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Cognitive and Non-Cognitive Abilities of Immigrants: New Perspectives on Migrant Quality from a Selective Immigration Country

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NON-TECHNICAL SUMMARY

Many OECD countries choose selective immigration policies to increase the average migrant quality. Australia, New Zealand, and Canada have adopted immigration policies that aim to attract people with specific qualifications undersupplied in their local labor markets. Admission is based on documentation of language proficiency, educational attainment, occupational qualification, and health. Although recent theoretical work has helped to understand the consequences of selective immigration policies on migrant quality, relatively little is known about whether such policies achieve their desired outcomes.

In this study, we shed light on migrant quality in Australia using nationally representative survey data. We find that immigrants in Australia are remarkably positively selected in terms of their personality traits and cognitive ability. First-generation immigrants outperform non-immigrant Australians in extraversion, conscientious, openness to new experiences, and to some degree agreeableness. Some of these characteristics carry on to the second-generation who were born and raised in Australia. Australians with at least one foreign-born parent also have higher levels of openness to new experiences, conscientiousness, and agreeableness compared to Australians with two Australian-born parents. They perform also better on some cognitive ability tests, which are associated with high-levels of executive function. Despite higher levels of human capital, however, neither first nor second-generation immigrants outperform non-immigrant Australians in labor-market returns and occupational prestige.

Overall, we conclude that Australia has attracted an exceptionally high quality of migrants, both in terms of formal qualifications and unobservable characteristics. They have also passed on their favourable non-cognitive abilities to their children, who outperform non-immigrant Australians on a range of ability tests. Our findings demonstrate that concerns about the quality of migrants attracted to Australia are misguided and that in fact migrants to Australia possess an exceptionally strong human capital portfolio from which economic prosperity may be expected. Indeed, attracting high-quality human capital maybe one of the secrets for Australia's sustained economic growth over the past 30 years.

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ABSTRACT

Many countries adopt selective immigration policies to boost migrant quality. Recent theoretical work suggests that migrant selection based on observable characteristics (education, language proficiency) is likely to affect migrants' unobservable characteristics. We contribute to this literature by quantifying traditionally unobservable components of migrant quality in Australia, a high-income, high-migrant share OECD country with a selective immigration policy. Using nationally representative survey data, we proxy migrant quality with standard measures of the Big-Five personality traits and cognitive ability. We find that although first-generation immigrants score significantly lower on English language ability, they outperform non-immigrant Australians in extraversion, conscientiousness, and openness to new experiences, traits which are associated with better sociability, norm adherence, and creativity. The migrant premium in non-cognitive ability has been particularly high since Australia introduced selective immigration policies, which admitted migrants regardless of nationality but based on personal attributes. The migrant premium in personality is passed on to the second generation. Whilst the off-spring no longer experiences language penalties, it scores significantly higher on conscientiousness, agreeableness, a trait associated with altruism, and executive function. Despite higher levels of human capital, neither first nor second-generation immigrants outperform non-immigrant Australians in labor-market returns and occupational prestige.

Keywords: economics of immigration; migrant quality; selection on unobservables; non-cognitive ability; cognitive ability; Australia

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1. Introduction

Migrants are regarded as a highly self-selected group. Selection stems from the fact that migrants face considerable economic and psychic costs to overcome geographical distance and the institutional barriers to arrive and settle in a destination country (Roy 1951; Borjas 1987; Chiswick 1999; Chiquiar and Hansen 2005). Both migrants' education levels and networks are considered important factors to determine these costs and therefore the degree of selection into migration (Bertoli & Rapoport 2015; Abramitzky et al. 2012; McKenzie & Rapoport 2010). Destination countries are strongly concerned with the quality of migrants who arrive due to selection dynamics (Borjas 1999). Many OECD countries choose selective immigration policies to increase the average migrant quality. Australia, New Zealand, and Canada have adopted immigration policies that aim to attract people with specific qualifications undersupplied in their local labor markets. Admission is based on documentation of language proficiency, educational attainment, occupational qualification, or health. Although recent theoretical work has helped to understand the consequences of selective immigration policies on migrant quality (e.g. Bertoli et al. 2016; Bertoli & Rapoport 2015), "remarkably little is known about […] whether the chosen policy, in fact, has the desired outcomes in terms of the size and composition of the immigrant flow." (Borjas 2014, p. 215).

In this study, we shed light on migrant quality in Australia, a country that has been using a skill-selective immigration regime for at least half a century. We approach migrant quality from the perspective that quality exceeds educational qualifications and labor market prices, which have been the focus of the few empirical papers that quantify migrant quality (Antecol et al., 2003; Aydemir, 2011; Belot and Hatton, 2012; Jasso and Rosenzweig, 2009). Migrants' qualities also materialise in their character traits, motivations and other innate abilities (Nakosteen et al. 2008; Bertoli et al. 2016). Both cognition and personality are likely to influence how accurately migrants comply with admission requirements and make an effort to integrate upon arrival. Such abilities are likely to reduce the costs and to increase the benefits of migration. We will therefore compare the human capital portfolio of migrants with the human capital portfolio of non-immigrant Australians. We define the human capital portfolio comprehensively, which includes formal qualifications, non-cognitive skills (Big-Five personality traits) and cognitive ability (language ability, memory, and coding speed). To estimate the migrant ability gap, we use high-quality, nationally representative survey data from the Household, Income, and Labour Dynamics in Australia (HILDA). We focus our analysis on both first- and second-generation immigrants to improve our understanding of the

intergenerational transmission of human capital across migrant cohorts. We compare migrants' abilities to Australians who do not have a migration background within the past two generations, to which we refer as non-immigrant (NI) Australians.

Our study provides a contemporaneous snapshot of the human capital portfolio of migrants by using data from the past decade. Our migrant quality estimates need to be interpreted as the outcome of both self-selection into migration and assimilation to destination country human capital norms. Self-selection of migrants by personality traits and cognitive ability is likely to be high. Bütikofer and Peri (2016) suggested that cognitive and non-cognitive ability, such as the level of adaptability, are likely to reduce the perceived cost of migration. Ayhan et al. (2017) find evidence that migrants from rural to urban areas (In Ukraine) are more likely to migrate if they score high on openness to experience, a trait associated with adaptability to change, and the ability to tolerate risk. Evidence from the psychology literature echoes this finding on openness and furthermore attributes high levels of extraversion as key determinant of migration (Camperio et al., 2007; Jokela et al., 2008; Silventoinen et al. 2008).

It is challenging to separately identify self-selection from the degree of assimilation in human capital in an empirical setting. To address this issue to some degree, we compare the quality of migrants that arrived at young age with NI-Australians of similar age, keeping year of birth constant. In addition, we also compare the more recent and earlier arrivals with NI-Australian under a similar setting. We interpret our estimated migrant gaps as the degree of the outcome of migrant selection dynamics, but caution that this gap maybe the result of assimilation. In a robustness check, we re-estimate our key regression models by adding years-since-migration as an additional control variable, so that we are closer to interpreting our finding as selection effects.[1]

We find that immigrants in Australia are remarkably positively selected in terms of their personality traits and cognitive ability. First-generation immigrants (FGI) outperform NI Australians in extraversion, conscientious, openness to new experiences, and to some degree agreeableness. Some of these characteristics carry on to the second-generation (SGI) who were born and raised in Australia. Australians with at least one foreign-born parent also have higher levels of openness to new experiences, conscientiousness, and agreeableness compared to Australians with two Australian-born parents. They perform also better on some cognitive

[1] See Borjas 1999 for a discussion of the vexing problem of separating the selection effect from the assimilation effect. We acknowledge also that it is impossible to separately identify age, cohort and assimilation effects.

ability tests, which are associated with high-levels of executive function. The ability premium of conscientiousness, agreeableness and executive function are particularly high for second-generation females with two foreign-born parents.

Despite higher levels of education and non-cognitive abilities, FGI do not outperform natives in occupational prestige and labor-market productivity. Even more so, more recent arrivals experience significant labor-market penalties. This labour market penalty for migrants is consistent with theoretical predictions (Dequiedt & Zenou 2013) and previous empirical findings (e.g. Aydemir 2011 on migrants to Canada; Mattoo 2008 on migrants to the US, Őtzen 2006; Belot & Hatton 2012 for OECD countries). One explanation for lower wages despite higher levels of human capital is that employers discriminate against those migrants whose educational qualifications were attained in a country of highly dissimilar cultural background (language, education system). Another explanation is that migrants lack local language requirements, a deficit we indeed observe in the data especially for more recent arrivals. They may also lack knowledge of local labor markets and have fewer networks that they can exploit to find the most sought-after jobs. Both discrimination and local knowledge deficits could lead to lower wage returns to ability. Although a convincing hypothesis, we find little evidence that FGI have smaller wage returns to non-cognitive ability. If anything, FGI experience positive returns to agreeableness, a trait associated with altruism, while NI Australians experience negative returns, the latter being consistent with the previous literature (e.g. Heineck & Anger, 2010; Mueller & Plug, 2006).

The second generation should be less affected by labor-market discrimination and asymmetric information, because the children of immigrants grow up with the same formal training opportunities and culture as NI Australians. Yet, SGI also do not rank higher in the occupational prestige and wage distribution relative to NI Australians. Under the assumption that SGI face the same labor-market conditions, this can only be the case if their returns to ability are lower than for NI Australians. We find indeed greater wage penalties to emotional stability, a trait associated with a higher likelihood of mental health problems. On the other hand, SGI also experience greater (positive) returns to agreeableness, similar as the FGI. This suggests that the offspring of migrants may not attract higher wages, because their more positive returns to some traits are neutralised by more negative returns to others.

Overall, we conclude that Australia has attracted an exceptionally high quality of migrants, both in terms of formal qualifications and unobservable characteristics. They have

also passed on their favourable non-cognitive abilities to their children, who outperform natives on a range of ability tests. Attracting high-quality human capital maybe one of the secrets for Australia's sustained economic growth over the past 30 years. A recent study by the Treasury and the Department of Home Affairs (2018) forecasted that a continuation of the current intake of migrants will add up to one percentage point to GDP growth each year for the next 30 years, while making a combined lifetime tax contribution of almost $7 billion. Our findings in conjunction with this landmark report suggest that migrants contribute to the growth in wealth of Australia and therefore to an increase in social welfare.[2]

The remainder of this paper proceeds as follows. We review the relevant literature on migrant quality and selection on observables and unobservables in Section 2. In Section 3, we provide an overview of the history of Australia's migration policy. In Section 4, we explain the dataset used in the analysis. In Section 5, we outline our empirical framework to estimate the migrant gap in cognitive and non-cognitive abilities. Section 6 presents the estimation results on (1) the migrant gap of ability separately for FGI and SGI, (2) of other forms of human capital, wages, occupation, and (3) on the returns to personality. Section 7 concludes. An online appendix provides supplementary material.

2. Migrant self-selection and migrant quality: literature review

Previous literature provides ample empirical evidence on the hypothesis that migrants are not a random selection of individuals from the population of their countries of origin. Self-selection occurs if migrants' observable characteristics significantly differ from non-migrants' characteristics at country of origin. Most previous empirical studies define self-selection by observable characteristics such as educational attainment or hourly wages. For instance, McKenzie and Rapoport (2010) quantify migrants' and stayers' skill levels by their levels of education. Chiquiar and Hanson (2005) quantify it through both educational attainment and wages. However, whether this self-selection is positive or negative largely depends on the context. Some studies conclude that migrants are negatively selected (e.g. Abramitzky et al. 2012, Ambrosini and Peri 2012, Borjas 1987, Fernández-Huertas Moraga 2011), others find

[2] Tracing the history of migration and population growth over 50 years, the report found that skilled migrants were delivering an economic dividend, lifting the standard of living by 0.1 per cent of GDP per capita, -increasing productivity by 10 per cent and raising the workforce participation rate. The migrant contribution had helped cushion Australia against the full impact of the global financial crisis (Treasury and the Department of Home Affairs, 2018).

that they are not negatively selected (Kaestner and Malamud 2014), while some argue that the direction of selection depends on the availability of migrant networks in destination countries (Beine et al. 2011; Bertoli 2010; McKenzie & Rapoport 2010). Belot & Hatton (2012) conclude that the degree of selection depends strongly on the relative returns to skill between destination and source country, the degree of poverty, and the cultural distance which shape the costs and benefits of moving.

Another strand of literature focuses on measuring the quality of immigrants compared to natives in destination countries. For instance, Antecol et al. (2003) use the observed education, language ability, and wages of immigrants in a group of destination countries (Australia, Canada, and United States). They find that the immigrants to Australia and Canada have a higher level of measured skill levels – relative to natives – compared to immigrants in the United States. Jasso and Rosenzweig (2009) compare the education levels and language proficiencies of employed immigrants in Australia and the United States. They demonstrate that the return to skills in the origin and destination countries, as well as geographical proximity, plays an important role in the skill composition of migrants. Although they find that the return to skills in Australia is lower than in the United States, the skill composition of migrants in Australia is more diverse in Australia, possibly due to the larger distance to origin countries. They find no evidence that the different immigration systems in the two countries play a key role in determining the skill characteristics of their immigrants.

Migrants to Australia have been shown to perform well in local labor markets. Using data from the Household, Income and Labour Dynamics in Australia (HILDA) survey for the period of 2001-2014, To et. al (2017) find that male migrants from OECD and English-speaking countries have higher hourly wages than native-born Australians, while female migrants have a similar hourly wage as Australian-born females. Hourly wages for migrants from non-English-speaking, non-OECD countries are lower relative to natives once controlling for differences in education. Yet, wage penalties narrow with the years spent in Australia. Breunig et al. (2013), who find similar wage penalties with the same data for earlier years, argue that English language proficiency plays a critical role in explaining these labor-market penalties. Guven and Islam (2015) find that high levels of English language proficiency lead to better wages and other outcomes for migrants in Australia, relying on age at arrival as random variation in language proficiency.

Although the empirical evidence is limited, some studies suggest that the children of immigrants seem to perform exceptionally well in Australia. Dustman et al. (2012) compare the performance of the children of Turkish immigrants in several OECD countries, including Australia. The authors find that the children of Turkish immigrants perform better than the children of natives in math and reading tests in Australia. Looking at a different aspect of second generations outcomes in Australia, Moschion and Tabasso (2014) compare the intergenerational transmission of trust between second-generation immigrants in the US and Australia. They find that trust levels of second generation Australians are much less affected by their parents' trust levels (proxied by country-of-origin trust levels) compared to the trust levels of second-generation Americans. They attribute their findings to lower levels of crime, segregation, and inequality in Australia compared to the United States, which are considered important determinants of trust.

We contribute to this empirical literature by describing migrant quality according to what has traditionally been considered as selection by unobservable characteristics (Bertoli et al. 2016). These characteristics include cognitive and non-cognitive abilities. We present these for a rich OECD country that screens migrants on the basis of education, character, health and educational qualification. We thus build on the few empirical studies on the selection of immigrants by human capital such as Antecol et al. (2003) for the US, Canada and Australia, Aydemir (2011) for Canada, and Belot & Hatten (2012) for OECD countries.

