

The Health Consequences of Persistent Overqualification Among Immigrants in Canada

by

Takuya Shibayama

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

Background: Canada's immigration system prioritizes the admission of highly educated immigrants. Notwithstanding, skilled immigrants often struggle to integrate into the labour force. A considerable body of evidence shows that immigrants are more likely to be overqualified for their jobs compared to their non-immigrant counterparts. The overrepresentation of immigrants among the overqualified is problematic, as overqualification is associated with poor mental health. Moreover, cross-sectional research suggests that the negative mental health impact of overqualification might be more severe for immigrants than non-immigrants. This study seeks to further investigate the relationship between well-being, overqualification, and immigration status using longitudinal methods.

Methods: This study used data from the Longitudinal and International Study of Adults (LISA), which is a nationally representative survey administered by Statistics Canada. Linear mixed models were used to analyze the affect of overqualification on mental health and life satisfaction trajectories. Mental health was measured via the Kessler 10 Psychological Distress Scale and life satisfaction was measured via a face-valid, one-item measure. To assess if overqualification and well-being (i.e., mental health and life satisfaction) is moderated by immigration status, a three-way interaction term was included in the model. Post-estimation analyses were conducted to unpack significant interaction effects.

Results: Both overqualified immigrants and non-immigrants experienced a significant rise in psychological distress over a four-year period. The negative psychological impact of overqualification was comparable between immigrant and non-immigrant groups. In general, psychological distress scores did not rise above clinically meaningful levels. With respect to life satisfaction, overqualified immigrants experienced an increase over time, whereas overqualified non-immigrants did not.

Conclusion: Overqualification is perceived as an unpleasant experience by both immigrants and non-immigrants alike. Further research investigating longer time trends are necessary to form further conclusions about the relationship between overqualification and mental health. The rise in life satisfaction among overqualified immigrants is similar to findings from past research. Although speculation, such an increase in well-being may be attributable to response shift. Response shift refers to a change in how individuals appraise their satisfaction with life. Life satisfaction may increase among overqualified individuals when other life-domains such as family and relationships become more emphasized or valued over career-related achievements.

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INTRODUCTION

Canada is aptly described as a nation of immigrants. Between 2015 and 2019, Canada welcomed over 300 000 immigrants each year (Statistics Canada, 2019). Although immigration levels fell in 2020 due to the COVID pandemic, Canada admitted roughly 400 000 immigrants in 2021, and 437 000 immigrants in 2022 (Immigration, Refugees, and Citizenship Canada, 2021; Statistics Canada, 2023c). Fueled by concerns over the ageing labour force and low birth rate (Immigration, Refugees and Citizenship Canada, 2022a), Canada further plans to receive over 1.45 million new immigrants between 2023 and 2025 (Immigration, Refugees and Citizenship Canada, 2022b). The total fertility rate to maintain any population without immigration is 2.1 births per woman (Statistics Canada, 2022a). In 2015, Canada's total period fertility rate was 1.51, which further decreased to 1.33 in 2022 (Statistics Canada, 2023a). Remarkably, some experts predict that by 2030, Canada's population growth will depend solely on the influx of immigrants (Statistics Canada, 2016).

From an economic perspective, approximately 25% of the Canadian labour force are immigrants, with many being self-employed creating job opportunities for hundreds of thousands of Canadians (Immigration, Refugees and Citizenship Canada, 2020b). Furthermore, immigration heavily contributes to sustaining the Canadian labour force, as the working-age population is quickly ageing (Immigration, Refugees and Citizenship Canada, 2023). Some estimates suggest that five million Canadians will retire between 2020 and 2030, lowering the worker to retiree ratio from 4:1 to 3:1 (Immigration, Refugees and Citizenship Canada, 2023). Needless to state, Canada's immigration system is expected to play an important function in supporting national welfare and economic stability in the forthcoming decades.

Historically, Canada was not always welcoming of immigrants. For much of the 19th and 20th century, Canada's immigration policy favoured the admission of Europeans over individuals who would be considered visible minorities (Taylor, 1991). Indeed, "until 1962 the process of immigration control in Canada was explicitly racist" (Satzewich, 1989, p. 78), and it blatantly interfered with the immigration of non-white persons (Taylor, 1991). For instance, the enactment of the *Chinese Immigration Act* in 1885, subjected Chinese immigrants to pay a \$50 head tax when entering Canada (Holland, 2007). This tax was increased to \$500 in 1904, culminating in the total ban of Chinese immigrants in 1923, which would last until 1947 (Holland, 2007; Taylor, 1991). Although not to the same extent, immigration from other parts of Asia (e.g., India, Japan), Africa, and South and Central America were similarly constrained (Taylor, 1991).

It was not until 1962 that Canada would begin to embrace a multicultural immigration framework and remove the discriminatory elements from their migration policies (Taylor, 1991). In 1967, the government adopted a points-based selection paradigm that would favour immigration candidates with higher levels of education and job-ready skills (Taylor, 1991; Troper, 1993). This new points-based procedure slowly supplanted the older system that selected individuals based on race (Taylor, 1991; Troper, 1993). The rationale for this shift was to fix Canada's image by removing the outdated and draconian immigration laws that violated the code of human rights (Troper, 1993).

Furthermore, there was much debate in the 70's concerning the role of immigration in supporting both population and economic growth (Troper, 1993). In public discourse, many Canadians argued that immigrants would steal jobs from Canadian-born citizens and

denounced plans of increasing immigration (Troper, 1993). However, Canada's birth rate was on the decline and during the economic recession of 1990 – 92, legislative changes were introduced that increased the admittance rate of entrepreneurs and single immigrant candidates over refugees and family reunification applicants (Troper, 1993).

