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ABSTRACT

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

Economic theory suggests that selective immigration policies based on observable characteristics will affect unobservable migrant quality. Little empirical evidence exists on this hypothesis. We quantify traditionally unobservable components of migrant quality in Australia, a high-migrant share OECD country with a selective immigration policy. We proxy migrant quality with widely-accepted measures of personality and cognitive ability. Both first- and second-generation immigrants outperform natives on socially-beneficial personality traits. While first-generation migrants suffer language-ability penalties, their off-spring overcome these penalties and outperform natives in cognitive ability. Immigrants do not outperform natives in the labor market, a finding which may be explained by heterogeneous wage returns to non-cognitive ability.

JEL Classification: F22, J61, J24, J31, J62, O15

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

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I. Introduction

Migrants face considerable economic and psychic costs to overcome geographical distance and the institutional barriers to enter and settle in a destination country (Roy 1951; Borjas 1987; Chiswick 1999; Chiquiar and Hansen 2005). It is very likely to be a specific type of individual who opts for leaving her home country. It is commonly assumed that the decision to migrate is facilitated by migrants' education level and the social networks available in the destination country, both of which lower the costs of migration (Bertoli & Rapoport 2015; Abramitzky et al. 2012; McKenzie & Rapoport 2010). Certain personality profiles, characterized by high levels of openness, adaptability and extraversion, are also likely to reduce the psychic costs of migration. (Bütikofer & Peri 2019, Ayhan et al. 2019, Camperio et al., 2007; Jokela et al., 2008; Silventoinen et al. 2008).

Who decides to move abroad will affect the quality of migrants who arrive in a destination country. Policymakers are deeply concerned with the resulting pool of successful arrivals. As a consequence, many popular destination countries have opted for selective immigration policies to increase the average migrant quality. Australia, New Zealand, and Canada have adopted policies that aim to attract migrants with qualifications undersupplied in their local labor markets (Tani 2018). Admission is based on documentation of language proficiency, educational attainment, or occupational qualification. 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). Possibly the only empirical exception is Bertoli & Stillman (2019) who find on average more positive selection among lower educated migrants and suggest that selection based on observable education will not necessarily lead to better quality migrants in terms of wages

We contribute to this literature by quantifying innate abilities, which we interpret as a proxy for migrant quality. We shed light on migrant quality in Australia, a country that has been using a skill-selective immigration regime for almost 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 & Hatton, 2012; Jasso & Rosenzweig, 2009). Migrants' qualities also materialize 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 well migrants are able and willing to adhere to the norms of, and to integrate into, the society in the destination country. We study migrants' human capital portfolios, defined comprehensively to include formal qualifications, non-cognitive skills (Big-Five personality traits) and cognitive ability (language ability, memory, and coding speed).

To estimate the migrant ability gap relative to natives, we use high-quality, nationally representative data from the Household, Income, and Labour Dynamics in Australia (HILDA) survey (Summerfield et al. 2017). 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.

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, conscientiousness, openness to new experiences, and to some degree agreeableness, traits that are considered highly beneficial to society. Most of these characteristics are passed on to the second-generation (SGI), children born and fully raised in Australia. Australians with two foreign-born parents outperform natives on those cognitive ability tests which are associated with high-levels of executive function. Ability premiums are particularly high for second-generation females.

We interpret our estimated migrant gaps as the outcome of migrant selection dynamics, but caution that this gap maybe the result of assimilation. This interpretation is valid under the assumption that both cognitive and non-cognitive skills are relatively fixed in adulthood, which is a reasonable assumption (Cobb-Clark and Schurer, 2012; Elkins et al. 2017). Our conclusions remain unchanged in robustness checks in which we control for years-since-migration.[1]

[1] Note, it is difficult to separately identify age, cohort and assimilation effects (Borjas 1999). We can do so in our setting as we exploit repeated cross-sections with samples of independent observations.

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 in Canada (Aydemir 2011), in the US (Mattoo 2008, Bertoli & Stillman 2019) and OECD countries (Belot & Hatton 2012). One explanation for lower wages, despite higher levels of human capital, is that educational qualifications obtained in countries of dissimilar cultural background are not fully transferable. Alternatively, employers may discriminate against workers from dissimilar cultural backgrounds. 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 innate ability. We find evidence of heterogeneous returns to non-cognitive ability, which may indeed explain lower wages for first-generation immigrants. The reason is that FGI have positive returns to agreeableness, while natives have negative returns, and these wage benefits are more than fully offset by large wage penalties to openness to experience which we observe for FGI.