3. Australian immigration policy

Australia is historically an immigrant-receiving country. About two in seven of its current residents, or 28 percent, have been born abroad. In comparison to other immigrant-receiving countries in the OECD, Australia has one of the highest proportions of foreign-born residents by 2017.[3] For instance, in Canada, New Zealand, and the United States the proportion of foreign-born residents is 21.5 percent, 22.7 percent, and 15.3 percent, respectively.[4] Moreover, data from the 2016 Census show that about one in five Australians are second-generation immigrants, for whom at least one parent was born overseas. Only about one in two Australians have no immediate immigration background, which means that their ancestors have arrived in

[3] Luxemburg has the highest rate of foreign-born population in the OECD countries, while Australia has the second-highest rate.
[4] Source: http://www.un.org

Australia at least three generations before.[5] This exceptionally high proportion of foreigners makes Australia very suitable for studying migrant quality.

Australia has a long history of growing its population through an active migration policy since the early 1900s. Up until the post World War II years, migrants were admitted predominantly on the basis of Western European origins, a policy sometimes referred to as the `White Australia' policy. After World War II, Australia opened its borders also to immigrants from Eastern Europe including Russia. Borders remained closed to migrants from Asia, although refugees from Vietnam and guest workers from China were admitted. Since 1974, Australia's migration policy has evolved to accepting economic migrants regardless of nationality, but based on occupational qualification and language proficiency. This new policy aimed to attract the necessary skills for which shortages were observed in domestic labor markets. In recent decades Australia has refined such a point-based approach to immigration similar to the ones used in Canada and New Zealand. This shift has resulted in the award of permanent resident visas, predominantly to skilled migrants, who generated more than two third of total migrant income and tax revenues.[6]

Australian migration policy in combination with major wars fought in Europe, Vietnam, and more recently, in the Near East has shaped the unique profile of Australian immigrants. According to the Australian Bureau of Statistics (ABS), Australia's population consist of people that were born in 190 different countries.[7] The countries with highest numbers of foreign-born residents include European countries such as England, Italy, and Germany to name a few, as well as Asian countries such as China, India, Philippines, and Vietnam. The diverse profile of migrants in Australia creates a special case to for the current study.

4. Data

We use data from the Household, Income, and Labour Dynamics in Australia (HILDA) survey which is a nationally representative household panel study conducted annually since 2001 (Summerfield et al. 2017). The survey comprises a household questionnaire, a person questionnaire for each household member, and a self-completion questionnaire. All adult household members aged 15 years and above are invited to respond to an interviewer-assisted

[5] Source: abs.gov.au
[6] Personal Income of Migrants, Australia, 2009-10 online report.
[7] Census of Population and Housing: Reflecting Australia - Stories from the Census, 2016

(continuing or new-person) questionnaire, in which information on education, employment, or family formation is collected. In addition, each eligible household member is invited to complete a self-completion questionnaire (SCQ) to be filled out in private, which takes about 30 minutes to complete). This SCQ collects predominantly attitudinal or more sensitive questions. The interviewer collects the completed SCQs during the interview, at a later date or, if a date cannot be arranged, the household is asked to return the SCQ by mail. A small fraction of households opt to return a completed SCQ before the interviewer conducts the face-to-face interview. Completion rates of the SCQs are around 90 percent (Summerfield et al. 2017).

For the analysis, we selected a sample of eligible survey participants from Waves 5 to 16 (2005 to 2016), because these were the years when non-cognitive and cognitive ability measures were collected. Personality traits were collected in the SCQs in years 2005, 2009, and 2013. Cognitive ability measures were collected as part of the interviewer assessment in 2012 and 2016. Our estimation sample includes 19,447 individuals, of which 10,373 are Australians with no immediate migration background, 3,656 (18.8 percent) are second-generation immigrants, and 3,676 (18.9 percent) are first-generation immigrants. A full list of variables used in the analysis and their descriptive statistics are reported in Table 1.

4.1. First and second-generation immigrants

We define first generation immigrants (FGI) as migrants who were born abroad and are currently a resident of Australia. Second generation immigrants (SGI) are defined as individuals born in Australia to a family in which at least one parent was born abroad (see Moschion and Tabasso, 2014).

Stricter/alternative definitions to both first-generation and second-generation immigrants are used in separate analyses. FGI who arrive before the age of 14 could be considered as SGI, as they still undergo a significant part of their compulsory education in the host country. We also consider FGI who arrived before 1974 and on or after 1974, reflecting exposure to different migration policies and thus migration incentives. In 1972, the Australian Labor Government decided to grant a visa based on personal attributes and ability to contribute to Australian Society, a decision which became effective from 1974. Furthermore, we apply a stricter definition of SGI, by considering children of two FGI only. For such strict SGI foreign cultural capital should be stronger than for children of one foreign-born parent.

Non-immigrant background individuals are those who were born in Australia to parents who were both born in Australia. From here onward, we refer to this group as non-immigrants (NI) Australians.

4.2. Cognitive and non-cognitive ability

Self-selection of migrant by innate abilities is difficult to quantify, because of the complex nature and un-observability of innate abilities. In the past ten years, however, measurement systems of innate abilities have dramatically improved, as many of the nationally representative surveys that are suitable for studying migrants now contain cognitive and non-cognitive ability measures. Cognitive and non-cognitive ability are key determinants of a person's life success (see Almund et al., 2011 for an overview).

Non-cognitive ability

There are many non-cognitive ability measures available, but the five-factor personality structure (OCEAN) is generally accepted by psychologists as a meaningful and reliable mechanism for describing and understanding human differences (Goldberg, 1992, 1993). This structure includes five facets of personality at the broadest level: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Openness measures an individual's degree of intellectual curiosity, creativity and a preference for variability. Conscientiousness measures an individual's ability to work hard, be reliable and comply with rules. Extraversion measures an individual's gregariousness or sociability. Some say that it also includes a notion of dominance. Agreeableness measures an individual's ability to cooperate, forgive and demonstrate altruism. Neuroticism refers to an individual's instability of emotions, lack of impulse control and irritability.

An extensive array of literature has demonstrated the value of personality to employers as demonstrated by substantial labor market returns to some traits (Chamorro-Premuzic & Furnham, 2003; Fletcher, 2013; Gensowski 2018; Heineck & Anger, 2010; Mueller & Plug, 2006; Nyhus & Pons, 2005). Conscientiousness in particular is frequently credited as a super-trait that is associated with better health behaviors, academic performance (Chamorro-Premuzic & Furnham, 2003; Furnham, Chamorro-Premuzic, & McDougall, 2003; Kappe & van der Flier, 2012; Noftle & Robins, 2007; Trapmann, Hell, Hirn, & Schuler, 2007) and higher wages at the beginning for young workers (Fletcher, 2013; Nyhus & Pons, 2005). Other Big-

Five personality traits—e.g. agreeableness—are related to economic preferences such as reciprocity and altruism (Becker et al., 2012), or pro-sociality (Hilbig et al., 2014), which are at the basis of socioeconomic development (e.g. Bigoni et al., 2016) and population well-being (Post, 2005).

We therefore measure respondents' non-cognitive ability with the Big Five personality traits. In waves 5, 9, and 2013 HILDA collected an inventory of the Big-Five personality traits based on Saucier (1994) that can be used to construct measures for extraversion, agreeableness, conscientiousness, emotional stability (the reverse of neuroticism), and openness to experience. To construct a summary measure for each trait, we use the 28 items used to measure personality on the Big-Five and conduct factor analysis (see Cobb-Clark and Schurer 2012, Elkins, Kassenboehmer, and Schurer 2017, Kassenboehmer, Leung, and Schurer 2018, Kassenboehmer and Schurer 2018 for applications). These measures demonstrate a large degree of internal consistency. In our sample, Cronbach's alpha of all non-cognitive skill measures are beyond 0.7 and some lie even beyond 0.8 such as conscientiousness and openness to experience. All personality variables are standardized to mean 0 and standard deviation 1.[8] To maximize sample sizes, we use Big-Five personality information on each individual when the data had been collected for the first time. For most sample members, this was in 2005, but some sample members became eligible for individual surveys in 2009 or 2013.

Cognitive ability

Measures for cognitive ability have been used widely in the literature to identify the impact of intelligence. Although attempts have been made in the past to capture intelligence with one proxy, cognitive ability cannot be understood as a uni-dimensional concept. Psychologists distinguish between fluid intelligence, the rate at which people learn, and crystallized intelligence, which refers to acquired knowledge. IQ tests intend to measure fluid intelligence. For instance, Neal and Johnson (1996) use a proxy variable for human capital to estimate the productivity effect of human capital. The study uses measures from the Armed Forces Qualification Test (AFQT) and the Armed Services Vocational Aptitude Battery (ASVAB) to

[8] Note, the measures used are relatively stable in adulthood, as discussed and demonstrated in Cobb-Clark and Schurer (2012) and Elkins, Kassenboehmer and Schurer (2017). Small variations over time can be attributed to measurement error and that past measures of non-cognitive skills can yield attenuation biases. Instead of using measures from all three available time periods, we could have used an average measure over 12 years to minimize measurement error. Our results are not sensitive to such an alternative measurement.

proxy acquired human capital. Lin, Lutter, and Ruhm (2018) demonstrate the predictive power of adolescent cognitive ability on later-life labor market outcomes.

The HILDA survey assessed respondents' cognitive ability in Wave 12 and Wave 16 as part of the interviewer-assisted survey. This assessment included standard tests to measure memory, executive function, and crystallized intelligence through a Backward-Digit Span Test (BDS), a Symbol-Digit Modalities Test (SDM), and a National Adult Reading Test (NART), respectively (see Wooden 2013 for an overview). The BDS measures working memory span and is a sub-component of traditional intelligence tests. The interviewer reads out a string of digits which the respondent has to repeat in reverse order. BDS measures the number of correctly remembered sequences of numbers. SDM is a test of executive function, which was originally developed to detect cerebral dysfunction but is now a recognized test for divided attention, visual scanning and motor speed. Respondents have to match symbols to numbers according to a printed key that is given to them. SDM measures the number of correctly matched symbol-number pairs. NART is assessed through a 25-item list of irregular English words, which the respondents are asked to read out loud and pronounce correctly. NART measures the number of correctly pronounced words. On average, sample members score 4 on the BDS, 49 on the SDM, and 14 on the NART tests. Because the range of possible values differs across these three measures, we standardize each measure to mean 0 and SD 1. Again, we use data for most individuals from 2012, when cognitive ability information was first assessed, and for a small proportion of individuals who became eligible sample members after 2012, we use data from 2016.

5. Empirical framework

We estimate the migrant ability gap as a proxy for migrant quality using pooled cross-sectional data. The outcome variable is ability (A_i) (cognitive, non-cognitive) for individual *i* which was measured in 2005 for non-cognitive ability (or 2009 or 2013) or in 2012 for cognitive ability (or 2016):

$$A_{it} = \alpha_1 + \alpha_2 I_i + X_i' \boldsymbol{\beta} + \varepsilon_i, \quad (1)$$

where the key variable of interest is a binary indicator for immigrant status I_i. The model is estimated separately for first-generation immigrants (FGI) and second-generation immigrants (SGI). In the case of FGI, The indicator variable I_i takes the value 1 if the individual was born

overseas, and zero otherwise. In the case of SGI, the indicator variable I_i takes the value 1 if the individual was born in Australia to parents where at least one of the parent was born overseas, and zero otherwise. Stricter/alternative definitions, as defined in Section 4.1, are applied in sub-sequent analyses.

Following previous empirical work on estimating migrant quality (e.g. Antecol et al. 2003), we control for a minimal number of covariates which may systematically vary with both ability and immigrant status. The vector X_i' includes (1) a continuous measure of age, (2) a dummy variable for whether the individual is female, (3) dummy variables for each birth year to capture cohort effects, (4) dummy variables for geographic location to capture systematic variations by state and remoteness, and (5) a control for the wave in which the outcome is measured. The error term ε_i absorbs all remaining factors that do not correlate with immigrant status but which influence outcomes.

Of main interest is the estimate of α_2 which measures the migrant ability gap relative to Australians with parents who were both born in Australia, which we refer to also as non-immigrants or Australians with no immediate migration background. In the case of FGI, it is important to note that α_2 captures the difference in cognitive and non-cognitive ability for FGI after the individual had arrived in Australia. On average, first generation immigrants have stayed in the country for 26 years (see Table 1). For some individuals in our sample, arrival in Australia dates back as far as the 1920s. Thus, strictly speaking, α_2 may capture both the speed of assimilation and the self-selection of migrants to Australia. One possibility to hold assimilation constant is to control for years-since-migration. As we control for both age and cohort effects, we cannot separately identify this assimilation effect (see Borjas 1999 for a discussion). Therefore, we present such results in a robustness check without interpreting the years-since-migration coefficient. Furthermore, it may be valid to assume that assimilation in abilities may play a minor role. Both cognitive and non-cognitive abilities are relatively stable in adulthood (see e.g. Cobb-Clark and Schurer, 2012; 2013; Elkins et al., 2017 for evidence and review of the literature).

As all our outcome measures on ability are standardized to mean 0 and standard deviation 1, we interpret α_2 in terms of standard deviation change.

6. Estimation results

6.1. Non-cognitive ability

6.1.1. First generation immigrants

We present the migrant personality gap in Table 2 for the main coefficients of interest. Full estimation results are reported in the Online Appendix (Table A1). Panel A summarizes our estimation results on the personality differences between non-immigrants (NI) and first-generation immigrants (FGI). We find that FGI score higher on extraversion, conscientious, and openness to new experiences than NI, ceteris paribus. They also score lower on emotional stability. The estimated differences are sizable in magnitude. For instance, FGI are 0.05 SD more extraverted, 0.10 SD more conscientious, and almost 0.15 SD more open to new experiences. These estimates remain robust to controlling for years-since-migration except that the already small coefficient on extraversion is no longer statistically significant, while the effect is larger for conscientiousness and for agreeableness (and statistically significant at the 10% level). See Online Appendix (Table A2) for these results.

There is no discernible difference in the FGI premium between earlier (arrival before 1974) and later FGI (arrival 1974 or after), except that FGI arrivals before 1974 are more extraverted than NI, while there is no significant difference between FGI who arrived more recently and NI. However, there are notable differences in the estimated personality gap between FGI who arrived before the onset of adolescence in Australia (before the age of 14), and FGI who arrived during adolescence and at later ages (after the age of 13). FGI who arrived at younger ages, who may be considered as second-generation immigrants, are no different in their extraversion and emotional stability scores than NI, but are significantly more agreeable (by almost 0.10 SD), and substantially more open to new experiences (by 0.20 SD) than NI. Both younger and older age arrivals score equally higher on conscientiousness than NI (by about 0.10 SD).