In the 21st century, similar concerns over economic sustainability continues to support immigration policies that favour the reception of highly educated immigrants (McMullin et al., 2004). In 2019, the proportion of economic immigrants was 58% (Immigration, Refugees and Citizenship Canada, 2020b). Canada aims to further increase this proportion to 60% by 2024, while slightly decreasing the proportion of refugees and protected persons coming into Canada (Immigration, Refugees and Citizenship Canada, 2022b, 2022c). Notably, a large percentage of economic immigrants are university-educated (Immigration, Refugees and Citizenship Canada, 2020a), as holding a post-secondary credential greatly heightens one's probability of being accepted under the points system. In 2017, 2018, and 2019, more than 90% of invitations to apply for permanent residency within the Express Entry programs were offered to university degree holders (Immigration, Refugees and Citizenship Canada, 2020a).

Generally, highly educated immigrants have better socio-economic outcomes compared to their less educated counterparts, as they have an easier time integrating into the labour market (Picot et al., 2023). However, recent findings have illustrated that university educated immigrants endure abiding financial disadvantages if they are unable to secure employment soon after their arrival (Picot et al., 2023). University educated immigrants who are unsuccessful in securing employment within the first two years of landing, proceed to earn less income than those with a secondary education for the next seven years (Picot et al., 2023).

Furthermore, immigrants are more likely than their non-immigrant counterparts to be overqualified for their jobs, that is, possess educational credentials beyond occupational requirements (Cornelissen & Turcotte, 2020). According to census data on university graduates, 10.1% and 3.6% of immigrant and non-immigrant workers, respectively, experienced persistent overqualification between 2006 and 2016 (Cornelissen & Turcotte, 2020). In other words, immigrants were three times more likely than their Canadian born counterparts to experience prolonged bouts of overqualification (Cornelissen & Turcotte, 2020).

The over-representation of immigrants among the overqualified may be problematic as emerging evidence indicate that overqualification is associated with indicators of poor well-being (Mawani, 2018; Smith & Frank, 2005). Many immigrants feel discouraged and unsatisfied when their educational qualifications are considered irrelevant.

[My job] is not [in] my field so I don't feel like I am happy with this job... I was working before and getting a lot of money, and I don't know why I come to this country.

(Dean & Wilson, 2009, p. 194)

And I was working under high school graduates you know... They were my supervisors and managers on all the previous jobs that I had done ... that was actually very, very discouraging. (George et al., 2012, p. 415)

Some recent findings also suggest that the negative health impact of overqualification may be greater for immigrants than non-immigrant citizens (Mawani, 2018).

The majority of studies on the health impact of overqualification in immigrant and non-immigrant populations have been qualitative or cross-sectional in nature (Cornelissen &

Turcotte, 2020). Such studies have contributed greatly to elucidate the relationship between overqualification and health; however, they cannot assess the long-term health consequences of prolonged overqualification. To date, the few longitudinal studies that have been conducted on this topic focused on analysing the general population (i.e., immigrants and non-immigrants together) or sub-populations (i.e., immigrants) in isolation (e.g., Chen et al., 2010; Smith & Frank, 2005). To my knowledge, a longitudinal study *comparing* the health impact of overqualification between immigrant and non-immigrant populations has never been conducted. Accordingly, this study uses the Longitudinal and International Study of Adults (LISA) to study the relationship between overqualification, well-being, and immigration status over a four-year period.

BACKGROUND

The “Healthy Immigrant Effect” is a well-researched phenomenon, and describes the observation that immigrants have a health advantage over than the native born (Vang et al., 2017). Canadian research has found that recent immigrants have lower odds of being diagnosed with anxiety disorders compared to their non-immigrant counterparts (Aglipay et al., 2013; Betancourt, 2010; Menezes et al., 2011). Mood and substance-use disorders are also believed to be lower among the immigrant population (Menezes et al., 2011). Furthermore, immigrants in Canada may have better physical health compared to non-immigrants. Prior findings show that immigrants fare better than non-immigrants with respect to various health outcomes including asthma (Betancourt, 2010; Newbold & Danforth, 2003), obesity, (Betancourt, 2010), and cancer (Betancourt, 2010; McDermott et al., 2011). As evidence for the Healthy Immigrant Effect can be found in various countries (e.g., Canada, United States, and Australia), it is regarded as a well substantiated effect (Vang et al., 2017).

Notably, the Healthy Immigrant Effect appears to disappear over time (Betancourt, 2010; Newbold & Danforth, 2003; Vang et al., 2017). In other words, health decline is associated with a longer stay in the host nation. Betancourt (2011) reports that immigrants who had resided in Canada for less than 5 years were 1.6 times less likely to be obese or overweight compared to the non-immigrant population; however, more established immigrants were only 1.2 times less likely to be obese or overweight. The same report also stated that the prevalence of hypertension was greater among non-immigrants compared to recent immigrants. On the other hand, there was no difference in the prevalence of hypertension among established immigrants and non-immigrant Canadians (Betancourt, 2010). The same conclusion was

reached by Newbold and Danforth (2003) – they observed that established immigrants with more than 10 years of Canadian residency had greater prevalence of arthritis, hypertension, and diabetes compared to both recent immigrants and non-immigrants. A more recent study also concluded that established immigrants have poorer well-being compared to recent arrivals (Kwak, 2018). Admittedly, some of the above mentioned evidence is more than a decade old. However, to my knowledge, contemporary studies on the decline of the Healthy Immigrant Effect are few.