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 cultural norms 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 little evidence of this hypothesis. SGI experience large wage benefits to agreeableness, similar as the FGI, but no significant wage penalties to other traits which could have offset the positive returns. Thus, we are unsure why the second generation does not outperform natives in the labour market.

What we can conclude is that Australia has attracted a pool of high-quality migrants, both in terms of formal qualifications and personal attributes, which society values but which are hard to observe for immigration agents. Immigrants in Australia

have passed on their favourable non-cognitive abilities to their children, who today outperform natives on both cognitive and non-cognitive 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 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]

II. Prior Literature

Previous literature concedes 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 the country of origin. Most previous work defines observable characteristics in terms of educational attainment or hourly wages (McKenzie and Rapoport 2010, Chiquiar and Hanson 2005). This literature has focused predominantly on the question whether self-selection by education or wages is positive or negative. 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 that they are not positively 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). Exploiting data from many OECD countries, Belot & Hatton (2012) suggest that self-selection depends on many more factors, including the relative returns to skill between destination and source country, the degree of poverty in the source country, and the cultural distance between source and destination country.

[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).

Self-selection of migrants is also likely to be shaped by personality traits and cognitive ability, factors which affect the psychic costs of moving. Bütikofer & Peri (2019) find that adaptability, a measure constructed from administrative data, is an important predictor of outward migration for men in Norway. They find this to be particularly true for migrants of low cognitive ability, concluding that low-skilled migrants are highly positively selected. Using survey data from Ukraine, Ayhan et al. (2019) find that migrants from rural to urban regions are more likely to migrate if they score high on openness to experience, a trait associated with both the adaptability to change and the ability to tolerate risk. Ukrainians are however less likely to move to urban areas if they score high on agreeableness and conscientiousness, the latter being an indicator of dependability and ability to follow protocols.[3]

Another strand of literature focuses on comparing migrants directly with natives, a literature which emphasizes the quality of the pool of migrants who arrive in a destination country as a consequence of selection dynamics. This literature quantifies migrant quality almost exclusively on the basis of observable characteristics such as wages, education, and language ability. For instance, Antecol et al. (2003) compare education, language ability, and wages of migrants with natives in Australia, Canada, and United States. They find that the immigrants to Australia and Canada have a higher level of education and language ability – relative to natives – compared to immigrants in the United States. Jasso & Rosenzweig (2009) compare the education levels and language proficiencies of employed immigrants in Australia and the United States. They demonstrate that, although the return to skill is lower in Australia than in the United States, the skill composition of migrants is more diverse in Australia than in the United States. 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. 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

[3] 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).

for differences in education. Yet, wage penalties narrow with the years spent in Australia. Breunig et al. (2013) show that English language proficiency plays a critical role in explaining these labor-market penalties. Guven & Islam (2015) demonstrate that higher levels of English language proficiency help migrants to attract better wages in Australia.

Little is known about both the labour-market performance and abilities of second-generation immigrants in Australia. The only existing evidence for Australia is limited to the study of test scores and trust. Dustman et al. (2012) compare the performance of the Turkish second-generation immigrants in selected OECD countries, including Australia. The authors find that Turkish second-generation immigrants living in Australia perform better than the children of natives in math and reading tests. 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 immigrants are no different from natives, although first-generation immigrants have lower levels of trust than natives.

We contribute to this empirical literature by quantifying migrant quality through measures of innate ability, characteristics that were considered as unobservable in the recent literature (Bertoli et al. 2016). With the exception of Bütikofer & Peri (2019) and Ayhan et al. (2019), we are the first to study the cognitive and non-cognitive ability portfolios of migrants of a rich OECD country that screens migrants of observable characteristics such as education and skill since the late-1970s (Birrel, 2003). We differ from the two previous studies, as we study innate abilities as a measure of migrant quality instead of using innate abilities as a predictor of the decision to migrate. The important difference lies in the choice of the control group: whereas we compare immigrants with non-immigrant Australians residing in the destination country, Peri & Buetikofer (2019) and Ayhan et al. (2019) compare migrants with non-migrating source country residents.

Our approach is closest in nature to the few empirical studies that use standard measures of migrant quality – educational qualification and wage potential – to compare migrants' outcomes with outcomes of destination country's non-immigrant residents in selected OECD countries (Antecol et al. 2003, Bertoli & Stillman 2019, Aydemir 2011, Belot & Hatten 2012). We extend this literature by describing a broader

skill portfolio that tells us something about the non-market benefits of migrants. We furthermore demonstrate how this broader skill portfolio is affected by the introduction of immigration policies which select migrants on the basis of observable human capital and wage potential. Our findings will contribute to a better understanding of the broader market and non-market benefits of Australia's migrant population.

