0.75	0.84
Hedonistic	0.71	0.71
Religious	1.10	1.07
Relationship	0.79	0.83