The reasons behind the health decline of immigrants are undoubtedly multi-faceted, some evidence suggests that problems with labour force integration may be related (Lou & Beaujot, 2005). A prevalent issue among immigrants in the Canadian labour force is overqualification. Overqualification describes a form of underemployment characterized by the mismatch between one's educational qualifications and occupational settings (Frank & Hou, 2018). For example, an individual with a university degree or a college diploma working in occupations only requiring a secondary school education would be considered overqualified. Researchers delineate the concept of overqualification into two categories: 1) marginal overqualification and 2) overqualification (Frank & Hou, 2018; Hou et al., 2020; Lu & Hou, 2020). Marginal overqualification refers to university degree holders employed "in occupations that require some post-secondary education but not a university degree" (Frank & Hou, 2018, p. 891); overqualification refers to individuals holding university degrees employed in occupations in which only secondary education is required (Frank & Hou, 2018).

Other forms of underemployment include low-wage employment and involuntary part-time contracts (Dooley, 2003). Low-wage employment refers to individuals that are working full

time hours but earn an income near the poverty threshold (Dooley, 2003); involuntary part-time employment describes individuals who work part-time that wish to find full time work (Dooley, 2003). Although various forms of underemployment is associated with negative health effects (Dooley et al., 2000), the current investigation limits its focus to overqualification.

Prevalence of Overqualification

In many countries, the prevalence of overqualification is on the rise (F. Green & Henseke, 2016; Livingstone, 2019). Findings from prior research suggest that overqualification has been increasing in the Canadian labour market for decades. Utilizing five separate national surveys administered between 1982 and 2016, Livingstone examined Canadian Labour market trends pertaining to overqualification (Livingstone, 2019). Livingstone found that the proportion of overqualified workers had grown from 24% in 1982 to 39% in 2016. Canada also appears to have one of the highest proportions of overqualified workers, behind only Japan and the Czech Republic among the OCED countries (F. Green & Henseke, 2016).

Several explanations have been posited regarding the causes of overqualification. Firstly, there is much evidence to support the idea that declines in economic activity (i.e., recessions) increase the prevalence of overqualified workers. For example, Khattab and Fox (2016) examined pre- and post-recession changes in employment status and found that the odds of being overqualified was greater post-recession. Specifically, the odds of overqualification were 1.21 times higher post-recession for the general British population (Khattab & Fox, 2016). Interestingly, the odds of post-recession overqualification were moderated by immigration status. Eastern European immigrants had significantly greater odds (OR = 2.17) of being overqualified compared to their non-immigrant, British counterparts.

(Khattab & Fox, 2016). Other studies have revealed that the prevalence of overqualification is higher among individuals who completed their university education during a recession (Liu et al., 2016; Summerfield & Theodossiou, 2017; Verhaest & van der Velden, 2013).

Other scholars assert that discrepancies between the supply and demand of educated persons lead to increases in overqualification (Livingstone, 2019; Vaisey, 2006). The rate of post-secondary educational attainment has steadily increased from the 1980s in both Canada and the United States (Livingstone, 2019; Vaisey, 2006). Some estimates suggest that approximately 25% of Canadian labour force participants were post-secondary degree holders in 1982; by 2016, the same figure had jumped to 68% (Livingstone, 2019). Hou and colleagues reported similar findings: between 2001 and 2016, a 66% increase was observed in the number of university degree holders in Canada (Hou et al., 2020). The concomitant rise in the proportion of overqualified workers during the same time period (Livingstone, 2019) suggests that Canada may have an oversupply of highly educated persons relative to demand (Hou et al., 2020). Lastly, at the individual level, overqualification can be the result of personal choice (Maltarich et al., 2011). Fifteen reasons have been identified regarding the decision to seek voluntary overqualification (Newland, 2017). Some of these motives include pursuing a better work-life balance, less occupational stress, changing fields of work, and raising children or spending time with family (Newland, 2017).

Overqualification Among Immigrants

Notably, being an immigrant appears to significantly increase the risk of overqualification (Statistics Canada, 2014). The prevalence of overqualification has been found to be greater among immigrant populations in Canada (Smith & Frank, 2005), as well as a

plethora of other countries, including Australia (C. Green et al., 2007), Britain (Battu & Sloane, 2002), Denmark (Nielsen, 2007), Sweden (Dunlavy et al., 2016), Spain (Sanromá et al., 2015), and the United States (Beckhusen et al., 2013). In the Canadian context, some evidence suggests that the overqualification rate among immigrants began to rise during the 1990s. To illustrate, Frenette and Morissette investigated the earnings disparity between recent immigrants and Canadian-born citizens between 1980 and 2000 (Frenette & Morissette, 2005). Given the influx of university educated immigrants in the 1990s, one might expect the earnings disparity between the two groups to have shrunk (Frenette & Morissette, 2005). In reality, the earnings gap between recent immigrants and non-immigrants increased two-fold for men during this time frame; for women, the earnings gap similarly rose, but to a lesser extent (Frenette & Morissette, 2005; Hou & Picot, 2016). Accordingly, the researchers concluded that the value of holding a university degree changed in the 1990s for recent immigrants, as having a university education did not confer any advantage in procuring high-paying jobs. Comparable results were reported by Picot and Sweetman who noted that recent immigrants with post-secondary education were “unable to convert their education and experiences into earnings” (Picot & Sweetman, 2004, p. 11).