III. Australian Immigration Policy

Australia has always been an immigrant-receiving country. Today, about two in seven of its current residents, or 28%, have been born abroad. In comparison to other immigrant-receiving countries in the OECD, Australia has one of the highest shares of foreign-born residents.[4] In comparison, in Canada, New Zealand, and the United States the proportion of foreign-born residents is only 21.5%, 22.7%, and 15.3%, respectively.[5] 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 Australia at least three generations before.[6] This exceptionally high share of residents with immediate migration background makes Australia very suitable for studying migrant quality.

Since the early 1900s, Australia uses migration policy actively to grow its population. Up until World War II, 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 embarked on a large-scale Migration Program with the creation of an immigration portfolio. The aim of this program was to boost economic development and grow the population steadily by 1 percent per year. To achieve its goal, Australia's commenced admitting migrants from Eastern Europe including Russia, yet kept borders closed to most migrants from Asia. Exceptions were made for refugees from Vietnam and guest workers from China. By the end of the

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

1960s, Australia admitted up to 185,000 migrants per annum. This period is often referred to as the "national-building years" (Birrell 2003).

In 1972, the Australian Government under Prime Minister Whitlam officially revoked the White Australia policy and adopted a non-discriminatory approach to immigration. In 1973, legislative changes to citizenship criteria allowed all migrants, regardless of race or origin, to apply for Australian citizenship after three years of residence. The Department of Immigration issued instructions to all overseas staff to disregard nationality and race as factors in immigrant assessment processes. By 1973 "a non-discriminatory immigration policy was in place" (Miller 2003, p. 192).

The 1970s saw other important changes to the immigration policy. For the first time in history, the Australian Migration Program introduced a migration cap over concerns of weak labour markets. This led to a significant drop in the number of migrants admitted to Australia, with a record-low of 50,000 in 1973. In the years following, the Government under the new Prime Minister Fraser accepted a large number of refugees who arrived illegally via boat up until 1982.

Since the early 1980s, Australian migration policy steadily shifted the focus away from large-scale assisted programs that sought to attract migrants from specific source countries, to targeted migration policy initiatives concentrated on attracting immigrants to fill skill shortages. Thus, the occupations of migrants and their labour market outcomes became the centre of the migration debate since the late 1970s (Birrell 2003). In 1979 Australia introduced the Numerical Multi-factor Assessment System for migrant selection, a point system which gave weight to factors such as family ties, occupation and language skills. In 1988/89 the Migration Program was furthermore reformed into three streams, including a family stream, a skilled worker stream which focused on occupational qualifications, business expertise and capital, and a humanitarian stream. The skilled programme grew in importance over time, seeking to attract migrants with skills and business expertise. Quotas were furthermore raised to 115,000 arrivals per annum.

In recent decades, Australia has refined such a point-based approach to immigration similar to the ones used in Canada and New Zealand (Tani 2018). This shift has resulted in the award of permanent resident visas, predominantly to skilled migrants, who generated more than two third of total migrants' income and tax

revenues.[7] The abolition of racial discrimination and the introduction and refinement of such a point system is likely to have affected migrant quality in terms of human capital and labor-market performance (see e.g. Miller 1999 for Australian evidence). It is unknown to which degree it has affected other forms of characteristics of migrants.

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) latest Census (2016), Australia's population consist of people that were born in 190 different countries.[8] The countries with highest numbers of foreign-born residents in 2016 are the United Kingdom, New Zealand, China, India, Philippines, Vietnam. Italy, Malaysia, and Sri Lanka, Germany, Greece and the Netherlands. This diverse profile of migrants in Australia creates a special case to for the current study.

IV. Data and Empirical Strategy

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 interviewed by an interviewer (continuing or new-person questionnaire), who collects information, among others on family background, education, employment, or family formation decision. 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, including health and personality information. 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 high at around 90% (Summerfield et al. 2017).

[7] Personal Income of Migrants, Australia, 2009-10 Online Report.
[8] Census of Population and Housing: Reflecting Australia - Stories from the Census, 2016

For the main 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%) are second-generation immigrants, and 3,676 (18.9%) are first-generation immigrants. A full list of variables used in the analysis (defined below) and their descriptive statistics are reported in Table 1.

A. Variable Definitions

First and second-generation immigrants

We define first generation immigrants (FGI) as migrants who were born abroad and are currently a resident of Australia. We follow Moschion and Tabasso (2014) to define second generation immigrants (SGI) as individuals born in Australia to a family in which at least one parent was born abroad. 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. By 1973, the Australian Labor Government has de facto abolished the White Australia policy (see Section III.), which led to a change in the composition of migrants. In addition, the late 1970s an introduction of a point-system which admitted migrants on the basis of the expected labor market productivity. 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.