Sex differences in the migrant personality gap

Because men and women may select differently into migration or assimilate differently into the host country's new culture, we estimate the models on personality traits separately for men and women. There are few, although noteworthy sex differences in the migrant gap of personality (Table 3, Panel A). First, the migrant gap in extraversion is only observable for male but not for female FGI. Second, while we do not observe a significant migrant gap in

agreeableness on average, we find a statistically significant gap for male but not for female FGI. Third, the negative migrant gap in emotional stability is only observable for female FGI. The migrant gap in conscientiousness is observed equally for men and women.

Country differences in the migrant personality gap

We furthermore ask whether there are important heterogeneities in the migrant personality gap personality by country of origin.[9] Figure 1 shows the personality trait gaps separately for the nine largest source countries in Australia. These are the UK (N=1,153), New Zealand (N=446), India (N= 157), Philippines (N= 157), China (N=134), South Africa (N= 123), Vietnam (N=97), Germany (N= 116), and the Netherlands (N=110).

There are important migrant-gap differences between these source countries. We observe large positive differences in conscientiousness between FGI and NI Australians for immigrants from the UK, India, South Africa, Germany, and the Netherlands, and small differences for New Zealand and Philippines. For instance, FGI from the UK, India, South Africa, German and the Netherlands score between 0.2 and 0.4 SD higher on conscientiousness than comparable NI Australians. FGI from New Zealand, a country that is very similar in culture to Australia, score significantly higher on conscientiousness by 0.1 SD. We find similar striking evidence of positive selection of migrants for openness to experience. FGI from New Zealand, South Africa, and Germany score between 0.1 SD (New Zealand) and 0.35 SD (Germany) higher on openness to experience.

The migrant penalty on emotional stability, which we have reported in Table 2, is driven by migrants from India, China, and Vietnam. Migrants from these countries score lower on emotional stability by between -0.18 SD (India) and -0.35 SD (China). It may be possible that these three nationalities understand the questions regarding emotional stability in a different way than other cultures that are closer to the English-language background.

[9] We conduct this analysis for FGI only, as it is extremely difficult to narrow down the country of origin of SGI who have two parents born abroad.

6.1.2. Second generation immigrants

Panel B in Table 2 summarizes the estimation results for second-generation immigrants (SGI), who are children born in Australia with at least one foreign-born parent. Similar as FGI, SGI are estimated to score higher on conscientiousness, a result that is mainly driven by female SGI (Table 3, Panel B), and openness to new experiences than NI Australians, independent of whether we apply a strict or a generous definition for SGI. Both SGI groups tend to be more agreeable than NI, a result that is consistent with the agreeableness premium estimated for FGI who arrived very young in Australia. Neither group differs from NI in terms of their extraversion or emotional stability. The only notable difference is that SGI with two foreign-born parents are significantly more conscientious (0.05 SD versus 0.13 SD, t-stat = - 2.47) and significantly more agreeable (0.05 SD versus 0.14 SD, t-stat = -2.71) than SGIs where only one parent was born abroad.

6.2. Cognitive ability

6.2.1. First generation immigrants

Table 4 reports the migrant gaps in cognitive ability for key coefficients of interest. Full estimation results are reported in the Online Appendix (Table A3). We observe large and significant differences in cognitive abilities between NI Australians and both FGI and SGI, although in opposite directions. As shown in Panel A, FGI score 0.26 SD lower on the National Adult Reading Test (NART-25, Column (3)), which is a measure of verbal pronunciation ability, than NI Australians. They also score 0.07 SD lower on the Backward Digit Span (BDS), which measures short-term memory (column (1)), although this penalty is no longer statistically significant when controlling for years-since-migration (Online Appendix, Table A4). There are no notable differences in scores on the Symbol Digits Modalities Test (SDM) between FGI and natives (column (2)), which measures speed and accuracy of responses.

The language penalties observed for FGI are sizable only for FGI who had arrived after 1973, with a penalty size of 0.36 SD. There are three explanations for this large difference. First, FGI who arrived after 1973 may have spent less time in Australia than immigrants who had arrived before 1974. Hence, they had less time for assimilation in language ability. Second, FGI who arrived after 1973 may have come from source countries, with a larger proportion of non-English speaking backgrounds. Thus, they may have been more disadvantaged in their language abilities from the beginning. Third, earlier arrivals may have arrived at younger ages,

and thus adopted English as their first language. We find indeed that FGI who arrived before the onset of adolescence suffer no language pronunciation penalties, whereas FGI who arrive later suffer a penalty of 0.41 SD relative to NI. This finding is consistent with the evidence presented in Guven and Islam (2015), who demonstrated that age at arrival is a strong predictor of language ability in Australia.

Sex differences in the migrant cognitive ability gap

There are few sex differences in the migrant cognitive ability gap, with two notable exceptions (Online Appendix, Table A5). The cognitive ability penalty observed for FGI on the NART-25 test is slightly larger in magnitude for female than for male migrants (although the difference is not statistically significant). Female FGI experience a penalty in short-term memory, while male FGI do not relative to natives. One explanation for this heterogeneous cognitive ability penalty by sex is that female migrants to Australia were less likely to enter the labor market (than male migrants) and thus were less likely to adopt the local language.

Country of origin differences in the migrant cognitive ability gap

We observe important heterogeneities by country of origin in the language penalty for FGI (see Online Appendix, Table A6). While FGI from the UK and South Africa perform better than NI Australian in language pronunciation (0.27 SD and 0.20 SD, respectively), all other FGI experience a statistically significant penalty including New Zealanders, but excluding Dutch FGI. The largest penalties are observed for FGI who arrived from a non-European or English-speaking background such as the Philippines (-0.77 SD), India (-0.34 SD) or China (-1.4 SD).

FGI from the Philippines score however significantly higher on the BDS, a short-term memory tests (0.24 SD), while FGI from China score significantly higher on executive function ability tests (0.47 SD) than NI Australians. FGI from India, Vietnam and Germany score significantly below natives in terms of their short-term memory scores. This suggests that FGI migrants come to Australia with different cognitive ability strengths and weaknesses depending on their source countries.

6.2.2. Second generation immigrants

In stark contrast to the FGI, SGI have significantly higher language abilities and executive function than natives. They score 0.46 SD higher on the NART-25 test than NI Australians, and 0.45 SD higher on the SDM test (Panel B). The cognitive premium for SGI on the SDM is even larger (0.07 SD, column (2)) when applying a strict definition of SGI where both parents are foreign born. When considering heterogeneities by sex, it turns out that this premium in executive function is mainly driven by female SGI (Online Appendix, Table A5). SGI score no different on the BDS than NI Australians (column (1)).

Our findings suggest that children of immigrants overcome their parents' language difficulties and short-term memory disadvantage. Even more so, female children of immigrants outperform natives in terms of speed and accuracy of solving a SDM test.

6.3. Migrants gaps in formal human capital, occupation, and wages

We have shown that migrant quality is high among both FGI and SGI, especially among those with two foreign-born parents. Both groups are characterized by high levels of, for instance, conscientiousness, a trait highly valued by society and employers. Furthermore, although FGI suffer language and emotional stability penalties relative to NI Australians, their off-spring fully compensates for these gaps and outperforms NI Australians in terms of language, and speed and accuracy in tests.

We now explore whether high levels of migrant quality is also observed in terms of formal human capital, occupational prestige, and labor-market productivity. We estimate standard models of human capital and wages, in which we furthermore control for years-since-migration, as is standard in the literature on the wage returns of immigrants.[10] Table 5 shows the estimated migrant-gap in years of education (Panel A), occupational prestige (Panel B), and productivity (Panel C), separately for FGI and SGI (relative to NI Australians). As expected, FGI have significantly higher levels of education by more than 1 year (column (1)). This years-of-education gap is entirely driven by more recent FGI, who arrived after 1973 (column (3)) and those who arrived during or after the onset of adolescence (column (5)). SGI are no different to NI Australians.

[10]As we have this data available over many time periods, we pool observations over time and adjust the standard errors for clustering standard errors for repeated individual observations.

Yet, FGI do not work in occupations with higher prestige, as measured by the Occupational Prestige Score, which ranks occupations on a scale from 0 (low) to 100 (high) (Panel B). Despite higher levels of education, they also attract lower wages by 12.4 log percent points than NI Australians (Panel C, column (1)). This labor market penalty for FGI is consistent with findings reported elsewhere that migrants lack local knowledge and networks to access the high-income jobs. However, there is a large degree of heterogeneity across FGI. For instance, FGI who arrived before 1974 experience a significant wage-premium over NI Australians in the magnitude of 23.3 log percent, while FGI who had arrived after 1973 experience a 16.9 log percent wage penalty. Age at arrivals plays an important role in explaining this penalty. FGI who arrived before the onset of their adolescence experience no wage penalty. This is consistent with the observation that the SGI also does not experience any wage (or occupational prestige) penalties (columns (5) and (6)).

6.4. Wage returns of ability

Finally, we explore whether FGI and SGI can use their better non-cognitive abilities to obtain higher returns in the labor market. We estimate a standard wage regression model, where log hourly wages is the dependent variable and allowing for interaction terms between immigrant status and ability. We exploit the within-individual variation of our data to identify the causal impact of non-cognitive ability and its heterogeneous impact by migrant status, using a fixed effects specification similar to Fletcher (2013). This specification allows us to control for unobserved, time-invariant heterogeneity that may correlate with ability. We focus this analysis on personality traits only, for which we have three time periods available that stretch over a 12-year time period.[11] The estimation results are presented in Table 6.

We observe that, on average, natives experience a wage return on extraversion and openness to experience. A one-standard deviation increase in extraversion for natives leads to a wage increase of about 2 log percent, which has been found in previous studies (Fletcher 2013, Mueller and Plug 2006). In contrast, a one-standard deviation increase in openness to

[11] We alert that our estimates may suffer from attenuation bias. Cobb-Clark and Schurer (2012) and Elkins et al. (2017) have shown that the Big-Five personality traits vary little over four-year windows and that their variation cannot be explained by systematic events that occur to sample members in the HILDA survey data. Thus, we may not have enough variation in the data for personality traits either. The variation in cognitive ability tests is even less. We also estimated a fixed effects model on the returns to cognitive ability. However, we have only two waves of data (2012 and 2016), yielding too little variation in cognitive ability. We find no significant differences between FGI/SGI and NI Australians in terms of their returns to cognitive ability, but we alert that this may be due to lack of variation. These results are provided upon request.

experience leads to a 2.3 log percent reduction in wages for natives, a finding that is consistent with previous evidence for men (e.g. Gensowski 2018 (not statistically significant); Fletcher 2013; Heineck and Anger 2010).[12]

Although overall the wage returns do not differ for immigrants from natives, we observe one critical difference. Both FGI and SGI experience significantly higher and positive returns to agreeableness than NI Australians. For natives, every 1 SD increase in agreeableness translates into a wage penalty of 1 log percent for NI Australians (although not statistically significant). This is a common finding in the literature (e.g. Gensowski 2018 for highly educated men; Heineck and Anger 2010 for women, Mueller and Plug 2006 for men). In contrast, for FGI the estimated return to agreeableness is 3.2 log percent higher, which translates into a 2.2 log percent increase in wage for a 1 SD increase in this trait. This labor-market benefit is observed predominantly for FGI who arrived before adolescence (column (4)), who can be considered as SGI, and for SGI where one parent was born abroad (column (6)). Finally, the labor-market penalty of openness to experience is particularly strong for FGI who arrived in Australia before 1974, while it is not statistically significant different from the returns of natives for all other groups.

We can only speculate on why immigrants experience higher and positive returns on agreeableness. One explanation is that improvements in agreeableness matter more in the higher end of the agreeableness distribution, because FGI who arrived in Australia before the onset of adolescence and SGI score very high on agreeableness relative to natives. However, Mueller and Plug (2006) demonstrates that this is not the case in their application using US survey data. They find positive returns only in the bottom 25th percent of the Agreeableness distribution, while they find negative returns in the top 25th percent (not statistically significant). Another explanation is that immigrants may be better matched into jobs where agreeableness abilities are highly remunerated.

7. Conclusion

Immigrants are often regarded as a self-selected group. A well-documented literature in migration economics argues that migrants are not a random group of individuals from the home country (Ambrosini and Peri 2012, Antecol et al. 2003, Borjas 1987, Chiquiar and Hanson

[12] Note, Mueller and Plug (2006) find a positive return to Openness to Experience for both men and women over and above the influence of cognitive ability.

2005, Dequiedt and Zenou 2013, Fernández-Huertas Moraga 2011; 2013, Jasso and Rosenzweig 2009, Kaestner and Malamud 2014). On the one hand, immigrants are often considered as high ability individuals that were able to push through the emotional, financial, and legal barriers of migration. On the other hand, immigrant-receiving countries including Australia, impose policies to ensure they attract migrants with certain observable characteristic that are able to fill the gaps in the domestic labor markets.

However, migrant selection based on observable characteristics such as language ability, formal qualification, and health does not take into account that migrants also have other, often unobserved, characteristics that may be attractive to the host country. Migrants certainly also self-select on the basis of their character and motivation, and this selection may not be independent of selection on more formal qualifications (Bertoli et al. 2016).

We contribute to the current literature on migrants' self-selection, by providing evidence on their innate abilities. To the best of our knowledge, we are the first to shed light on some of these innate, hard-to-observe, abilities by detailing the non-cognitive and cognitive ability differences between immigrants and natives in Australia. We use high-quality, nationally representative survey data from the Household, Income, and Labour Dynamics in Australia (HILDA) survey to estimate the migrant gap in the Big-Five personality traits and standard measures of cognitive ability such as memory, executive function and language ability.

Overall, we conclude that Australia has attracted a pool of high quality migrants, and these migrants have passed on their innate abilities to their children. Even more so, the children of migrants have fully overcome their parents' language difficulties, and outperform natives on multiple dimensions of ability. Attracting high-quality human capital maybe one of the secrets for Australia's sustained economic growth over the past 30 years. A recent study by the Treasury and the Department of Home Affairs (2018) forecasted that a continuation of the current intake of migrants will add up to one percentage point to GDP growth each year for 30 years, while making a combined lifetime tax contribution of almost $7 billion. Our findings in conjunction with this landmark report suggest that migrants contribute to the growth in wealth of Australia and therefore to an increase in social welfare.