More recent data suggests that the overqualification rate appears to be increasing for recent immigrant workers, while the same rate is decreasing among non-immigrants (Hou et al., 2020). The relative increase in overqualification among immigrants can be partly explained due to the many barriers they face when searching for employment (Hou et al., 2020). Some of these barriers include lack of English/French fluency and Canadian work experience, as well as overlooked foreign credentials (Creese & Wiebe, 2012; Man, 2004; Premji et al., 2014). Some

studies further show that discriminatory hiring practices prevent certain immigrant groups from finding adequate employment. For instance, one study showed that having an Indian, Pakistani, Chinese, or Greek name decreases one's chances of hearing back from a potential employer compared to individuals with English names (Oreopoulos, 2011). In a similar vein, Creese and Wiebe showed that employers may discriminate against hiring African immigrants based on their accent (Creese & Wiebe, 2012).

As a consequence of such barriers, many recent immigrants are forced into finding "survival jobs" to meet basic needs (Creese & Wiebe, 2012). Moreover, due to the gendered nature of the labour market, some barriers to employment may be more salient among immigrant women compared to their male counterparts (Creese & Wiebe, 2012). For example, Creese and Wiebe (2012) argue that many jobs involving manual labour, which predominantly employ men, do not require Canadian job experience. In contrast, jobs that are more likely to employ women, such as the service industry and administrative occupations require Canadian experience and a high degree of English/French language competency, which new immigrants are unlikely to have (Creese & Wiebe, 2012). Although both men and women struggle to find occupations that align with their educational qualifications, immigrant women could be more disadvantaged in securing education-matched employment (Creese & Wiebe, 2012).

As alluded to above, the underutilization of human capital has financial consequences for both individual immigrants and the microeconomic environments which surround them (McGuinness, 2006). At the individual level, overqualification is associated with wages incommensurate with one's level of education (F. Green & Henseke, 2016; Reitz, 2001). One study estimated that the underutilization of skills was associated with \$2.4 billion (CAD) in

reduced earnings among immigrants in 1996 (Reitz, 2001). Furthermore, many immigrants earn less income than the national average for the first 10 years after arrival (Beiser, 2005). Although most immigrants integrate successfully into Canadian society, a sizeable minority of immigrants endure long periods of poverty (Beiser, 2005).

At the microeconomic level, prior research shows that overqualification is associated with decreased job satisfaction (Farooq et al., 2008; Maynard et al., 2006), higher turnover intentions (Maynard et al., 2006), and counterproductive work behaviours (Khan et al., 2022), which lower the productivity of businesses and firms (McGuinness, 2006). In addition, the underutilization of skills may lead to personnel shortages in key social infrastructures pivotal for sustaining social harmony. As the COVID pandemic reached full force, Canada struggled to keep pace with the increasing demands of the health care system due to staffing shortages (Hou & Schimmele, 2020). Yet, recent data show that immigrants are overrepresented among those with an underutilized health education (Hou & Schimmele, 2020).

Overqualification, Psychological Health, & Life Satisfaction

Before the 21st century, research on occupation and health often conceptualized employment status as a binary construct, that is, employed or unemployed (Dooley, 2003; Dooley et al., 2000). Consequently, the relationship between overqualification and well-being was largely overlooked until fairly recently (Dooley, 2003). As academic investigators began to consider more nuanced forms of employment, such as overqualification, involuntary part-time, and low-wage employment, the relationship between *underemployment* and psychological well-being started to become more apparent (Dooley et al., 2000).

Psychological Health

Although psychological health consists of various components, one of the more fundamental aspects of mental well-being is the ability to “work productively and fruitfully” (World Health Organization, 2004, p. 10). Not surprisingly, inadequate working conditions such as being overqualified for one’s job, is linked to poor mental health. Qualitative and cross-sectional studies conducted by various researchers have found that being overqualified is associated with lower self-reported mental health (Dean & Wilson, 2009; Mawani, 2018), higher levels of depression (Bracke et al., 2013; Wassermann & Annekatrin, 2019), low life satisfaction (Wassermann & Annekatrin, 2019), and emotional exhaustion (Gong et al., 2021). Although wanting, longitudinal studies on this subject have also reported similar results (Chen et al., 2010; Reid, 2012).

Past studies on the impact of overqualification and mental health have relied on a varied number of operationalisations to measure mental health. For instance, Chen and colleagues (2010) used a one-item, binary response measure to assess psychological well-being. On the other hand, Mawani (2018) utilized the Self-Rated Mental Health (SRMH) scale, which is a one-item, 5-point, ordinal response measure that asks subjects to rate their mental health. Other quantitative measures that have been used include the Center for Epidemiologic Studies Depression (CES-D 8) scale (Bracke et al., 2013) and the General Health Questionnaire (GHQ-12) (Reid, 2012). Regardless of how mental health has been operationalized, evidence has been found to dovetail: overqualification is associated with poor mental health outcomes (e.g., Bracke et al., 2013; Chen et al., 2010; Dean & Wilson, 2009; Reid, 2012). Such an agreement between findings suggest that the association between overqualification and poor

psychological health is a fairly robust phenomenon from a multiverse perspective (Steege et al., 2016).

Another significant aspect regarding the relationship between overqualification and mental health is related to immigration status. Although overqualification is associated with poor mental health for both immigrants and non-immigrants in most studies, some findings suggest that the mental health consequences of overqualification may be more severe for immigrants (Mawani, 2018). Mawani reported that the odds of having poor mental health were similar between overqualified non-immigrants and qualified non-immigrants within a Canadian sample. However, the odds of poor mental health were 1.63 times higher for overqualified immigrants compared to qualified immigrants (Mawani, 2018). As such, the phenomenon of overqualification may be experienced differently between immigrants and non-immigrant individuals (Mawani, 2018).