The control group consists of Australian-born residents with no immediate migration background. These are Australians who were born to parents who were both born in Australia. From here onward, we refer to this group as non-immigrants (NI) Australians.

Innate abilities

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 both 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 for young workers at the beginning of their careers (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 exceed 0.8 such as conscientiousness and openness to experience. 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. All personality variables are standardized to mean 0 and standard deviation 1.[9]

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 proxy acquired human

[9] 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.

capital. Adolescent cognitive ability is a strong predictor of later-life labor market outcomes (e.g. Lin, Lutter, and Ruhm 2018).

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.

B. Estimation Model

We estimate the migrant ability gap as a proxy for migrant quality using repeated cross-sectional data. The outcome variable is ability (A_i) (cognitive, non-cognitive) for individual *i* which was measured in t=2005 for non-cognitive ability (or in t=2009 or t=2013 for individuals not observed earlier) or in t=2012 for cognitive ability (or in t=2016 for individuals not observed earlier):

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

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 III.A. 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 dummy variable indicating 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 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. We are able to interpret this effect as the outcome of migrant selection only under the assumption that 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). In this case, contemporaneous measures of both personality and cognitive ability can be used as proxies for such skills at time of arrival. As this is a strong assumption, we provide in a robustness check estimates from a regression model where we additionally control for years-since-

migration.[10] In addition, we present additional analyses in which we separate the sample into earlier (before 1974) and later arrivals (in or after 1974).

We present a heterogeneity analysis, in which we estimate the migrant ability gap by sex for both FGI and SGI. This is important as men and women may select differently into the decision to migrate. Furthermore, we present a heterogeneity analysis by country of origin, and educational attainment. This heterogeneity analysis helps us, among others, to better understand to which degree the selection by observables (e.g. education) influences selection by unobservables (innate abilities).[11]

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.

V. Results

We now turn to presenting our estimation results on the migrant personality (Section A) and cognitive ability gaps (Section B.). We then move on to present migrant gaps in observable outcomes (Section C.) and migrant gaps in the returns to personality (Section D.).

A. Migrant Personality Gap

In Table 2 we present the estimated migrant-personality gap for both first-generation immigrants (Panel A) and second-generation immigrants (Panel B). Full estimation results are reported in the Online Appendix (Table A1). Our findings can be summarized in six stylized facts:

1. Migrants born abroad are extremely positively selected by personality. They score significantly higher on extraversion, conscientious, and openness to new experiences than natives. The estimated differences are sizable in magnitude, ranging between 0.05 SD (extraversion) and 0.15 SD (openness to new

[10] Note, we are able to separately identify the effects for age, cohorts and assimilation, because we have a repeated cross-section of independent individuals. This is important because the previous empirical literature has been vexed by the challenge of identifying the three effects in pure cross-sectional data (see Borjas 1999 for a discussion).

[11] Ideally we would like to present a heterogeneity analysis by Visa type and whether the migrant remained in Australia. In total, 874 migrants left Australia again, and 149 skilled migrants and 158 migrants who arrived under a family visa responded to the survey question. Because of a high number of missings and therefore small sample sizes, we cannot fully exploit this information in our analysis.

experiences). Yet, FGI also score lower on emotional stability. 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, which is now statistically significant at the 10% level (see Online Appendix, Table A2).

2. Overall, there are no discernible differences in the FGI premium between earlier (before 1974) and later arrivals (1974 or after), groups that were exposed to different migration policies, and heterogeneities by educational attainment are of little importance. The only difference is that earlier arrivals are more extraverted than NI, while later arrivals are no different from natives.[12] Also, highly educated later arrivals are significantly more agreeable than natives, while later arrivals with low levels of education are less agreeable than natives (Figure 1). This suggests that the abolition of the discriminatory migration policy and the introduction of a point-based system did not affect selection by unobservables in different ways across the educational attainment distribution on average, but it helped to select more agreeable migrants from the higher-education spectrum.
3. Age of arrival matters to some degree, suggesting that length of exposure to local culture may shape personality. FGI who arrived before the onset of adolescence in Australia (before the age of 14) are no different in their extraversion and emotional stability scores than NI. Yet, they 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.
4. Some of the migrant-personality gaps are observed only for male or female migrants (Table 3, Panel A). First, the migrant gap in extraversion is only observable for male FGI, and male FGI also score higher on agreeableness than

[12] We have for a small number of observation information on which Visa that had entered Australia. There are 149 FGI who had entered the country with a skilled Visa and 158 individuals who had entered the country with a family migration Visa. For the remainder sample, this information is missing. These skilled migrants score almost 0.4 SD higher on Conscientiousness (statistically significant at the 1 percent level). We find no statistically significant differences in personality between FGI who entered under a family migration Visa and natives. Moreover, the migrants who leave Australia again (N=874) tend to be less conscientious and less emotionally stable than FGI who continued to stay in Australia, however these estimated differences are not statistically significant. These results are provided upon request.

natives, while female FGI score no different from natives. On the other hand, it is only female FGI who score lower on emotional stability than natives.