Our findings are particularly important in the context of a world-wide political shift toward conservative immigration policy. In some countries, ultra-conservative, anti-migration parties have entered the political scene, and some are able to influence the direction of a country's immigration scheme through official representation in parliaments. Politicians often

blame immigrants for the troubles of the country depending on their political lenience. This is no different in Australia, an immigrant-receiving country where one in three of the population is foreign-born, one of the highest shares of foreign-born in the OECD.[13] Australia is currently implementing ever tighter vetting rules introduced since 2015 by the Immigration Department.[14]

A right-shift has occurred in sentiments against migrants, suggesting that migrants may erode social norms, take away jobs, and abuse the welfare system.[15] Although Australia has been traditionally an open and welcoming country, more recent, nationally representative opinion polls demonstrate that the majority of Australians feel that the current migrant intake is too high, a number rising from 37% to over 54% within the past two years. More than two in five people believe today that if "Australia is too open to people from all over the world, we risk loosing our identity as a nation" (Lowy Institute Poll, 2018). Our findings demonstrate that concerns about the quality of migrants attracted to Australia are misguided and that in fact Australia's migration policy leads to an exceptionally strong human capital portfolio from which economic prosperity may be expected.

[13] Based on Australian Bureau of Statistics as of June 2015, 28.2% of Australian resident population was born overseas.

[14] It is forecasted that the annual permanent migrant intake will be reduced by more than 20,000, from a ceiling of currently 190,000 per annum that was capped for the past four years. It is expected that the number of skilled and sponsored Visas will be dramatically reduced.

[15] Manpreet K. Singh for the SBS on "Anti-immigration sentiment rises sharply in Australia: report", published on 25 June 2018, online news.

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TABLES

Table 1. Summary statistics

	Australians		**Second-generation immigrants**		**First-generation immigrants**	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Cognitive ability tests (2012, or 2016)						
BDS (0-8)	4.936	1.403	5.005	1.411	4.873	1.446
SDM (1-104)	49.351	12.526	47.731	13.360	51.564	12.204
NART 25 (1-25)	13.293	5.301	13.671	4.960	12.918	5.928
Individual observations	10373		3656		3676	
Non-cognitive ability (2005, or 2009, or 2013)						
Extraversion (1-7)	4.467	1.060	4.505	1.094	4.473	1.048
Conscientiousness (1-7)	4.976	1.044	4.985	1.053	5.187	0.998
Agreeableness (1-7)	5.335	0.956	5.362	0.935	5.434	0.953
Emotional Stability (1-7)	5.129	1.104	5.085	1.097	5.151	1.080
Openness (1-7)	4.162	1.076	4.300	1.058	4.322	1.063
Individual observations	11,361		3,959		4,127	
Control variables (2005, or 2009, or 2013)						
Female (0-1)	0.529	0.499	0.527	0.499	0.521	0.500
Age (15-100)	40.245	18.887	36.632	17.665	47.368	17.145
Years Education (11-18)	12.720	2.002	12.877	2.056	13.567	2.324
New South Wales (0-1)	0.298	0.457	0.278	0.448	0.328	0.470
Victoria (0-1)	0.239	0.426	0.264	0.441	0.239	0.426
Queensland (0-1)	0.233	0.423	0.176	0.381	0.172	0.377
South Australia (0-1)	0.096	0.294	0.101	0.302	0.086	0.280
Western Australia (0-1)	0.069	0.254	0.124	0.329	0.126	0.332
Tasmania (0-1)	0.044	0.204	0.026	0.158	0.016	0.125
Northern Territory (0-1)	0.006	0.077	0.007	0.081	0.008	0.090
Austral. Capital Territory (0-1)	0.016	0.126	0.024	0.152	0.026	0.158
Major urban region (0-1)	0.542	0.498	0.673	0.469	0.763	0.425
Other urban region (0-1)	0.279	0.449	0.191	0.393	0.138	0.345
Block local region (0-1)	0.032	0.177	0.019	0.137	0.018	0.134
Rural region (0-1)	0.146	0.353	0.117	0.321	0.080	0.272
Years since migration(0-88)					26.025	16.854
Years of education (11-18)	12.720	2.002	12.877	2.056	13.567	2.324
Occupation prestige (0-100)	46.041	22.691	46.458	22.444	49.099	23.294
Log hourly wage	3.629	0.510	3.187	0.524	3.213	0.556
Individual observations	11,361		3,959		4,127	

Table 2. Migrant gap in Big-Five personality traits

	(1) Extrav	(2) Consc	(3) Agree	(4) Emote Stab	(5) Openness
Panel A: First generation immigrants					
FGI	0.050***	0.099***	0.031	-0.066***	0.142***
(N=4,127)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
NT Observations	15,488	15,488	15,488	15,488	15,488
R-squared	0.031	0.070	0.082	0.078	0.039
FGI (Before 1974)	0.086***	0.078***	0.018	-0.069**	0.144***
(N= 1,452)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
NT Observations	12,817	12,817	12,817	12,817	12,817
R-squared	0.035	0.075	0.088	0.086	0.038
FGI (1974 or after)	0.036	0.103***	0.030	-0.073***	0.139***
(N=2,671)	(0.022)	(0.022)	(0.023)	(0.022)	(0.023)
NT Observations	14,036	14,036	14,036	14,036	14,036
R-squared	0.034	0.071	0.084	0.076	0.039
FGI(Age at arrival<14)	0.044	0.102***	0.089***	-0.034	0.195***
(N=1,322)	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
NT Observations	12,683	12,683	12,683	12,683	12,683
R-squared	0.036	0.076	0.092	0.081	0.040
FGI(Age at arrival>13)	0.054**	0.102***	0.002	-0.080***	0.111***
(N=2,805)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
NT Observations	14,166	14,166	14,166	14,166	14,166
R-squared	0.032	0.070	0.081	0.081	0.038
Panel B: Second generation immigrants					
Either parent is FGI	0.006	0.043**	0.035*	0.003	0.091***
(N=3959)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
NT Observations	15,320	15,320	15,320	15,320	15,320
R-squared	0.035	0.074	0.087	0.076	0.036
Both parents are FGIs	-0.003	0.122***	0.110***	0.038	0.066**
(N=1459)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
NT Observations	12,820	12,820	12,820	12,820	12,820
R-squared	0.036	0.076	0.091	0.082	0.037

Note: Estimated coefficients are interpreted in terms of standard deviation difference. Each model is estimated separately for first-generation and second-generation immigrants. Regression models for first-generation immigrants exclude sample of second generations. Each model controls for age, birth cohort, sex, geographic location, year when survey was collected (2005, 2009, and 2013). The control group is non-immigrant Australians with no immediate immigration background. Standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Migrant gap in Big-Five personality traits by sex

	Male					Female				
	(1) Extrav	(2) Consc	(3) Agree	(4) Emote Stab	(5) Openness	(1) Extrav	(2) Consc	(3) Agree	(4) Emote Stab	(5) Openness
	Panel A: First generation immigrants									
FGI	0.074***	0.097***	0.049*	-0.044	0.122***	0.027	0.095***	0.009	-0.080***	0.162***
(N= 1,976)	(0.026)	(0.027)	(0.029)	(0.027)	(0.027)	(0.027)	(0.026)	(0.025)	(0.026)	(0.026)
Observations	7,332	7,332	7,332	7,332	7,332	8,156	8,156	8,156	8,156	8,156
R-squared	0.033	0.077	0.037	0.048	0.039	0.023	0.065	0.036	0.126	0.049
FGI (Before 1974)	0.076*	0.052	-0.017	-0.068	0.102**	0.094**	0.096**	0.039	-0.056	0.178***
(N= 724)	(0.040)	(0.042)	(0.044)	(0.042)	(0.043)	(0.043)	(0.043)	(0.041)	(0.042)	(0.043)
Observations	6,083	6,083	6,083	6,083	6,083	6,735	6,735	6,735	6,735	6,735
R-squared	0.038	0.085	0.042	0.052	0.038	0.028	0.071	0.046	0.140	0.051
FGI (1974 or after)	0.084***	0.113***	0.076**	-0.036	0.128***	-0.006	0.091***	-0.011	-0.104***	0.154***
(N=1,249)	(0.031)	(0.032)	(0.034)	(0.032)	(0.033)	(0.032)	(0.031)	(0.030)	(0.031)	(0.031)
Observations	6,608	6,608	6,608	6,608	6,608	7,428	7,428	7,428	7,428	7,428
R-squared	0.037	0.078	0.041	0.047	0.042	0.027	0.066	0.038	0.124	0.050
FGI(Age at arrival<14)	0.037	0.083**	0.075*	-0.046	0.118***	0.055	0.110***	0.100**	-0.024	0.268***
(N=648)	(0.039)	(0.040)	(0.043)	(0.041)	(0.042)	(0.042)	(0.042)	(0.039)	(0.041)	(0.041)
Observations	6,004	6,004	6,004	6,004	6,004	6,679	6,679	6,679	6,679	6,679
R-squared	0.039	0.086	0.045	0.048	0.040	0.029	0.071	0.047	0.135	0.057
FGI(Age at arrival>13)	0.100***	0.109***	0.039	-0.039	0.100***	0.010	0.092***	-0.040	-0.107***	0.010
(N=1.328)	(0.030)	(0.032)	(0.034)	(0.032)	(0.030)	(0.031)	(0.031)	(0.030)	(0.030)	(0.031)
Observations	6,684	6,684	6,684	6,684	6,684	7,482	7,482	7,482	7,482	7,482
R-squared	0.036	0.077	0.039	0.050	0.036	0.025	0.065	0.038	0.130	0.025
	Panel B: Second generation immigrants									
Either parent is FGI	0.011	0.016	0.040	-0.002	0.087***	0.006	0.064**	0.033	0.009	0.098***
(N= 1,873)	(0.026)	(0.027)	(0.028)	(0.027)	(0.027)	(0.027)	(0.026)	(0.024)	(0.026)	(0.026)
Observations	7,229	7,229	7,229	7,229	7,229	8,091	8,091	8,091	8,091	8,091
R-squared	0.035	0.073	0.035	0.044	0.035	0.029	0.070	0.044	0.125	0.048
Both parents are FGIs	0.026	0.073*	0.149***	0.013	0.026	-0.023	0.167***	0.080**	0.072*	-0.023
(N= 693)	(0.038)	(0.040)	(0.042)	(0.040)	(0.038)	(0.040)	(0.039)	(0.037)	(0.039)	(0.040)
Observations	6,049	6,049	6,049	6,049	6,049	6,771	6,771	6,771	6,771	6,771
R-squared	0.039	0.080	0.046	0.050	0.040	0.032	0.072	0.049	0.134	0.032

Note: Estimated coefficients are interpreted in terms of standard deviation difference. Regression models for first-generation immigrants exclude sample of second generations. Each model controls flexibly for age, birth cohort, sex, geographic location, year when survey was collected (2005, 2009, and 2013). The control group is non-immigrant Australians with no immediate immigration background. Standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Migrant gap in cognitive ability

	(1) BDS	(2) SDM	(3) NART-25
Panel A: First Generation Immigrants			
FGI	-0.067***	-0.009	-0.259***
(N= 3,676)	(0.020)	(0.016)	(0.020)
Observations	14,049	14,049	14,049
R-squared	0.032	0.368	0.109
FGI (before 1974)	-0.091***	-0.008	-0.039
(N= 1,126)	(0.033)	(0.027)	(0.032)
Observations	11,503	11,503	11,503
R-squared	0.035	0.392	0.141
FGI (1974 or after)	-0.063***	-0.018	-0.362***
(N=2,546)	(0.023)	(0.019)	(0.022)
Observations	12,923	12,923	12,923
R-squared	0.028	0.345	0.119
FGI(Age at arrival<14)	-0.002	0.028	-0.001
(N= 1,213)	(0.030)	(0.024)	(0.029)
Observations	11,586	11,586	11,586
R-squared	0.030	0.358	0.145
FGI (Age at arrival>13)	-0.100***	-0.034*	-0.408***
(N= 2,463)	(0.023)	(0.019)	(0.023)
Observations	12,836	12,836	12,836
R-squared	0.033	0.378	0.121
Panel B: Second generation immigrants			
Either parent is FGI	0.018	0.045***	0.046**
(N= 3,656)	(0.019)	(0.015)	(0.018)
Observations	14,029	14,029	14,029
R-squared	0.028	0.362	0.143
Both parents are FGI	-0.008	0.069***	-0.023
(N=1,317)	(0.029)	(0.024)	(0.028)
Observations	11,690	11,690	11,690
R-squared	0.027	0.364	0.144

Note: Estimated coefficients are interpreted in terms of standard deviation difference. Each model is estimated separately for first-generation and second-generation immigrants. Regression models for first-generation immigrants exclude sample of second generations. Each model controls flexibly for age, birth cohort, sex, geographic location, year when survey was collected (2012, 2016). The control group is non-immigrant Australians with no immediate immigration background. BDS the number of correctly remembered sequences of numbers. SDM measures the number of correctly matched symbol-number pairs. NART measures the number of correctly pronounced words. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Formal human capital, occupational prestige, hourly wages

VARIABLES	(1) FGI	(2) FGI Arrive<1974	(3) FGI Arrive>1973	(4) FGI(Age at arrival<14)	(5) FGI(Age at arrival>13)	(6) SGI	(7) SGI strict
Panel A: Education	1.077***	0.223	1.210***	0.512**	1.245***	0.017	-0.012
	(0.094)	(0.467)	(0.109)	(0.249)	(0.106)	(0.054)	(0.080)
Constant	13.294***	12.114***	12.772***	12.308***	12.815***	10.556***	12.115***
	(2.896)	(3.240)	(2.997)	(3.197)	(3.026)	(2.944)	(3.189)
Observations	20,247	16,297	18,524	16,562	18,251	19,485	16,463
R-squared	0.091	0.071	0.096	0.074	0.096	0.071	0.072
Panel B: Occupation	0.507	2.501	-0.760	6.961	-0.071	-0.093	-0.753
	(1.516)	(6.347)	(2.095)	(4.357)	(1.836)	(0.799)	(1.161)
Constant	12.539	-41.942	0.119	-22.989	-10.966	-11.702	-39.152
	(77.874)	(86.677)	(79.784)	(84.362)	(81.672)	(75.772)	(83.465)
Observations	4,686	3,889	4,232	3,893	4,225	4,538	3,889
R-squared	0.046	0.057	0.050	0.058	0.050	0.051	0.058
Panel C: Wages	-0.124***	0.233**	-0.169***	0.025	-0.152***	-0.013	-0.010
	(0.016)	(0.118)	(0.025)	(0.053)	(0.026)	(0.011)	(0.015)
Constant	1.692***	2.055***	1.420**	1.811***	1.662**	-0.838	1.427**
	(0.618)	(0.668)	(0.633)	(0.645)	(0.650)	(0.588)	(0.650)
Observations	13,434	10,793	12,473	11,100	12,159	13,260	11,188
R-squared	0.280	0.291	0.287	0.294	0.284	0.293	0.299

Note: Panel A: Outcome variable is total number of years of education. Panel B: Outcome variable is Occupational Prestige Score which is bound between 0 (low) and 100 (high). Panel B: Outcome variable is the logarithm of hourly wages. Each model is estimated separately for first-generation (FGI) and second-generation immigrants (SGI). Each model controls flexibly for age & age squared, birth cohort, sex, geographic location, years since migration (for all first generation migrants), year when outcome was collected. For Panel C, additional control variables of full set of dummy variable for occupation and years of education are added. Clustered Standard errors in parentheses for all estimations (by individual to account for repeated observations). *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Wage returns to the Big-Five personality traits by immigrant status