To understand how overqualification might affect immigrants differently from the Canadian-born, the process of immigration must be considered (Mawani, 2018). According to Mawani, the immigration process, particularly for skilled workers, instills unrealistic expectations regarding one's employment prospects after being admitted into Canada (Mawani, 2018). For example, under the Federal Skilled Workers Program (FSWP), potential migrants are screened for various factors considered important for successfully integrating into the Canadian labour force. Since 2013, the FSWP requires potential immigrants to complete an Educational Credential Assessment (ECA), which examines if one's "foreign degree, diploma, or certificate is valid and equal to a Canadian one" (Immigration, Refugees, and Citizenship Canada, 2013 para 1). Applicants are further assessed for their English/French language

competency, as well as prior work experience. Understandably, after being thoroughly vetted for their qualifications, immigrants will expect to find suitable employment corresponding to their level of education and skills (Mawani, 2018).

Such expectations often go unmet due to a disconnect between immigration policy and occupational regulations. For instance, many immigrants face issues with credential recognition, despite completing ECA during the immigration process (Alboim & McIsaac, 2007). Such a situation occurs because the credential assessments required by immigration programs do not guarantee if one's qualifications will be recognized by the college or regulatory agency, which governs a particular occupation (Alboim & McIsaac, 2007). Granted, immigrants from the United States and Europe have benefited from the introduction of ECA in 2013. Post-ECA immigrants from the U.S. and Europe have greater success finding employment and earn more income compared with pre-ECA immigrants from the same region (Banerjee et al., 2021). However, the association between ECA and successful employment outcomes is much weaker for immigrants from Asia and Africa (Banerjee et al., 2021). For visible minority immigrants, foreign credentials continues to be overlooked.

In addition, barriers to employment, such as the lack of Canadian experience (Creese & Wiebe, 2012), English/French language competency (Man, 2004), and discriminatory hiring practices (Oreopoulos, 2011), add further difficulty for immigrants trying to secure education-matched employment. In short, the process of becoming overqualified is different for immigrants versus non-immigrant citizens (Mawani, 2018). Immigrants encounter stress-inducing obstacles not shared by much of the Canadian-born (i.e., immigration process, credential non-recognition, language barriers, and discrimination) when trying to secure

employment in Canada. As such, Mawani (2018) proposes that the experience of overqualification might have different mental health impacts for immigrants versus non-immigrants.

Life satisfaction

Life satisfaction is defined as one's cognitive and affective judgments regarding their current state of life, and it is considered to be an integral component of well-being (Oishi et al., 2018). The cognitive dimension refers to one's appraisal of their present life evaluated against personal standards of achievement, and the affective component concerns one's emotional happiness (Hall, 2014; Oishi et al., 2018). Stated more simply, life satisfaction can be described as a "have-want discrepancy" (Wu, 2009, p. 37). Dissonance between one's desires and achievements leads to lower life satisfaction; conversely, harmony between one's ambitions and achievements results in higher life satisfaction (Wu, 2009).

The standard by which a person judges their contentment with life differs between people (Oishi et al., 2018). After all, people have different ambitions in life. Some may have a great desire for occupational prestige, such as working at a prestigious law firm or hospital. Others may place greater emphasis on developing and maintaining interpersonal relationships or raising a family. The idiosyncratic benchmarks by which a person appraises their life satisfaction are likely innumerable. Nonetheless, an individual's global perception of life satisfaction provides important information about one's well-being (Oishi et al., 2018). For instance, dissatisfaction with life is correlated with depressive symptoms (Koivumaa-Honkanen et al., 2004), heightened anxiety (Fergusson et al., 2015), and suicidal ideation (Fergusson et al., 2015). Lower levels of life satisfaction also predict cancer, stroke, and type 2 diabetes incidence

particularly among women (Feller et al., 2013). In essence, global life satisfaction appears to be an important marker of well-being that is linked to both mental and physical health outcomes.

With respect to the present work, past research shows that life satisfaction is lower among overqualified workers compared to their education-job matched counterparts (Frank & Hou, 2018; Piper, 2015; Wassermann & Annekatrin, 2019). To my knowledge, only one study has assessed if the impact of overqualification on life satisfaction differs between immigrants and non-immigrants in the Canadian population. The cross-sectional work carried out by Frank & Hou (2018) illustrated that overqualified immigrant and non-immigrant workers report lower levels of life satisfaction compared to qualified workers. Interestingly, however, the negative influence of overqualification on life satisfaction was more severe for non-immigrants than immigrants (Frank & Hou, 2018). Moreover, among overqualified immigrants, life satisfaction was greater for established immigrants compared to recent immigrants, which indicates that satisfaction with life might have improved over time (Frank & Hou, 2018). Such findings are odd given that overqualification is associated with declining mental health trajectories in immigrants (Chen et al., 2010). As life satisfaction is highly correlated with psychological well-being (Fergusson et al., 2015; Layard et al., 2013), one would expect similar conclusions to be drawn regarding the impact of overqualification on life satisfaction and mental health. Further research is needed to gain more insight regarding this apparent contradiction.

THEORETICAL FRAMEWORKS

Various psychosocial frameworks have been proposed, which describes the potential mechanisms through which overqualification impacts one's health. Such ideas include, effort-reward imbalance (social exchange), goal-striving stress, relative deprivation, and person-environment fit.