5. The migrant-personality gap differs substantially by country of origin, suggesting important cultural and reporting differences in personality (Figure 3, which depicts migrant gaps for the Top-9 source countries,).[13] Positive selection in conscientiousness is observed largely for migrants from the UK, India, South Africa, Germany, and the Netherlands (ranging between 0.2 and 0.4 SD), while only small differences are observed for New Zealand and Philippines (around 0.1 SD). Positive selection by openness to experience is only observed for migrants from New Zealand, South Africa, and Germany, estimated gaps that range between 0.1 SD (New Zealand) and 0.35 SD (Germany). Negative selection by emotional stability is only observed for migrants from India, China, and Vietnam. Estimated penalties range between -0.18 SD (India) and -0.35 SD (China). It may be possible that migrants from these source countries understand the questions regarding emotional stability in a different way than other cultures that are closer to the English-language background.
6. Migrant families with two foreign-born parents produce children with high levels of conscientiousness and agreeableness, indicating a strong transmission of the positive selection in these traits from the first to the second generation (Table 2, Panel B). Positive selection by conscientiousness is stronger for female second-generation immigrants (Table 3, Panel B). Children of migrant families with two parents born abroad are no different in their extraversion or openness to experience from natives. In contrast, children of migrant families where only one parent was born abroad score no different from natives, except that both boys and girls are significantly more open to new experiences.

B. Migrant Cognitive Ability Gap

In Table 4 we present the estimated migrant-cognitive ability gap, again for both first-generation immigrants (Panel A) and second-generation immigrants (Panel B). Full

[13] 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. These countries are 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).

estimation results are reported in the Online Appendix (Table A3). Our findings can be summarized in eight stylized facts:

1. Migrants born abroad score significantly lower on language tests and slightly lower on short-term memory tests. FGI score 0.26 SD lower on the National Adult Reading Test (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)). Importantly, the BDS penalty is no longer statistically significant when controlling for years-since-migration (Online Appendix, Table A4).
2. There are no notable differences between migrants and natives with respect to coding speed and accuracy. Migrants thus do not perform worse on executive function, a cognitive ability assessed with the Symbol Digits Modalities Test (SDM) (column (2)).
3. The language penalties of migrants are more sizable for migrants who had arrived after 1973. 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.
4. The language penalty of migrants who arrived after 1973 is significantly larger for highly educated migrants than for migrants with low levels of education (Figure 2). This finding is consistent with the change in migration policies around the mid-1970s, which admitted migrants based on their skills and independent of their race and nationality.

5. The language and short-term memory penalties of migrants are predominantly driven by female migrants (Online Appendix, Table A5). One explanation for this finding is that female migrants to Australia were less likely to enter the labor market than male migrants and thus were not selected by language skill.
6. As expected, language penalties are stronger for migrants from source countries where English is not the main language of communication (Online Appendix, Table A6). The largest penalties are observed for migrants who came from the Philippines (-0.77 SD), India (-0.34 SD) or China (-1.4 SD). Surprisingly, migrants from the UK and South Africa perform better than NI Australian in language pronunciation by 0.27 SD and 0.20 SD, respectively, indicating a strong degree of positive selection among the two groups.
7. In contrast, migrants from some source countries where English is not the main language of communication, perform extremely well in short-term memory (BDS) or executive function (SDM). For instance, migrants from the Philippines score higher on the BDS than natives by 0.24 SD, while FGI from China score significantly higher on the SDM test than natives by a staggering 0.47 SD. Migrants 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.
8. Second-generation immigrants outperform natives in language ability and female SGI outperform natives in their executive function. SGI score 0.05 SD higher on the NART-25 test than NI Australians, and 0.05 SD higher on the SDM test (Table 4, Panel B). The cognitive premium for SGI on the SDM is larger (0.07 SD, column (2)) when both parents are foreign born, and this results is fully explained by female SGI, who score 0.09 SD higher on the SDM test (Online Appendix, Table A5). Neither boys nor girls from families where both parents are foreign born perform differently in language tests and short-term memory than natives. 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.