	(1) FGI	(2) FGI Arrive<1974	(3) FGI Arrive>1973	(4) FGI(Age at arrival<14)	(5) FGI(Age at arrival>13)	(6) SGI	(7) SGI strict
Extraversion	0.021**	0.020*	0.021**	0.020**	0.021**	0.021**	0.021**
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Conscientiousness	0.013	0.013	0.013	0.013	0.013	0.012	0.013
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Agreeableness	-0.010	-0.009	-0.010	-0.010	-0.010	-0.010	-0.010
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Emotional stability	-0.009	-0.008	-0.008	-0.008	-0.009	-0.007	-0.008
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Openness	-0.024**	-0.023**	-0.024**	-0.023**	-0.024**	-0.023**	-0.023**
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Extraversion × Immigrant	-0.019	-0.033	-0.016	-0.024	-0.013	-0.008	-0.003
	(0.020)	(0.034)	(0.022)	(0.030)	(0.023)	(0.020)	(0.027)
Conscientiousness × Immigrant	-0.015	0.019	-0.029	0.016	-0.034	-0.016	-0.024
	(0.020)	(0.034)	(0.022)	(0.029)	(0.024)	(0.018)	(0.026)
Agreeableness × Immigrant	0.032*	0.036	0.028	0.052*	0.021	0.041**	0.028
	(0.019)	(0.033)	(0.021)	(0.028)	(0.022)	(0.018)	(0.025)
Emotional stability × Immigrant	0.007	-0.017	0.013	0.004	0.007	-0.010	-0.024
	(0.017)	(0.030)	(0.019)	(0.025)	(0.021)	(0.017)	(0.025)
Openness × Immigrant	-0.013	-0.083**	0.012	-0.030	0.000	0.005	0.041
	(0.021)	(0.035)	(0.024)	(0.030)	(0.025)	(0.020)	(0.027)
Observations	13,434	10,793	12,473	11,100	12,159	13,260	11,188
Number of individuals	7,782	6,157	7,222	6,350	7,025	7,603	6,374

Note: FGI: First generation immigrants; SGI: Second generation immigrants. Each model is estimated separately for first- and second-generation immigrants. We use a within-estimation model that exploits changes in log hourly wages and in the Big-Five personality traits. Control variables include age, age squared, full set of dummy variables for education groups, geographical location, year of observation, and occupation groups. Time periods refer to t=2005, 2009, 2013. The control group is non-immigrant Australians without immediate migration background. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

FIGURES

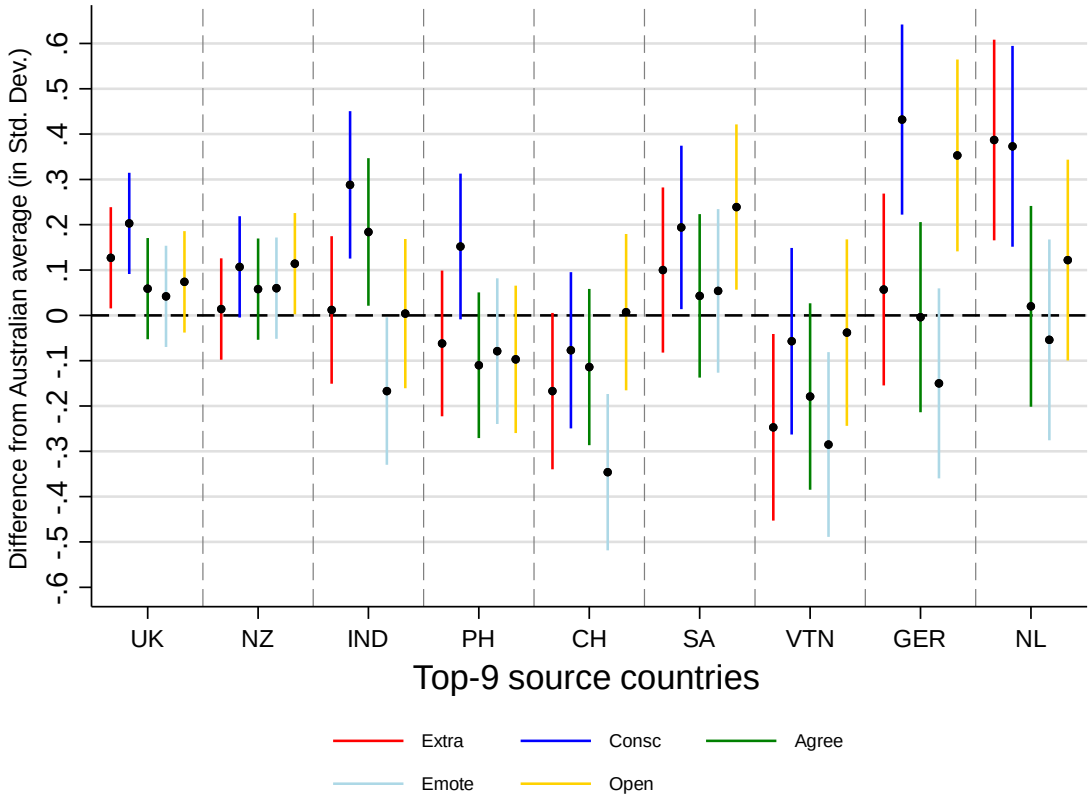

Figure 1: Migrant gap in Big-Five personality traits by top-9 source countries

Note: Figure depicts estimated coefficients of the first-generation migrant gap in Big-Five personality traits, spike represents 95% confidence interval. Each model is separately estimated for first generation immigrants from one of the top-9 source countries in order of population size: UK (N=1,153), New Zealand (N=446), India (N= 157), Philippines (N= 157), China (N=134), South Africa (N= 123), Vietnam (N=97), Germany (N= 116), and the Netherlands (N=110). Big-Five traits are depicted by colours. Red: Extraversion; Blue: Conscientiousness; Green: Agreeableness; Light blue: Emotional stability; Yellow: Openness to new experiences. Regression models for first-generation immigrants exclude sample of second generations. Each model controls flexibly for age, birth cohort, sex, geographic location, year when survey was collected (2012, 2016). The control group is non-immigrant Australians with no immediate immigration background.

Online Appendix

Table A1. Full estimation results Big-Five personality traits

	First generation immigrants					Second generation immigrants				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Extrav.	Consc.	Agreeable	Emot. Stab.	Openness	Extrav.	Consc.	Agreeable	Emot. Stab.	Openness
Immigrant	0.050***	0.099***	0.031	-0.066***	0.142***	0.006	0.043**	0.035*	0.003	0.091***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Age	-0.022	0.006	0.005	-0.006	-0.026	-0.009	0.025	-0.011	0.010	-0.039**
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Female	0.202***	0.162***	0.489***	0.019	-0.067***	0.214***	0.179***	0.497***	0.003	-0.065***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Wave	0.018	0.003	0.010	0.013	0.019	0.004	-0.011	0.027	-0.006	0.034*
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
1911.hgyob	1.389	1.068	2.776**	0.173	0.589					
	(1.072)	(1.075)	(1.090)	(1.076)	(1.090)					
1912.hgyob	0.070	0.751	0.432	-1.105	1.222	-1.112	0.090	-2.238***	-1.225	0.452
	(1.131)	(1.134)	(1.150)	(1.136)	(1.150)	(0.750)	(0.751)	(0.749)	(0.750)	(0.755)
1913.hgyob	-0.179	0.572	1.136	-0.510	1.583	-1.303*	-0.112	-2.013***	-0.594	0.469
	(1.134)	(1.137)	(1.153)	(1.139)	(1.153)	(0.695)	(0.696)	(0.694)	(0.695)	(0.700)
1914.hgyob	0.849	1.314	1.695	-0.518	1.177	-0.634	1.176*	-0.707	-0.110	0.595
	(1.079)	(1.082)	(1.097)	(1.083)	(1.097)	(0.636)	(0.637)	(0.635)	(0.636)	(0.640)
1915.hgyob	0.386	0.435	1.591	-0.056	1.252	-1.360*	0.508	-0.011	0.062	0.733
	(1.206)	(1.209)	(1.226)	(1.211)	(1.227)	(0.753)	(0.754)	(0.752)	(0.753)	(0.759)
1916.hgyob	1.224	-0.123	0.515	0.276	-0.344	-0.107	-0.308	-1.526**	-0.051	-0.652
	(1.106)	(1.109)	(1.124)	(1.111)	(1.125)	(0.596)	(0.597)	(0.595)	(0.597)	(0.601)
1917.hgyob	0.782	0.725	1.632	-0.162	1.201	-0.301	0.230	-0.945	-0.446	0.450
	(1.036)	(1.039)	(1.053)	(1.040)	(1.054)	(0.577)	(0.577)	(0.576)	(0.577)	(0.581)
1918.hgyob	0.393	1.042	1.442	-0.034	0.799	-0.610	0.107	-1.752***	-0.375	-0.071
	(1.027)	(1.030)	(1.044)	(1.032)	(1.045)	(0.563)	(0.563)	(0.562)	(0.563)	(0.566)
1919.hgyob	0.138	0.733	1.908*	-0.413	1.003	-0.549	0.754	-1.179**	-0.321	0.157
	(1.041)	(1.044)	(1.058)	(1.046)	(1.059)	(0.590)	(0.591)	(0.589)	(0.590)	(0.594)
1920.hgyob	0.267	0.962	1.512	-0.322	0.859	-0.840	0.033	-1.515***	-0.382	-0.205
	(1.034)	(1.037)	(1.051)	(1.039)	(1.052)	(0.557)	(0.558)	(0.556)	(0.557)	(0.561)
1921.hgyob	0.537	1.311	1.494	-0.353	0.868	-0.526	0.896*	-1.171**	-0.425	0.023

	(1.025)	(1.028)	(1.042)	(1.030)	(1.043)	(0.543)	(0.543)	(0.542)	(0.543)	(0.547)
1922.hgyob	0.504	1.277	1.867*	-0.662	0.889	-0.646	0.927*	-0.853	-0.463	0.037
	(1.032)	(1.036)	(1.050)	(1.037)	(1.050)	(0.562)	(0.563)	(0.561)	(0.562)	(0.566)
1923.hgyob	0.442	1.095	1.580	-0.428	0.797	-0.563	0.835	-0.927*	-0.307	-0.055
	(1.037)	(1.040)	(1.054)	(1.042)	(1.055)	(0.559)	(0.559)	(0.558)	(0.559)	(0.562)
1924.hgyob	0.257	0.958	1.384	-0.522	0.742	-0.720	0.611	-1.357**	-0.383	-0.219
	(1.039)	(1.042)	(1.056)	(1.043)	(1.057)	(0.559)	(0.559)	(0.558)	(0.559)	(0.563)
1925.hgyob	0.419	1.083	1.603	-0.467	0.715	-0.572	0.618	-1.100*	-0.447	-0.126
	(1.046)	(1.049)	(1.063)	(1.050)	(1.064)	(0.567)	(0.568)	(0.566)	(0.567)	(0.571)
1926.hgyob	0.338	1.074	1.698	-0.730	0.746	-0.702	0.724	-1.005*	-0.703	0.046
	(1.050)	(1.054)	(1.068)	(1.055)	(1.069)	(0.573)	(0.573)	(0.572)	(0.573)	(0.577)
1927.hgyob	0.301	1.159	1.633	-0.832	0.920	-0.687	0.779	-1.190**	-0.736	0.051
	(1.057)	(1.060)	(1.074)	(1.061)	(1.075)	(0.579)	(0.580)	(0.578)	(0.579)	(0.583)
1928.hgyob	0.292	1.063	1.600	-0.759	0.808	-0.656	0.757	-1.324**	-0.496	-0.351
	(1.063)	(1.066)	(1.081)	(1.068)	(1.082)	(0.590)	(0.590)	(0.589)	(0.590)	(0.594)
1929.hgyob	0.328	1.034	1.749	-0.784	1.114	-0.728	0.613	-1.222**	-0.736	0.129
	(1.069)	(1.072)	(1.087)	(1.074)	(1.087)	(0.596)	(0.597)	(0.595)	(0.596)	(0.600)
1930.hgyob	0.427	1.178	1.763	-0.710	0.875	-0.432	0.988	-1.162*	-0.453	-0.128
	(1.077)	(1.081)	(1.095)	(1.082)	(1.096)	(0.606)	(0.607)	(0.605)	(0.606)	(0.610)
1931.hgyob	0.277	1.120	1.609	-0.834	0.798	-0.787	0.759	-1.483**	-0.625	-0.281
	(1.084)	(1.087)	(1.102)	(1.089)	(1.103)	(0.617)	(0.618)	(0.616)	(0.617)	(0.621)
1932.hgyob	0.349	1.101	1.672	-0.741	0.993	-0.645	0.732	-1.408**	-0.641	0.030
	(1.092)	(1.095)	(1.110)	(1.097)	(1.111)	(0.629)	(0.630)	(0.628)	(0.629)	(0.634)
1933.hgyob	0.385	1.167	1.732	-0.713	0.774	-0.549	0.982	-1.172*	-0.403	-0.273
	(1.099)	(1.103)	(1.118)	(1.104)	(1.118)	(0.638)	(0.639)	(0.637)	(0.638)	(0.643)
1934.hgyob	0.293	1.117	1.700	-0.801	0.936	-0.776	0.887	-1.288**	-0.494	-0.208
	(1.108)	(1.111)	(1.126)	(1.113)	(1.127)	(0.651)	(0.652)	(0.650)	(0.651)	(0.655)
1935.hgyob	0.320	1.132	1.804	-0.766	0.997	-0.599	0.934	-1.252*	-0.441	-0.060
	(1.116)	(1.120)	(1.135)	(1.121)	(1.136)	(0.661)	(0.662)	(0.660)	(0.661)	(0.665)
1936.hgyob	0.400	1.185	1.819	-0.800	0.878	-0.463	1.001	-1.188*	-0.429	-0.272
	(1.125)	(1.128)	(1.144)	(1.130)	(1.145)	(0.671)	(0.672)	(0.670)	(0.671)	(0.676)
1937.hgyob	0.119	0.948	1.430	-1.017	0.749	-0.781	0.837	-1.477**	-0.661	-0.192
	(1.134)	(1.137)	(1.153)	(1.139)	(1.153)	(0.685)	(0.686)	(0.684)	(0.685)	(0.690)
1938.hgyob	0.400	1.110	1.685	-0.804	0.903	-0.604	0.956	-1.293*	-0.625	-0.249
	(1.143)	(1.146)	(1.162)	(1.148)	(1.163)	(0.696)	(0.697)	(0.695)	(0.697)	(0.701)
1939.hgyob	0.234	1.162	1.697	-0.956	0.864	-0.687	0.888	-1.406**	-0.679	-0.115
	(1.152)	(1.155)	(1.171)	(1.157)	(1.172)	(0.708)	(0.709)	(0.707)	(0.708)	(0.713)
1940.hgyob	0.075	1.077	1.705	-0.960	0.734	-0.680	0.973	-1.356*	-0.637	-0.434
	(1.162)	(1.165)	(1.181)	(1.167)	(1.182)	(0.722)	(0.723)	(0.721)	(0.722)	(0.727)