Effort-Reward Imbalance Model (Social Exchange)

The social exchange framework describes how societies provide various opportunities that involve the exchange of effort with certain rewards (Siegrist, 2000). For example, diligent effort in the workplace is rewarded with raises and promotions; laborious efforts at school leads to high-paying, high status occupations (e.g., physicians and lawyers). However, rewards are not always proportional to the expended effort and many individuals have limited agency over what opportunities are accessible (Siegrist, 2000). What often results is a discrepancy between one's effort and reward, or simply, effort-reward imbalance (ERI) (Siegrist, 2000). When reward is not proportional to effort, self-regulatory needs in the form of "self-esteem, self-efficacy, and self-integration" (Siegrist, 2000, p. 1286) are threatened. Prolonged exposure to ERI in environments such as one's workplace is speculated to produce psychosocial distress detrimental to one's mental and physical state (Harari et al., 2017; Siegrist, 2000).

Originally, ERI was postulated as a mechanism for explaining the link between cardiovascular disease and lack of socio-economic control (Siegrist et al., 1986). To study the effects of ERI, the ERI questionnaire was developed, which assesses the ratio of effort to reward in relation to one's workplace (Siegrist et al., 2014). Specifically, one's perception of effort expenditure at work is compared with rewards that have been received or are expected (e.g.,

raises & promotions). When one's efforts at work do not result in a proportional reward in status, upward mobility, or job security, one's health may be put at risk (Siegrist, 2000; Siegrist et al., 2014). Using the aforementioned ERI – scale (as well as others), many studies have demonstrated an association between ERI and cardiovascular morbidity/mortality (e.g., Bosma et al., 1998; Kivimäki et al., 2002; Kuper et al., 2002). Beyond cardiovascular outcomes, some evidence suggest that workplace ERI is associated with poor mental health outcomes, such as depression (see review van Vegchel et al., 2005) and predicts weight gain (Kivimäki et al., 2002).

This concept of effort-reward imbalance has been applied to explain the association between overqualification, well-being and job satisfaction (Gong et al., 2021; Harari et al., 2017). In particular, one's educational attainment is viewed as one's effort, and one's occupational level is thought of as one's reward (Gong et al., 2021). Stated simply, overqualification can be conceptualized as the perpetual state which provides little reward for previous effort expended in education or training (Gong et al., 2021; Harari et al., 2017). When an individual is overqualified for their work, an effort-reward imbalance is realized, which is thought to produce psychosocial distress that is harmful to one's health (Harari et al., 2017).

Goal-Striving Stress

Similar to ERI, the Goal Striving-Stress framework suggests that poor health results from an imbalance created from an education-occupation mismatch. Instead of conceptualizing this imbalance as an effort-reward discrepancy, goal-striving stress theory postulates that the imbalance is between aspiration and achievement (Parker et al., 1960; Smith & Frank, 2005). Aspiration refers to some future goal one hopes to attain, and achievement is defined as the level of success relative to those ambitions (Smith & Frank, 2005).

Specific to overqualification, one's educational investment (i.e., years of schooling/level of educational obtainment) is thought to reflect one's *aspiration*; occupational status is regarded as the *achievement*, which symbolizes the fruits of one's educational labour (Parker et al., 1960; Smith & Frank, 2005). The discrepancy between aspiration and achievement is theorized to produce psychosocial distress inimical to well-being (Parker et al., 1960; Smith & Frank, 2005). To my knowledge, the relationship between goal-striving stress, overqualification, and health outcomes have never been directly studied. As such, the mediatory role of goal-striving stress between overqualification and health is speculation. More generally, however, past research has found an association between goal-striving stress and poor health outcomes, such as coronary heart disease (Glover et al., 2020) and kidney disease (Cain et al., 2019).

Relative Deprivation

The previous two frameworks are based on the ability/inability to maintain a balance between two psychological elements (i.e., effort/reward, and aspiration/achievement) existing within oneself. Other theories, such as relative deprivation, are broader in scope and suggests that a harmful psychological imbalance can exist *between people* as well as *within people*. First, relative deprivation *between people* refers to the negative affect experienced by individuals when making social comparisons pertaining to a certain quality of being (Burns, 1966; Dunlavy et al., 2016). The initial conception of this theory involved the observation that individuals felt more dissatisfied when someone from their peer group/unit obtained promotions (Burns, 1966). On the other hand, individuals were less likely to feel dissatisfied when the stature of individuals within one's group were more likely to stay the same (Burns, 1966; Webber, 2007).

In generalized terms, an individual may feel deprived if similar others are more successful than themselves (Dunlavy et al., 2016).

Past research on relative deprivation between people have relied on both general and domain-specific instrument tools. General measures of relative deprivation assess global feelings (e.g., “When I think about what I have compared to others, I feel deprived”), whereas domain-specific measures are adapted to a certain context or domain, such as income (Mishra & Carleton, 2015, p. 146). Global feelings of relative deprivation have been associated with negative health outcomes in past research. Mishra & Carleton (2015) reported that general perceptions of relative deprivation were correlated with poor self-report ratings of physical and mental health (Mishra & Carleton, 2015). Some researchers also speculate that the association between relative deprivation and poor health may be stronger within immigrant groups, as such groups may attribute the cause of comparative privation to host country discrimination (Grant, 2008).