C. Migrants Gaps in Education, 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 conscientiousness, a trait highly valued by society and employers. Furthermore, although (female) 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.[14] 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). The findings can be summarized as follows:

1. Migrants born abroad have significantly higher levels of education than natives. FGI are estimated to have more than one year of education (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)).
2. Migrants born abroad do not work in occupations with higher prestige (Panel B).
3. Despite higher levels of education and no difference in occupational ranks, migrants born abroad face a wage penalty. On average, the wages of FGI are 12.4 log percent (%) lower than the wages of comparable 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. FGI who arrived before 1974 experience a significant wage-premium over NI Australians in the magnitude of 23.3%, while FGI who had arrived after 1973 experience a 16.9% wage penalty. Age at arrival plays an important role

[14]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.

in explaining this penalty. FGI who arrived before the onset of their adolescence experience no wage penalty.

4. The offspring of migrants are no different in their education levels, occupational rank, and productivity relative to natives (columns (4), (5) and (6)). This finding suggests that although SGI have very high levels of innate ability, they are not able to leverage their ability premium to achieve higher levels of educational attainment and better labor-market opportunities.

D. Migrant Gaps in the Wage Returns to Personality

We are now asking why neither the first nor the second generation is able to attract higher hourly wages, on average, despite higher levels of innate ability. To answer this question, we test whether migrant groups differ in their wage returns to innate ability. To do so, we estimate a standard wage regression model, in which log hourly wage is the dependent variable and ability measures and an interaction of ability measures with immigrant status are included as explanatory variables. To identify the causal impact of heterogeneous ability returns, we exploit the within-individual variation of our data, 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 conduct this analysis with personality traits as measure of ability only, for which we have three time periods available that stretch over a 12-year time period.[15] Our results can therefore only provide a partial answer. Estimation results are presented in Table 6.

We find indeed difference in the wage returns to personality for extraversion, openness to experience and agreeableness between natives and first-generation immigrants. Natives experience a positive wage return to extraversion and a negative wage return to openness to experience. A one-standard deviation increase in

[15] 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.

extraversion for natives leads to a wage increase of about 2%. This finding is consistent with previous studies (Fletcher 2013, Mueller and Plug 2006). In contrast, a one-standard deviation increase in openness to experience leads to a 2.3% 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).[16] In contrast, FGI experience zero wage returns to extraversion (0.021–0.019=0.002, or 0.2%), while their wage penalty to openness to experience is 60 percent larger than for natives (-0.024–0.013=-0.037, or 3.7%). The labor-market penalty of openness to experience is particularly strong for FGI who arrived in Australia before 1974.[17]

Furthermore, natives significantly differ from migrants in terms of their returns to agreeableness. Both FGI and SGI experience wage benefits of agreeableness, while NI Australians experience wage penalties. For natives, every 1 SD increase in agreeableness translates into a wage penalty of 1% 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% higher, which translates into a 2.2% 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)) and SGI (column (6)).

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) demonstrate 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.

[16] 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.
[17] Note, because of large standard errors the estimated difference is not statistically significant.

Overall, our findings suggest that Australian immigrants are able to translate some of their favourable personality traits into higher wages, but translate others into significantly lower wages. Although first-generation immigrants experience positive wage returns to agreeableness, this wage benefit of 2.2 % is more than fully offset by negative returns to openness to experience, with a wage penalty of 3.7%. Thus, it is possible that migrants' poorer labor market performance relative to natives is explained by a domineering wage penalty of high levels of openness to experience.

VI. Concluding Remarks

A well-documented literature in migration economics argues that migrants are not a random group of individuals drawn from their home country (Ambrosini and Peri 2012, Antecol et al. 2003, Borjas 1987, Chiquiar and Hanson 2005, Dequiedt and Zenou 2013, Fernández-Huertas Moraga 2011; 2013, Jasso and Rosenzweig 2009, Kaestner & Malamud 2014). The high economic and psychic cost of migration suggest that immigrants must have innate abilities that help them push through the financial and legal barriers of migration. Many of the immigrant-receiving countries such as Australia implemented selective migration policies that ensure to attract highly productive and able migrants. Most commonly, selective migration policies would select migrants on the basis of observable characteristics that could help fill gaps in domestic labor markets. Bertoli et al. (2016) suggested that migrant selection based on observable characteristics such as language ability and formal qualification is likely to affect migrants' innate, but usually unobserved, abilities.

We contribute to the current literature on migrant quality by providing a snapshot of migrant innate ability for a rich OECD country with a high share of migrants. 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, especially among female second-generation immigrants. 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.[18] Australia is currently implementing ever tighter vetting rules introduced since 2015 by the Immigration Department.[19]

A right-shift has occurred in sentiments against migrants, suggesting that migrants may erode social norms, take away jobs, and abuse the welfare system.[20] 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

[18] Based on Australian Bureau of Statistics as of June 2015, 28.2% of Australian resident population was born overseas.
[19] 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.
[20] Manpreet K. Singh for the SBS on "Anti-immigration sentiment rises sharply in Australia: report", published on 25 June 2018, online news.