1941.hgyob	0.305	1.205	1.779	-0.879	0.732	-0.592	1.004	-1.369*	-0.531	-0.349
	(1.170)	(1.174)	(1.190)	(1.176)	(1.191)	(0.734)	(0.734)	(0.733)	(0.734)	(0.739)
1942.hgyob	0.067	1.065	1.728	-0.933	0.758	-0.728	0.860	-1.461*	-0.724	-0.443
	(1.181)	(1.184)	(1.200)	(1.186)	(1.201)	(0.748)	(0.748)	(0.746)	(0.748)	(0.753)
1943.hgyob	-0.028	1.048	1.755	-1.064	0.856	-0.751	0.906	-1.322*	-0.718	-0.340
	(1.191)	(1.194)	(1.211)	(1.196)	(1.211)	(0.761)	(0.762)	(0.760)	(0.762)	(0.767)
1944.hgyob	0.143	1.100	1.758	-0.978	0.801	-0.628	1.084	-1.492*	-0.598	-0.412
	(1.201)	(1.204)	(1.221)	(1.206)	(1.221)	(0.774)	(0.775)	(0.773)	(0.774)	(0.779)
1945.hgyob	-0.047	1.037	1.811	-1.088	0.820	-0.787	0.890	-1.390*	-0.648	-0.454
	(1.210)	(1.214)	(1.230)	(1.216)	(1.231)	(0.787)	(0.787)	(0.785)	(0.787)	(0.792)
1946.hgyob	0.081	1.161	1.882	-0.957	0.640	-0.764	1.154	-1.318*	-0.551	-0.529
	(1.222)	(1.225)	(1.242)	(1.227)	(1.243)	(0.802)	(0.802)	(0.800)	(0.802)	(0.807)
1947.hgyob	0.010	1.120	1.863	-1.043	0.795	-0.668	1.132	-1.274	-0.501	-0.400
	(1.232)	(1.235)	(1.252)	(1.237)	(1.253)	(0.815)	(0.816)	(0.813)	(0.815)	(0.820)
1948.hgyob	0.165	1.039	1.793	-1.129	0.699	-0.553	1.031	-1.418*	-0.688	-0.473
	(1.241)	(1.245)	(1.262)	(1.247)	(1.263)	(0.828)	(0.829)	(0.827)	(0.828)	(0.834)
1949.hgyob	0.015	1.141	1.829	-1.094	0.768	-0.695	1.198	-1.491*	-0.566	-0.529
	(1.254)	(1.258)	(1.275)	(1.260)	(1.276)	(0.844)	(0.844)	(0.842)	(0.844)	(0.849)
1950.hgyob	-0.002	1.122	1.849	-1.207	0.921	-0.656	1.210	-1.471*	-0.633	-0.422
	(1.265)	(1.269)	(1.286)	(1.271)	(1.287)	(0.859)	(0.860)	(0.857)	(0.859)	(0.865)
1951.hgyob	-0.038	1.116	1.788	-1.347	0.691	-0.677	1.215	-1.360	-0.798	-0.598
	(1.277)	(1.281)	(1.298)	(1.282)	(1.299)	(0.873)	(0.874)	(0.872)	(0.873)	(0.879)
1952.hgyob	-0.130	1.117	1.806	-1.236	0.642	-0.746	1.158	-1.445	-0.703	-0.688
	(1.288)	(1.292)	(1.310)	(1.294)	(1.310)	(0.888)	(0.888)	(0.886)	(0.888)	(0.894)
1953.hgyob	-0.074	1.035	1.719	-1.351	0.726	-0.784	1.219	-1.461	-0.831	-0.527
	(1.300)	(1.304)	(1.322)	(1.306)	(1.322)	(0.904)	(0.905)	(0.902)	(0.904)	(0.910)
1954.hgyob	-0.168	1.042	1.806	-1.276	0.675	-0.814	1.196	-1.526*	-0.767	-0.668
	(1.312)	(1.316)	(1.334)	(1.318)	(1.335)	(0.918)	(0.919)	(0.916)	(0.918)	(0.924)
1955.hgyob	-0.134	1.039	1.905	-1.284	0.660	-0.818	1.134	-1.429	-0.733	-0.711
	(1.324)	(1.328)	(1.346)	(1.330)	(1.347)	(0.934)	(0.935)	(0.932)	(0.934)	(0.940)
1956.hgyob	-0.075	1.077	1.746	-1.421	0.648	-0.755	1.225	-1.585*	-0.815	-0.723
	(1.336)	(1.340)	(1.358)	(1.342)	(1.359)	(0.949)	(0.950)	(0.948)	(0.949)	(0.955)
1957.hgyob	-0.130	1.117	1.902	-1.381	0.639	-0.724	1.303	-1.539	-0.734	-0.805
	(1.348)	(1.352)	(1.371)	(1.354)	(1.372)	(0.964)	(0.965)	(0.963)	(0.965)	(0.971)
1958.hgyob	-0.204	1.099	1.873	-1.316	0.612	-0.846	1.208	-1.597	-0.806	-0.763
	(1.360)	(1.364)	(1.383)	(1.366)	(1.384)	(0.979)	(0.980)	(0.978)	(0.980)	(0.986)
1959.hgyob	-0.165	1.067	1.807	-1.424	0.500	-0.736	1.195	-1.607	-0.851	-0.834
	(1.372)	(1.377)	(1.395)	(1.379)	(1.396)	(0.995)	(0.996)	(0.993)	(0.995)	(1.002)
1960.hgyob	-0.236	1.062	1.760	-1.495	0.486	-0.858	1.337	-1.604	-0.837	-0.885

	(1.386)	(1.390)	(1.409)	(1.392)	(1.410)	(1.011)	(1.012)	(1.009)	(1.011)	(1.018)
1961.hgyob	-0.243	1.095	1.801	-1.363	0.389	-0.784	1.286	-1.600	-0.766	-0.898
	(1.399)	(1.403)	(1.422)	(1.405)	(1.423)	(1.028)	(1.029)	(1.026)	(1.028)	(1.035)
1962.hgyob	-0.274	1.074	1.777	-1.492	0.522	-0.771	1.307	-1.634	-0.871	-0.846
	(1.411)	(1.415)	(1.434)	(1.417)	(1.435)	(1.043)	(1.044)	(1.041)	(1.043)	(1.050)
1963.hgyob	-0.230	1.128	1.687	-1.459	0.491	-0.714	1.369	-1.769*	-0.844	-0.887
	(1.423)	(1.428)	(1.447)	(1.430)	(1.448)	(1.058)	(1.059)	(1.056)	(1.058)	(1.065)
1964.hgyob	-0.305	1.083	1.756	-1.595	0.511	-0.803	1.361	-1.689	-0.886	-0.933
	(1.437)	(1.441)	(1.461)	(1.443)	(1.462)	(1.074)	(1.075)	(1.073)	(1.074)	(1.082)
1965.hgyob	-0.398	1.103	1.719	-1.586	0.241	-0.897	1.402	-1.776	-0.869	-1.209
	(1.450)	(1.454)	(1.474)	(1.456)	(1.475)	(1.091)	(1.092)	(1.089)	(1.091)	(1.099)
1966.hgyob	-0.243	1.092	1.743	-1.530	0.390	-0.688	1.417	-1.718	-0.793	-1.039
	(1.463)	(1.468)	(1.488)	(1.470)	(1.489)	(1.107)	(1.108)	(1.105)	(1.107)	(1.115)
1967.hgyob	-0.418	1.101	1.776	-1.618	0.300	-0.768	1.436	-1.691	-0.784	-1.199
	(1.477)	(1.481)	(1.502)	(1.484)	(1.502)	(1.123)	(1.124)	(1.121)	(1.123)	(1.131)
1968.hgyob	-0.354	1.092	1.748	-1.589	0.242	-0.736	1.487	-1.797	-0.803	-1.245
	(1.489)	(1.494)	(1.514)	(1.496)	(1.515)	(1.138)	(1.139)	(1.136)	(1.138)	(1.146)
1969.hgyob	-0.244	1.039	1.669	-1.588	0.216	-0.690	1.500	-1.809	-0.793	-1.259
	(1.504)	(1.508)	(1.529)	(1.511)	(1.530)	(1.155)	(1.157)	(1.154)	(1.156)	(1.163)
1970.hgyob	-0.404	1.060	1.798	-1.558	0.276	-0.851	1.504	-1.743	-0.776	-1.251
	(1.517)	(1.522)	(1.543)	(1.524)	(1.544)	(1.172)	(1.173)	(1.170)	(1.172)	(1.180)
1971.hgyob	-0.512	1.029	1.855	-1.638	0.274	-0.884	1.427	-1.724	-0.804	-1.270
	(1.530)	(1.535)	(1.556)	(1.537)	(1.557)	(1.188)	(1.189)	(1.186)	(1.188)	(1.196)
1972.hgyob	-0.420	1.020	1.772	-1.709	0.274	-0.824	1.483	-1.799	-0.859	-1.273
	(1.545)	(1.549)	(1.571)	(1.552)	(1.571)	(1.204)	(1.205)	(1.202)	(1.204)	(1.212)
1973.hgyob	-0.464	1.079	1.903	-1.595	0.186	-0.877	1.551	-1.710	-0.850	-1.310
	(1.560)	(1.565)	(1.586)	(1.567)	(1.587)	(1.222)	(1.223)	(1.220)	(1.222)	(1.230)
1974.hgyob	-0.419	1.108	1.896	-1.674	0.298	-0.810	1.510	-1.815	-0.833	-1.356
	(1.572)	(1.577)	(1.599)	(1.579)	(1.599)	(1.237)	(1.239)	(1.235)	(1.237)	(1.246)
1975.hgyob	-0.515	1.092	1.781	-1.713	0.083	-0.897	1.586	-1.805	-0.837	-1.521
	(1.587)	(1.592)	(1.614)	(1.594)	(1.615)	(1.254)	(1.256)	(1.252)	(1.255)	(1.263)
1976.hgyob	-0.492	1.088	1.847	-1.640	0.163	-0.843	1.575	-1.822	-0.827	-1.469
	(1.601)	(1.606)	(1.628)	(1.608)	(1.629)	(1.270)	(1.272)	(1.268)	(1.271)	(1.279)
1977.hgyob	-0.400	1.020	1.780	-1.669	-0.026	-0.704	1.491	-1.951	-0.832	-1.564
	(1.615)	(1.620)	(1.642)	(1.623)	(1.643)	(1.288)	(1.289)	(1.286)	(1.288)	(1.296)
1978.hgyob	-0.401	1.063	1.849	-1.808	0.128	-0.774	1.593	-1.814	-0.908	-1.447
	(1.629)	(1.634)	(1.656)	(1.637)	(1.657)	(1.304)	(1.305)	(1.302)	(1.304)	(1.313)
1979.hgyob	-0.502	0.999	1.786	-1.793	0.069	-0.824	1.548	-1.943	-0.881	-1.597
	(1.644)	(1.649)	(1.672)	(1.652)	(1.673)	(1.321)	(1.323)	(1.319)	(1.321)	(1.330)

1980.hgyob	-0.527	1.148	1.863	-1.782	0.105	-0.838	1.637	-1.868	-0.822	-1.612
	(1.658)	(1.663)	(1.686)	(1.666)	(1.687)	(1.338)	(1.339)	(1.336)	(1.338)	(1.347)
1981.hgyob	-0.502	1.070	1.772	-1.807	-0.008	-0.802	1.628	-1.945	-0.836	-1.668
	(1.673)	(1.678)	(1.701)	(1.680)	(1.702)	(1.355)	(1.356)	(1.353)	(1.355)	(1.364)
1982.hgyob	-0.590	1.103	1.723	-1.675	-0.073	-0.801	1.673	-1.971	-0.691	-1.729
	(1.687)	(1.692)	(1.715)	(1.694)	(1.716)	(1.371)	(1.373)	(1.369)	(1.371)	(1.381)
1983.hgyob	-0.583	1.024	1.766	-1.870	0.009	-0.890	1.596	-1.941	-0.821	-1.688
	(1.701)	(1.706)	(1.730)	(1.709)	(1.731)	(1.388)	(1.390)	(1.386)	(1.389)	(1.398)
1984.hgyob	-0.597	0.981	1.847	-1.892	-0.057	-0.810	1.592	-1.963	-0.824	-1.738
	(1.716)	(1.721)	(1.745)	(1.724)	(1.746)	(1.405)	(1.407)	(1.403)	(1.406)	(1.415)
1985.hgyob	-0.537	0.827	1.660	-1.975	-0.160	-0.844	1.503	-2.184	-0.921	-1.907
	(1.730)	(1.736)	(1.759)	(1.738)	(1.760)	(1.422)	(1.423)	(1.420)	(1.422)	(1.432)
1986.hgyob	-0.564	0.898	1.681	-1.936	-0.046	-0.814	1.568	-2.135	-0.909	-1.786
	(1.745)	(1.750)	(1.774)	(1.753)	(1.775)	(1.439)	(1.440)	(1.436)	(1.439)	(1.449)
1987.hgyob	-0.641	0.827	1.614	-1.905	-0.218	-0.832	1.542	-2.194	-0.810	-1.953
	(1.760)	(1.765)	(1.789)	(1.768)	(1.790)	(1.456)	(1.457)	(1.453)	(1.456)	(1.466)
1988.hgyob	-0.588	0.789	1.604	-1.920	-0.180	-0.705	1.487	-2.243	-0.821	-1.991
	(1.775)	(1.780)	(1.805)	(1.783)	(1.806)	(1.473)	(1.475)	(1.471)	(1.473)	(1.483)
1989.hgyob	-0.573	0.819	1.637	-1.870	-0.146	-0.747	1.506	-2.244	-0.793	-1.947
	(1.790)	(1.795)	(1.820)	(1.798)	(1.821)	(1.490)	(1.491)	(1.487)	(1.490)	(1.500)
1990.hgyob	-0.592	0.801	1.576	-1.925	-0.224	-0.757	1.586	-2.242	-0.730	-2.038
	(1.805)	(1.810)	(1.835)	(1.813)	(1.836)	(1.506)	(1.508)	(1.504)	(1.507)	(1.517)
1991.hgyob	-0.684	0.752	1.546	-1.922	-0.394	-0.819	1.491	-2.350	-0.775	-2.211
	(1.820)	(1.825)	(1.850)	(1.828)	(1.851)	(1.523)	(1.525)	(1.521)	(1.524)	(1.534)
1992.hgyob	-0.672	0.630	1.505	-1.904	-0.319	-0.791	1.441	-2.363	-0.730	-2.095
	(1.835)	(1.841)	(1.866)	(1.843)	(1.867)	(1.542)	(1.543)	(1.539)	(1.542)	(1.552)
1993.hgyob	-0.574	0.691	1.554	-1.863	-0.355	-0.732	1.452	-2.359	-0.691	-2.232
	(1.850)	(1.856)	(1.881)	(1.858)	(1.882)	(1.558)	(1.559)	(1.556)	(1.558)	(1.569)
1994.hgyob	-0.552	0.803	1.672	-1.870	-0.433	-0.678	1.640	-2.221	-0.679	-2.275
	(1.866)	(1.871)	(1.897)	(1.874)	(1.898)	(1.575)	(1.577)	(1.573)	(1.575)	(1.586)
1995.hgyob	-0.705	0.750	1.582	-1.941	-0.500	-0.808	1.531	-2.371	-0.715	-2.277
	(1.881)	(1.887)	(1.913)	(1.890)	(1.914)	(1.593)	(1.594)	(1.590)	(1.593)	(1.604)
1996.hgyob	-0.846	0.621	1.525	-1.998	-0.338	-0.905	1.551	-2.415	-0.719	-2.233
	(1.896)	(1.902)	(1.928)	(1.905)	(1.929)	(1.610)	(1.612)	(1.608)	(1.611)	(1.621)
1997.hgyob	-0.733	0.566	1.529	-1.926	-0.528	-0.790	1.503	-2.375	-0.708	-2.371
	(1.912)	(1.918)	(1.944)	(1.921)	(1.945)	(1.628)	(1.629)	(1.625)	(1.628)	(1.639)
1998.hgyob	-0.800	0.830	1.737	-2.106	-0.192	-0.927	1.613	-2.323	-0.930	-2.179
	(1.924)	(1.930)	(1.956)	(1.933)	(1.957)	(1.641)	(1.643)	(1.639)	(1.641)	(1.652)
Victoria	0.036*	-0.030	0.012	0.057***	0.019	0.024	-0.027	-0.003	0.062***	0.000