Pertaining to domain-specific assessments, some research has been conducted on overqualification. Researchers have speculated that feelings of relative deprivation may emerge if overqualified workers compare themselves to their more successful counterparts (i.e., qualified workers) with similar educational backgrounds (Dunlavy et al., 2016; Erdogan et al., 2018). Erdogan and colleagues (2018) asked overqualified workers to compare their employment conditions with qualified individuals holding similar credentials and/or education. Their findings showed that job-specific feelings of relative deprivation mediates the relationship between overqualification and poor well-being (Erdogan et al., 2018).

The second form of relative deprivation (i.e., *within people*) refers to the negative affect arising from the comparison of past and present self-states (Feldman et al., 2002). If one's past state was superior to one's current state, one may feel deprived with respect to their temporal circumstances (Feldman et al., 2002). With respect to overqualification, within-person relative deprivation may occur when one's current job is inferior to one's past employment conditions (Feldman et al., 2002). Although the research on this matter is limited, within-person feelings of relative deprivation may mediate the association between overqualification and poor mental health (Feldman et al., 2002).

Person-environment fit

Another framework that may explain the relationship between negative health outcomes and overqualification is the theory of person-environment fit (PE), which has its origins in the organizational/management literature (Kristof-Brown et al., 2005). PE theory suggests that the individual characteristics of workers need to be in harmony with the job environment for optimal performance and well-being (Caplan, 1987; Kristof-Brown et al., 2005). Caplan (1987) explains that there are two kinds of PE fit in the workplace. The first is referred to as the "demands-abilities fit", which expresses the match between an individual's capacity to meet the demands of one's workplace (Caplan, 1987). In essence, the demands-abilities fit is concerned with how an individual supplies what is needed for an occupation. In contrast, "needs-supplies fit", refers to how the workplace fulfills various individual needs, such as social-emotional support (Caplan, 1987). In either type of PE fit, a "misfit" situation is surmised to produce psychosocial strains harmful to health (Caplan, 1987).

Past research on overqualification describes overqualification as an instance of demands-abilities misfit, as one's educational status or qualifications are usually greater than workplace tasks (Wassermann & Annekatrin, 2019). Overqualification can also be classified as a needs-supplies misfit, as one's occupation does not provide conditions for utilizing one's full skillset and knowledge (Wassermann & Annekatrin, 2019). Stated succinctly, the theory of PE fit proposes that the inability to fully use one's qualifications, skills, and talents may lead to poor well-being (Wassermann & Annekatrin, 2019). Past findings show that many workers experiencing overqualification fail to find meaning in their work when their skills and education are irrelevant (Dean & Wilson, 2009), which results in counterproductive workplace behaviours (Luksyte et al., 2011). Moreover, the underutilization of skills has been linked to poor psychological health (Reid, 2012) and skills deterioration over time (Creese & Wiebe, 2012; Desjardins & Rubenson, 2011; Man, 2004). The prospect of losing one's skills may act as a harmful stressor, especially among highly skilled immigrants (Man, 2004).

Summary of Theories

A core theme ties together all of the aforementioned frameworks, that is, the idea of "mismatch" or incongruency. Mismatching perceptions, environments, goals, rewards, and status are thought to be the drivers behind the association between overqualification and health outcomes. Past researchers have attributed the association between overqualification and poor health to all of the aforementioned theories, including effort reward imbalance (Gong et al., 2021; Harari et al., 2017), goal-striving stress (Smith & Frank, 2005), relative deprivation (Dunlavy et al., 2016; Erdogan et al., 2018; Feldman et al., 2002), and person-environment fit (Wassermann & Annekatrin, 2019). However, most research does not disentangle the extent to

which each theory plays an explanatory role in mediating the association between overqualification and health.

More research is required to delineate what “type” of mismatch may be more salient for certain groups. Furthermore, conceptual redundancies may exist among some of the theories. For example, the Goal-Striving Stress framework and the theory of ERI have similarities. Goal-Striving Stress theory describes the mismatch in terms of an aspiration-achievement discrepancy, whereas ERI describes the mismatch in terms of an effort-reward imbalance. It is unclear what distinguishes “aspiration” from “effort” or what distinguishes “achievement” from “reward.” The difference between conceptual terms appear to be subtle and could lead to confusion. Moreover, the subjective feeling of “relative deprivation” may be conceptually similar to the feelings which emerge when an effort/reward imbalance cannot be maintained. Although outside the scope of the current investigation, future research should closely examine the available theories and root out any conceptual tautologies to promote clarity.

STUDY AIMS AND RATIONALE

In short, past findings indicate that overqualification has a negative impact on well-being. Particularly, overqualification is associated with poor mental health and lower life satisfaction (Chen et al., 2010; Frank & Hou, 2018), and the negative health effects of overqualification could be more severe for immigrants than non-immigrant (Dunlavy et al., 2016; Mawani, 2018).

Much of the past research examining the health impact of overqualification among immigrants has relied on cross-sectional or qualitative data (Frank & Hou, 2018). Although such research has provided valuable insights, more research is required to investigate the relationship between overqualification and health over time. To my knowledge, no longitudinal study has examined the relationship between overqualification and well-being while treating immigration status as a moderator. Furthermore, in the extant research, there exists a tendency to combine refugees, economic, and family-related immigrants into one category (e.g., Frank & Hou, 2018; Mawani, 2018; Smith & Frank, 2005) due to limited sample size and lack of available data (Mawani, 2018). To fill such gaps in the literature, this study sought to examine whether the health consequences of overqualification differ between immigrants and non-immigrants over a 4-year period. The present investigation also assessed if the impact of overqualification on well-being differs between the following groups: 1) individuals from different immigration categories, and 2) recent vs. established immigrants. The specific hypotheses are as follows.