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.

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TABLES

Table 1. Summary statistics

	Non-immigrant 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	10,373		3,656		3,676	
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. Migrant gap in education, 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. Migrant gap in the wage returns to personality

	(1) FGI	(2) FGI Arrived <1974	(3) FGI Arrived >1973	(4) FGI Arrived at age<14	(5) FGI Arrived at age>13	(6) SGI One parent is FGI	(7) SGI Both parents are FGI
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

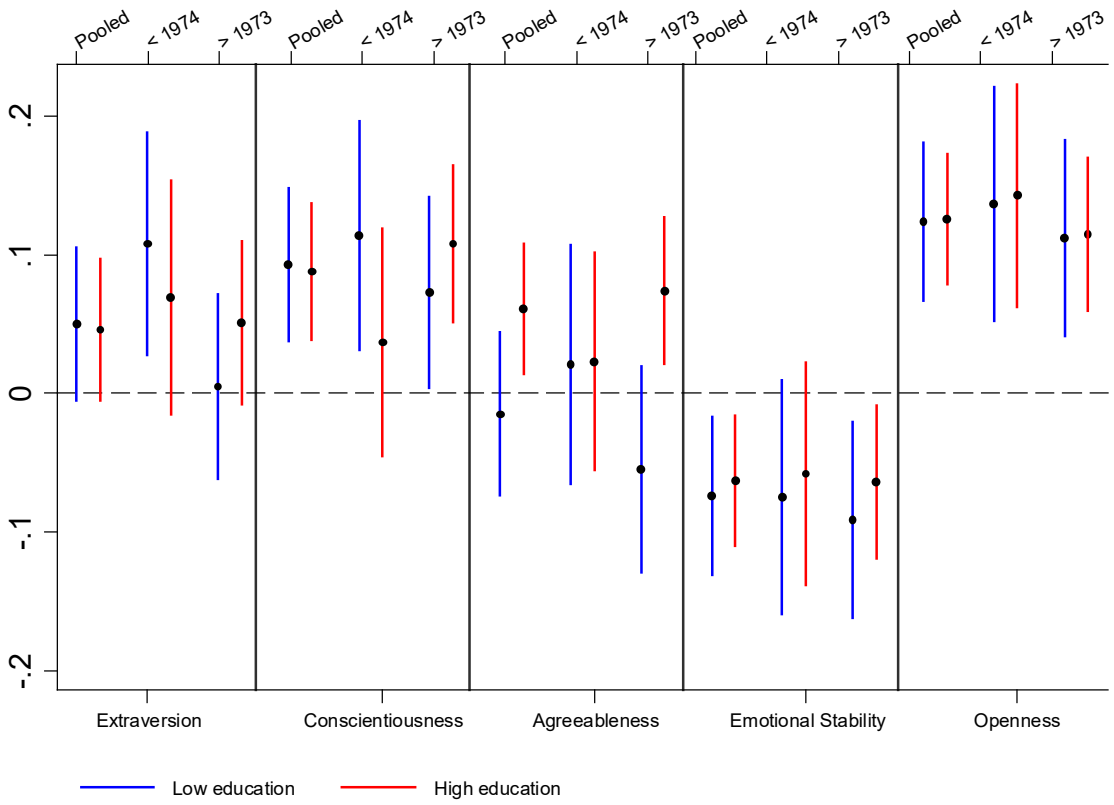

Figure 1: Migrant non-cognitive ability gap by education level

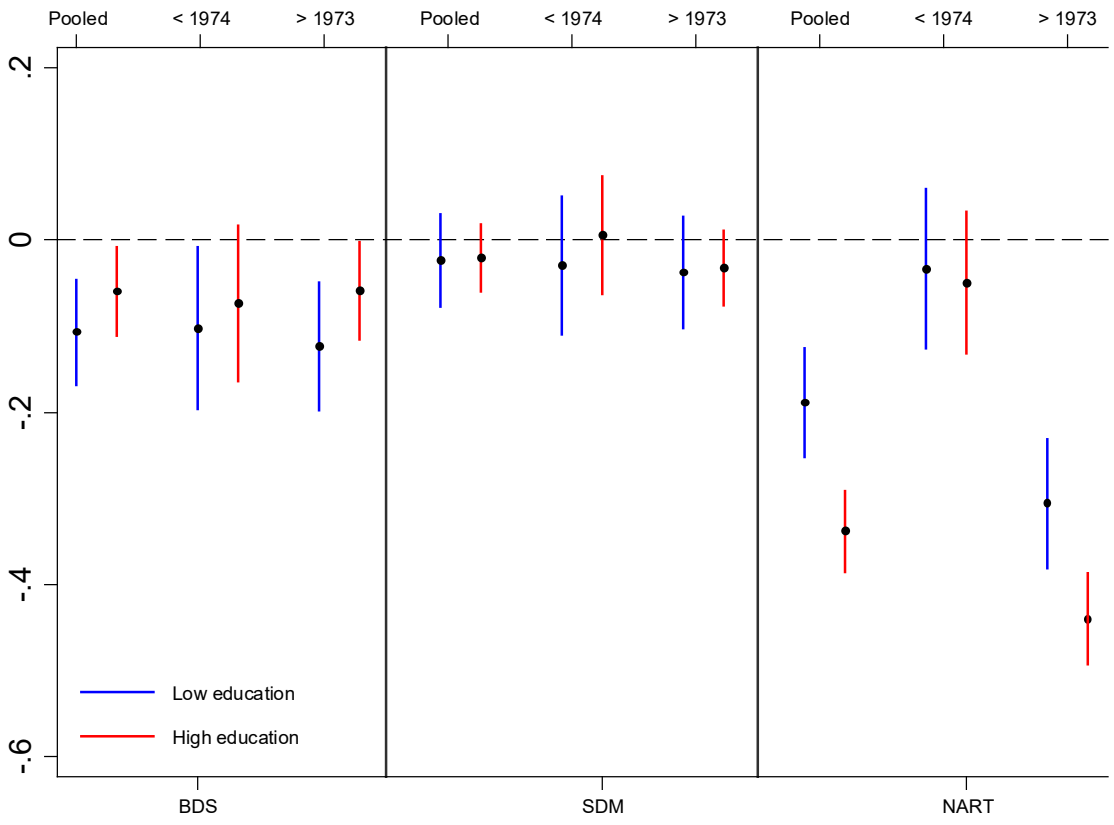

Figure 2: Migrant cognitive ability gap by education level

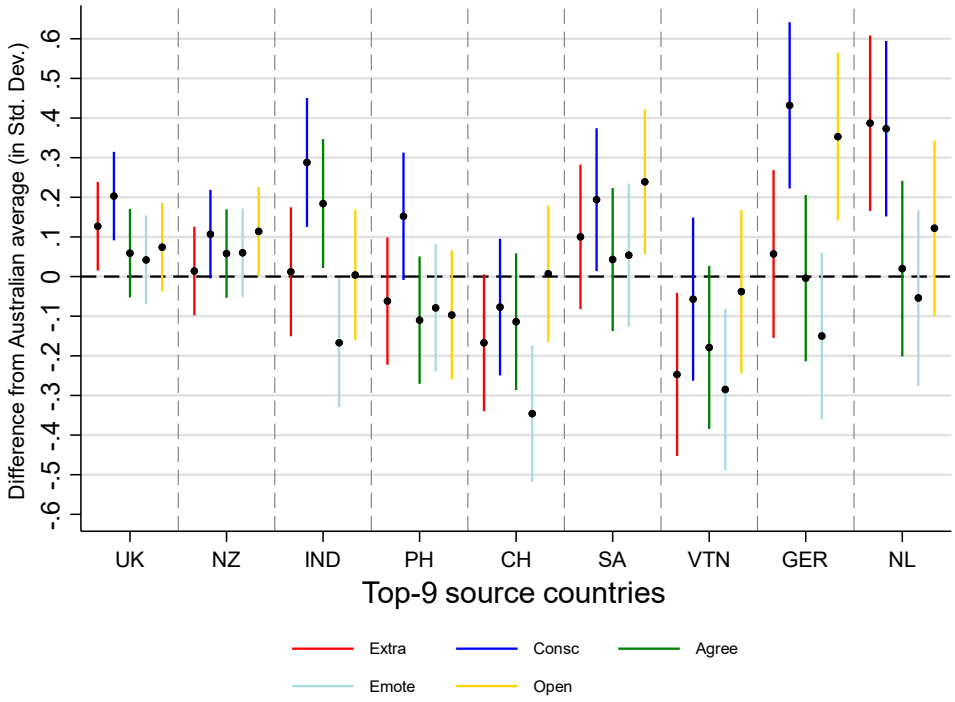

Figure 3: Migrant gap in personality by top-9 source countries

Note: Figure depicts estimated coefficients of the 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), the Netherlands (N=110). Regression models 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.

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 arrival

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.