	(0.021)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Queensland.	0.016	-0.001	-0.090***	0.019	-0.042*	-0.009	-0.017	-0.115***	0.005	-0.071***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.023)	(0.023)	(0.022)	(0.023)	(0.023)
South Austr	0.043	0.012	-0.051*	0.050*	-0.100***	-0.011	0.009	-0.065**	0.026	-0.118***
	(0.029)	(0.029)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
Western Aust.	0.030	0.027	0.014	0.056*	0.014	0.004	0.015	-0.012	0.033	-0.012
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.032)
Tasmania	0.068	0.079*	0.005	-0.021	-0.039	0.063	0.055	-0.002	-0.021	-0.018
	(0.044)	(0.044)	(0.045)	(0.044)	(0.045)	(0.043)	(0.043)	(0.043)	(0.043)	(0.044)
Northern Aust.	-0.030	-0.054	-0.047	0.146	-0.041	0.035	-0.013	-0.126	0.193*	-0.141
	(0.099)	(0.099)	(0.101)	(0.099)	(0.101)	(0.104)	(0.104)	(0.104)	(0.104)	(0.105)
ACT	-0.029	0.094	-0.074	0.101*	0.053	-0.056	0.055	-0.073	0.075	0.007
	(0.060)	(0.060)	(0.061)	(0.060)	(0.061)	(0.062)	(0.062)	(0.061)	(0.062)	(0.062)
Other urban	-0.034*	-0.015	-0.042**	-0.013	-0.113***	-0.046**	-0.029	-0.062***	-0.044**	-0.128***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.019)	(0.019)	(0.019)	(0.019)	(0.020)
Bounded local	-0.052	-0.159***	-0.031	-0.015	-0.192***	-0.053	-0.147***	-0.097**	-0.072	-0.229***
	(0.048)	(0.048)	(0.049)	(0.048)	(0.049)	(0.048)	(0.048)	(0.048)	(0.048)	(0.049)
Rural	-0.040	-0.025	-0.047*	0.058**	-0.079***	-0.054**	-0.037	-0.087***	0.029	-0.129***
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Constant	0.763	-1.625	-2.757	1.510	0.747	0.819	-2.614	1.262	0.311	2.671
	(1.954)	(1.960)	(1.987)	(1.963)	(1.988)	(1.675)	(1.677)	(1.672)	(1.675)	(1.686)
Observations	15,488	15,488	15,488	15,488	15,488	15,320	15,320	15,320	15,320	15,320
R-squared	0.031	0.070	0.082	0.078	0.039	0.035	0.074	0.087	0.076	0.036

Table A2. Migrant gap in non-cognitive ability for first-generation immigrants with and without controlling for years since migration

VARIABLES	(1) Extrav.	(2) Consc.	(3) Agreeable	(4) Emot. Stab.	(5) Openness
Immigrant	0.050***	0.099***	0.031	-0.066***	0.142***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Observations	15,488	15,488	15,488	15,488	15,488
R-squared	0.031	0.070	0.082	0.078	0.039
Immigrant	-0.005	0.160***	0.059*	-0.079**	0.125***
	(0.031)	(0.031)	(0.032)	(0.031)	(0.032)
Years since migration	0.002**	-0.002**	-0.001	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	15,488	15,488	15,488	15,488	15,488
R-squared	0.032	0.070	0.082	0.078	0.039

Note: Estimated coefficients are interpreted in terms of standard deviation difference. Regression models exclude sample of second generations. Each model controls flexibly for age, birth cohort, sex, geographic location, year when survey was collected (2005, 2009, and 2013). The control group is non-immigrant Australians with no immediate immigration background. Standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A3. Full estimation results cognitive ability tests

	First generation immigrant			Second generation immigrant		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	BDS	SDM	NART-25	BDS	SDM	NART-25
Immigrant	-0.067***	-0.009	-0.259***	0.018	0.045***	0.046**
	(0.020)	(0.016)	(0.020)	(0.019)	(0.015)	(0.018)
Age	-0.043**	-0.026*	-0.009	-0.026	-0.030**	-0.005
	(0.018)	(0.015)	(0.018)	(0.018)	(0.014)	(0.017)
Female	0.005	0.215***	0.017	0.005	0.235***	0.040***
	(0.017)	(0.014)	(0.017)	(0.017)	(0.013)	(0.016)
Wave	0.027	-0.015	-0.014	0.012	-0.011	-0.012
	(0.019)	(0.015)	(0.019)	(0.019)	(0.015)	(0.018)
1913.hgyob	1.527	-0.326	0.476	1.558	-0.317	0.498
	(1.388)	(1.131)	(1.384)	(1.381)	(1.111)	(1.294)
1916.hgyob				0.623	0.156	1.726
				(1.199)	(0.964)	(1.123)
1917.hgyob	0.128	0.952	1.922*	-0.006	0.704	1.092
	(1.101)	(0.897)	(1.098)	(1.074)	(0.863)	(1.006)
1918.hgyob	-0.119	1.783	1.017	-0.034	0.764	1.107
	(1.392)	(1.134)	(1.388)	(1.201)	(0.966)	(1.125)
1919.hgyob	-0.025	1.243	1.440	-0.197	0.764	0.835
	(1.104)	(0.900)	(1.101)	(1.077)	(0.866)	(1.009)
1920.hgyob	-0.244	0.749	-0.087	-0.200	0.549	-0.010
	(1.143)	(0.931)	(1.140)	(1.055)	(0.848)	(0.988)
1921.hgyob	-0.012	0.803	0.993	0.132	0.528	0.947
	(1.027)	(0.837)	(1.024)	(1.027)	(0.826)	(0.962)
1922.hgyob	-0.020	0.808	1.299	0.303	0.882	1.342
	(1.026)	(0.836)	(1.024)	(1.030)	(0.828)	(0.965)
1923.hgyob	-0.304	0.865	0.830	0.020	0.824	0.631
	(1.038)	(0.846)	(1.036)	(1.033)	(0.830)	(0.967)
1924.hgyob	-0.322	0.890	0.549	0.071	0.982	0.755
	(1.026)	(0.836)	(1.024)	(1.024)	(0.824)	(0.960)
1925.hgyob	-0.329	0.759	0.915	-0.079	0.684	0.999
	(1.025)	(0.835)	(1.023)	(1.022)	(0.822)	(0.957)
1926.hgyob	-0.444	0.589	1.063	0.102	0.550	1.431
	(1.030)	(0.839)	(1.027)	(1.026)	(0.825)	(0.961)
1927.hgyob	-0.364	1.092	1.294	-0.091	0.983	1.285
	(1.029)	(0.838)	(1.026)	(1.025)	(0.824)	(0.960)
1928.hgyob	-0.444	0.863	0.779	-0.248	0.944	0.919
	(1.032)	(0.841)	(1.030)	(1.030)	(0.828)	(0.965)
1929.hgyob	-0.383	1.053	1.120	0.063	1.057	1.251
	(1.036)	(0.845)	(1.034)	(1.034)	(0.831)	(0.968)
1930.hgyob	-0.398	1.094	1.239	-0.260	1.021	1.278
	(1.043)	(0.850)	(1.040)	(1.038)	(0.835)	(0.972)
1931.hgyob	-0.352	1.055	0.845	-0.029	1.005	1.096
	(1.047)	(0.853)	(1.045)	(1.043)	(0.839)	(0.977)
1932.hgyob	-0.434	1.113	0.866	-0.064	0.979	0.927
	(1.054)	(0.859)	(1.052)	(1.051)	(0.845)	(0.984)
1933.hgyob	-0.581	1.152	1.087	-0.277	1.111	1.191
	(1.060)	(0.864)	(1.058)	(1.057)	(0.850)	(0.990)
1934.hgyob	-0.469	1.110	0.999	0.108	1.167	1.013
	(1.066)	(0.869)	(1.064)	(1.063)	(0.855)	(0.996)
1935.hgyob	-0.435	1.298	1.008	-0.004	1.242	1.041
	(1.073)	(0.875)	(1.071)	(1.069)	(0.860)	(1.001)
1936.hgyob	-0.485	1.080	1.120	-0.053	1.056	1.188
	(1.078)	(0.879)	(1.075)	(1.073)	(0.863)	(1.005)
1937.hgyob	-0.573	1.399	0.984	-0.173	1.247	1.126
	(1.087)	(0.886)	(1.084)	(1.083)	(0.871)	(1.014)

1938.hgyob	-0.511	1.381	1.006	0.035	1.247	1.087
	(1.093)	(0.891)	(1.091)	(1.090)	(0.876)	(1.021)
1939.hgyob	-0.622	1.373	1.055	-0.081	1.289	1.322
	(1.101)	(0.897)	(1.098)	(1.096)	(0.881)	(1.027)
1940.hgyob	-0.696	1.252	0.983	-0.185	1.239	1.114
	(1.109)	(0.904)	(1.106)	(1.106)	(0.889)	(1.036)
1941.hgyob	-0.630	1.261	0.718	-0.056	1.259	1.116
	(1.116)	(0.910)	(1.114)	(1.112)	(0.894)	(1.042)
1942.hgyob	-0.727	1.526*	0.983	-0.149	1.437	1.180
	(1.125)	(0.917)	(1.122)	(1.122)	(0.902)	(1.051)
1943.hgyob	-0.607	1.605*	0.960	-0.053	1.502*	1.164
	(1.134)	(0.924)	(1.131)	(1.130)	(0.908)	(1.058)
1944.hgyob	-0.888	1.500	1.020	-0.312	1.413	1.115
	(1.142)	(0.931)	(1.139)	(1.138)	(0.915)	(1.066)
1945.hgyob	-0.842	1.523	0.877	-0.256	1.438	0.935
	(1.151)	(0.938)	(1.148)	(1.147)	(0.922)	(1.074)
1946.hgyob	-0.828	1.510	0.887	-0.127	1.459	1.136
	(1.161)	(0.946)	(1.158)	(1.157)	(0.930)	(1.083)
1947.hgyob	-0.711	1.650*	1.049	-0.046	1.546*	1.217
	(1.170)	(0.953)	(1.167)	(1.165)	(0.937)	(1.092)
1948.hgyob	-0.831	1.644*	1.038	-0.157	1.600*	1.237
	(1.179)	(0.960)	(1.176)	(1.174)	(0.944)	(1.100)
1949.hgyob	-0.874	1.710*	0.894	-0.222	1.649*	1.044
	(1.190)	(0.970)	(1.187)	(1.186)	(0.953)	(1.111)
1950.hgyob	-0.860	1.751*	1.024	-0.211	1.634*	1.164
	(1.200)	(0.978)	(1.197)	(1.195)	(0.961)	(1.120)
1951.hgyob	-1.118	1.748*	0.810	-0.438	1.658*	0.961
	(1.211)	(0.987)	(1.208)	(1.206)	(0.970)	(1.130)
1952.hgyob	-0.986	1.835*	0.951	-0.278	1.661*	1.121
	(1.221)	(0.995)	(1.218)	(1.216)	(0.978)	(1.140)
1953.hgyob	-1.035	1.730*	0.798	-0.313	1.649*	1.091
	(1.232)	(1.004)	(1.229)	(1.227)	(0.987)	(1.150)
1954.hgyob	-1.135	1.748*	0.822	-0.336	1.690*	1.105
	(1.242)	(1.012)	(1.239)	(1.237)	(0.995)	(1.159)
1955.hgyob	-1.217	1.761*	0.709	-0.436	1.670*	1.024
	(1.253)	(1.021)	(1.250)	(1.248)	(1.004)	(1.169)
1956.hgyob	-1.150	1.906*	0.869	-0.272	1.788*	1.179
	(1.264)	(1.030)	(1.261)	(1.259)	(1.013)	(1.180)
1957.hgyob	-1.079	1.816*	0.677	-0.286	1.764*	1.034
	(1.276)	(1.040)	(1.273)	(1.271)	(1.022)	(1.190)
1958.hgyob	-1.226	1.822*	0.692	-0.448	1.724*	0.991
	(1.288)	(1.050)	(1.285)	(1.283)	(1.031)	(1.202)
1959.hgyob	-1.395	1.771*	0.718	-0.598	1.603	0.897
	(1.299)	(1.058)	(1.295)	(1.293)	(1.040)	(1.211)
1960.hgyob	-1.251	1.836*	0.734	-0.486	1.690	0.964
	(1.311)	(1.069)	(1.308)	(1.306)	(1.050)	(1.223)
1961.hgyob	-1.276	1.874*	0.649	-0.425	1.707	0.916
	(1.322)	(1.078)	(1.319)	(1.317)	(1.059)	(1.234)
1962.hgyob	-1.354	1.950*	0.736	-0.480	1.767*	0.998
	(1.334)	(1.088)	(1.331)	(1.330)	(1.069)	(1.246)
1963.hgyob	-1.384	1.811*	0.684	-0.461	1.677	0.967
	(1.346)	(1.097)	(1.343)	(1.341)	(1.078)	(1.256)
1964.hgyob	-1.463	1.881*	0.619	-0.620	1.726	0.861
	(1.359)	(1.108)	(1.356)	(1.353)	(1.088)	(1.268)
1965.hgyob	-1.458	1.783	0.490	-0.650	1.607	0.795
	(1.372)	(1.118)	(1.368)	(1.366)	(1.099)	(1.280)
1966.hgyob	-1.418	1.910*	0.733	-0.555	1.709	0.910
	(1.384)	(1.128)	(1.381)	(1.379)	(1.109)	(1.292)
1967.hgyob	-1.472	1.742	0.605	-0.526	1.605	0.873
	(1.398)	(1.139)	(1.395)	(1.392)	(1.120)	(1.304)

1968.hgyob	-1.496	1.845	0.527	-0.574	1.743	0.899
	(1.409)	(1.148)	(1.406)	(1.403)	(1.128)	(1.314)
1969.hgyob	-1.564	1.990*	0.533	-0.644	1.770	0.812
	(1.423)	(1.160)	(1.420)	(1.417)	(1.140)	(1.328)
1970.hgyob	-1.602	1.911	0.407	-0.774	1.745	0.693
	(1.436)	(1.171)	(1.433)	(1.431)	(1.150)	(1.340)
1971.hgyob	-1.601	1.876	0.542	-0.735	1.685	0.885
	(1.448)	(1.180)	(1.445)	(1.443)	(1.160)	(1.351)
1972.hgyob	-1.772	1.866	0.441	-0.805	1.657	0.735
	(1.462)	(1.191)	(1.458)	(1.456)	(1.171)	(1.364)
1973.hgyob	-1.721	1.840	0.468	-0.655	1.661	0.726
	(1.476)	(1.203)	(1.472)	(1.470)	(1.182)	(1.377)
1974.hgyob	-1.738	1.818	0.480	-0.749	1.579	0.773
	(1.488)	(1.213)	(1.484)	(1.482)	(1.192)	(1.389)
1975.hgyob	-1.786	1.869	0.423	-0.814	1.686	0.742
	(1.502)	(1.224)	(1.498)	(1.496)	(1.203)	(1.402)
1976.hgyob	-1.803	1.887	0.573	-0.675	1.666	0.891
	(1.516)	(1.235)	(1.512)	(1.509)	(1.214)	(1.414)
1977.hgyob	-1.907	1.822	0.323	-0.848	1.589	0.719
	(1.530)	(1.247)	(1.526)	(1.524)	(1.225)	(1.427)
1978.hgyob	-2.044	1.774	0.204	-0.856	1.568	0.609
	(1.544)	(1.258)	(1.540)	(1.537)	(1.236)	(1.440)
1979.hgyob	-2.164	1.691	0.144	-0.966	1.518	0.585
	(1.558)	(1.270)	(1.554)	(1.551)	(1.247)	(1.453)
1980.hgyob	-2.010	1.960	0.287	-0.926	1.723	0.717
	(1.571)	(1.280)	(1.567)	(1.565)	(1.258)	(1.466)
1981.hgyob	-2.041	1.836	0.282	-0.889	1.593	0.619
	(1.585)	(1.292)	(1.581)	(1.579)	(1.270)	(1.479)
1982.hgyob	-2.137	1.733	0.115	-0.891	1.492	0.648
	(1.599)	(1.303)	(1.596)	(1.593)	(1.281)	(1.492)
1983.hgyob	-2.217	1.752	0.156	-0.950	1.610	0.604
	(1.613)	(1.315)	(1.609)	(1.607)	(1.292)	(1.506)
1984.hgyob	-2.234	1.825	0.139	-1.009	1.609	0.485
	(1.627)	(1.326)	(1.623)	(1.621)	(1.304)	(1.519)
1985.hgyob	-2.370	1.787	0.058	-1.163	1.549	0.493
	(1.641)	(1.338)	(1.637)	(1.635)	(1.315)	(1.532)
1986.hgyob	-2.348	1.703	0.112	-1.136	1.424	0.468
	(1.656)	(1.350)	(1.652)	(1.649)	(1.326)	(1.545)
1987.hgyob	-2.390	1.659	0.110	-1.106	1.472	0.447
	(1.671)	(1.362)	(1.667)	(1.664)	(1.338)	(1.558)
1988.hgyob	-2.471	1.708	0.030	-1.196	1.442	0.479
	(1.686)	(1.374)	(1.681)	(1.679)	(1.350)	(1.573)
1989.hgyob	-2.458	1.679	0.068	-1.230	1.430	0.411
	(1.700)	(1.385)	(1.696)	(1.693)	(1.361)	(1.586)
1990.hgyob	-2.465	1.581	-0.055	-1.165	1.316	0.317
	(1.714)	(1.397)	(1.710)	(1.707)	(1.373)	(1.599)
1991.hgyob	-2.535	1.578	-0.079	-1.242	1.293	0.299
	(1.728)	(1.409)	(1.724)	(1.722)	(1.384)	(1.613)
1992.hgyob	-2.707	1.551	-0.122	-1.343	1.264	0.269
	(1.743)	(1.421)	(1.739)	(1.737)	(1.397)	(1.627)
1993.hgyob	-2.591	1.604	-0.190	-1.262	1.258	0.203
	(1.759)	(1.433)	(1.754)	(1.752)	(1.408)	(1.641)
1994.hgyob	-2.830	1.456	-0.332	-1.462	1.183	0.033
	(1.774)	(1.446)	(1.770)	(1.766)	(1.420)	(1.655)
1995.hgyob	-2.882	1.407	-0.404	-1.499	1.175	0.032
	(1.789)	(1.458)	(1.784)	(1.781)	(1.432)	(1.669)
1996.hgyob	-2.980*	1.247	-0.537	-1.601	0.971	-0.173
	(1.804)	(1.470)	(1.800)	(1.797)	(1.445)	(1.683)
1997.hgyob	-2.931	1.364	-0.361	-1.442	1.065	0.001
	(1.818)	(1.482)	(1.814)	(1.811)	(1.457)	(1.697)

1998.hgyob	-2.957	1.434	-0.183	-1.509	1.192	0.108
	(1.834)	(1.495)	(1.829)	(1.827)	(1.469)	(1.712)
1999.hgyob	-2.966	1.417	-0.420	-1.463	1.160	0.019
	(1.849)	(1.507)	(1.845)	(1.842)	(1.481)	(1.726)
2000.hgyob	-3.132*	1.324	-0.523	-1.676	1.051	-0.101
	(1.865)	(1.520)	(1.861)	(1.857)	(1.493)	(1.740)
2001.hgyob	-3.182*	1.207	-0.599	-1.719	0.870	-0.213
	(1.877)	(1.530)	(1.872)	(1.869)	(1.503)	(1.751)
Victoria	-0.069***	0.010	0.147***	-0.057**	-0.006	0.151***
	(0.023)	(0.018)	(0.023)	(0.022)	(0.018)	(0.021)
Queensland.	-0.073***	-0.023	-0.064***	-0.062***	-0.043**	-0.141***
	(0.023)	(0.019)	(0.023)	(0.023)	(0.019)	(0.022)
South Austr	-0.166***	-0.013	-0.108***	-0.181***	-0.026	-0.126***
	(0.032)	(0.026)	(0.031)	(0.031)	(0.025)	(0.029)
Western Aust.	-0.054*	0.069***	0.084***	-0.058*	0.045*	0.031
	(0.033)	(0.027)	(0.033)	(0.033)	(0.026)	(0.031)
Tasmania	0.037	-0.005	-0.044	0.049	-0.038	-0.114***
	(0.047)	(0.038)	(0.047)	(0.046)	(0.037)	(0.043)
Northern Aust.	0.249**	0.075	0.344***	0.175	0.158*	0.266***
	(0.104)	(0.085)	(0.104)	(0.109)	(0.088)	(0.102)
ACT	-0.034	0.275***	0.314***	-0.102*	0.233***	0.151***
	(0.059)	(0.048)	(0.059)	(0.060)	(0.049)	(0.057)
Other urban	-0.160***	-0.144***	-0.298***	-0.164***	-0.170***	-0.373***
	(0.021)	(0.017)	(0.021)	(0.020)	(0.016)	(0.019)
Bounded local	-0.178***	-0.184***	-0.321***	-0.232***	-0.201***	-0.444***
	(0.055)	(0.045)	(0.055)	(0.055)	(0.044)	(0.052)
Rural	-0.095***	-0.089***	-0.203***	-0.110***	-0.120***	-0.277***
	(0.026)	(0.021)	(0.026)	(0.025)	(0.020)	(0.023)
Constant	3.289*	-0.679	0.163	1.777	-0.403	-0.307
	(1.861)	(1.516)	(1.856)	(1.853)	(1.490)	(1.736)
Observations	14,049	14,049	14,049	14,029	14,029	14,029
R-squared	0.032	0.368	0.109	0.028	0.362	0.143

Table A4. Migrant gap in cognitive ability for first-generation immigrants with and without controlling for years since migration

VARIABLES	(1) BDS	(2) SDM	(3) NART-25
FGI	-0.067***	-0.009	-0.259***
	(0.020)	(0.016)	(0.020)
Observations	14,049	14,049	14,049
R-squared	0.032	0.368	0.109
FGI	-0.020	0.008	-0.536***
	(0.033)	(0.027)	(0.033)
Years since arrival	-0.002*	-0.001	0.010***
	(0.001)	(0.001)	(0.001)
Observations	14,049	14,049	14,049
R-squared	0.032	0.368	0.116

Note: Estimated coefficients are interpreted in terms of standard deviation difference. Each model controls flexibly for age, birth cohort, sex, geographic location, year when survey was collected (2012, 2016). The control group is non-immigrant Australians with no immediate immigration background. BDS the number of correctly remembered sequences of numbers. SDM measures the number of correctly matched symbol-number pairs. NART-25 measures the number of correctly pronounced words. Clustered standard errors in parentheses (clustered by individual to account for repeated observations). *** p<0.01, ** p<0.05, * p<0.1.

Table A5: Migrant gap in cognitive ability, separately for male and female sample

	Male			**Female**		
	(1) BDS	(2) SDM	(3) NART-25	(1) BDS	(2) SDM	(3) NART-25
	Panel A: First Generation Immigrants (FGI)					
FGI	-0.028	0.021	-0.216***	-0.105***	-0.037*	-0.301***
	(0.029)	(0.023)	(0.029)	(0.027)	(0.022)	(0.027)
N	6,660	6,660	6,660	7,389	7,389	7,389
R-squared	0.039	0.354	0.118	0.038	0.380	0.117
FGI (before 1974)	-0.052	0.042	-0.026	-0.128***	-0.055	-0.051
	(0.048)	(0.039)	(0.048)	(0.047)	(0.038)	(0.044)
N	5,437	5,437	5,437	6,066	6,066	6,066
R-squared	0.042	0.379	0.150	0.042	0.403	0.147
FGI (1974 or after)	-0.021	0.008	-0.308***	-0.106***	-0.043*	-0.415***
	(0.033)	(0.027)	(0.034)	(0.031)	(0.026)	(0.030)
N	6,097	6,097	6,097	6,826	6,826	6,826
R-squared	0.037	0.332	0.126	0.035	0.355	0.130
FGI(Age arrival<14)	0.034	0.053	-0.006	-0.042	0.002	0.007
	(0.043)	(0.035)	(0.042)	(0.043)	(0.034)	(0.039)
Observations	5,482	5,482	5,482	6,104	6,104	6,104
R-squared	0.040	0.348	0.152	0.036	0.366	0.156
FGI (Age arrival>13)	-0.062*	-0.002	-0.348***	-0.136***	-0.064**	-0.467***
	(0.034)	(0.028)	(0.035)	(0.032)	(0.026)	(0.031)
Observations	6,049	6,049	6,049	6,787	6,787	6,787
R-squared	0.040	0.363	0.129	0.041	0.390	0.130
	Panel B: Second generation immigrants					
Either parent is FGI	0.053*	0.038*	0.051*	-0.019	0.051**	0.042*
	(0.028)	(0.023)	(0.027)	(0.026)	(0.021)	(0.024)
Observations	6,618	6,618	6,618	7,411	7,411	7,411
R-squared	0.034	0.344	0.147	0.034	0.376	0.154
Both parents are FGI	0.026	0.047	-0.008	-0.046	0.091***	-0.038
	(0.043)	(0.035)	(0.042)	(0.040)	(0.032)	(0.037)
Observations	5,494	5,494	5,494	6,196	6,196	6,196
R-squared	0.034	0.351	0.154	0.035	0.373	0.152

Note: Estimated coefficients are interpreted in terms of standard deviation difference. Each model controls flexibly for age, birth cohort, sex, geographic location, year when survey was collected (2012, 2016). The control group is non-immigrant Australians with no immediate immigration background. BDS the number of correctly remembered sequences of numbers. SDM measures the number of correctly matched symbol-number pairs. NART-25 measures the number of correctly pronounced words. Clustered standard errors in parentheses (clustered by individual to account for repeated observations). *** p<0.01, ** p<0.05, * p<0.1.

Table A6. Migrant gap in cognitive ability by top-9 source countries

	(1) BDS	(2) SDM	(3) NART-25
United Kingdom	0.063*	0.118***	0.272***
	(0.033)	(0.026)	(0.031)
New Zealand	-0.065	0.005	-0.100**
	(0.048)	(0.039)	(0.045)
Philippines	0.235***	-0.224***	-0.769***
	(0.073)	(0.059)	(0.069)
India	-0.383***	-0.280***	-0.340***
	(0.078)	(0.062)	(0.073)
China	0.003	0.466***	-1.411***
	(0.089)	(0.072)	(0.084)
South Africa	-0.015	0.013	0.198**
	(0.089)	(0.072)	(0.084)
Vietnam	-0.498***	-0.386***	-1.339***
	(0.121)	(0.097)	(0.114)
Germany	-0.317***	-0.002	-0.175*
	(0.105)	(0.084)	(0.099)
Netherlands	0.025	0.139*	-0.145
	(0.104)	(0.084)	(0.098)
Constant	1.927	-0.454	-0.163
	(1.756)	(1.412)	(1.655)
Observations	16,292	16,292	16,292
R-squared	0.032	0.368	0.159

Note: Estimated coefficients are interpreted in terms of standard deviation difference. Each model is estimated separately for first-generation immigrants, excluding sample of second generation. Each model controls flexibly for age, birth cohort, sex, geographic location, year when survey was collected (2012, 2016). The control group is non-immigrant Australians with no immediate immigration background. BDS the number of correctly remembered sequences of numbers. SDM measures the number of correctly matched symbol-number pairs. NART-25 measures the number of correctly pronounced words. Clustered standard errors in parentheses (clustered by individual to account for repeated observations). *** p<0.01, ** p<0.05, * p<0.1.