Hypothesis 1: Overqualification is associated with declining mental health trajectories for both immigrants and non-immigrants.

Hypothesis 2: Overqualification is associated with declining life satisfaction trajectories for both immigrants and non-immigrants.

Hypothesis 3: Overqualification and well-being outcomes are moderated by immigration status (i.e., immigrant vs. non-immigrant) – the health impact of overqualification will be greater for immigrants compared to non-immigrants.

Hypothesis 4: The impact of overqualification on well-being will be more pronounced for recent versus established Immigrants.

Hypothesis 5: The impact of overqualification on well-being will be more pronounced for skilled immigrants compared to other migrants admitted through different immigration programs (e.g., refugees, family reunification, etc.).

METHODS

Data Source

This study used a prospective, nationally representative survey known as the Longitudinal and International Study of Adults (LISA). The LISA is a Canadian survey that collects information on labour force participation, health, education, and immigration (Statistics Canada, 2020). Data collection for this survey commenced in 2012 and is administered bi-annually by Statistics Canada. Data collection is still ongoing, and four waves were available for analysis (i.e., 2012, 2014, 2016, and 2018). For this study, only the 2014, 2016, and 2018 waves were used, as the first wave did not collect information on mental health or life satisfaction.

The LISA sampling method follows “a stratified multi-stage, multi-phase design” (Statistics Canada, 2020). Explained briefly, the sampling design was area-based and stratified by province and urban/rural status. For the urban strata, systematic sampling methods were utilized to select households for study participation. For the non-urban strata, geographic clusters were first created before applying systematic sampling procedures for the selection of participating households. Every member of selected households over the age of 15 were asked to participate in the LISA (Statistics Canada, 2020). The main method of data collection for the LISA was through Computer Assisted Personal Interviews or CAPI (Statistics Canada, 2020). In some cases, data were collected via telephone interviews when respondents were located in physically unreachable locations.

The exclusion criteria for the LISA were as follows: diplomats or ambassadors of foreign countries living in Canada, households consisting solely of foreign residents (i.e., individuals without permanent residency or Canadian citizenship status), persons living in the territories,

people living on Indigenous reserves (First Nations) or full-time institutions (e.g., prisons, retirement homes), Canadian citizens living abroad, and Canadian Armed Forces members stationed in foreign countries (Statistics Canada, 2020). Additionally, individuals who completed the National Household Survey were excluded to reduce respondent burden, as the two surveys were running simultaneously in 2012 (for more information on sampling design, see Statistics Canada, 2020).

Before applying study specific exclusion criteria, the sample consisted of approximately 34 000 Canadians with a response rate of 89% in 2012. Roughly 11 000 Canadians were left remaining in the 2018 wave. For missing income data, the Canadian Census Edit and Imputation System (CANCEIS) software was used to impute missing values (Statistics Canada, 2020). The CANCEIS software conducts nearest-neighbour imputation to estimate missing data points (Statistics Canada, 2020). Other variables with missing values were left vacant. Lastly, the dataset includes survey weights, which uses the 2012 Census as the benchmark. For the present investigation, only participants with a university-level education or higher were included in the analyses. College graduates can also be overqualified for their jobs. However, as a large proportion of immigrants are university educated (Statistics Canada, 2022b), this study focuses exclusively on university degree holders. In addition, unemployed individuals were removed from analyses as overqualification status cannot be assigned to unemployed individuals. Moreover, ample research has already been conducted on the relationship between unemployment and health (e.g., Herbig et al., 2013; Kim & von dem Knesebeck, 2015; Virgolino et al., 2022). Finally, participants were removed if they had missing information on key predictor or outcome variables.

Dependent Variables

Psychological Well-being

The Kessler 10 Psychological Distress Scale (K10) was used to measure mental health status in the LISA. Specifically, the K10 is a measure of “non-specific psychological distress” (Kessler et al., 2002, p. 961), which consists of 10 questions pertaining to symptoms common among an array of mental health disorders, such as nervousness, restlessness, worthlessness, and hopelessness (Kessler et al., 2002). The 10 items are assessed on a 5-point scale (i.e., 1 = none of the time; 5 = all of the time), which are summed to determine overall levels of psychological distress (Andrews & Slade, 2001). The minimum score is 10 and the maximum score is 40. In general, individuals with K10 scores lower than 19 are thought to be mentally well (Andrews & Slade, 2001; Garland et al., 2023). Higher K10 scores are associated with clinical diagnoses of anxiety and mood disorders as defined by the Diagnostic and Statistical Manual of Mental Disorders – IV (DSM – IV) (Andrews & Slade, 2001; Furukawa et al., 2003). Respondents with 3 or more missing items on the K10 scale were removed from analyses. Respondents with ≤ 2 missing scores were kept for analyses and person-means imputation was performed to estimate missing values. A person-means imputation is performed by taking the average of the items for which a score was provided by the participant. The average score is then assigned for the missing items.

Life Satisfaction

Life satisfaction was assessed on a single-item, face valid measure, which asked participants to indicate their level of life satisfaction on an 11-point scale (0 = very dissatisfied, 10 = very satisfied). Single-item measures of life satisfaction have been found to have

comparable psychometric properties to multi-item instruments. For instance, Cheung and Lucas (2014) compared the one-item life satisfaction measure with the multi-item *Satisfaction with Life Scale* (SWLS) to evaluate construct and criterion validity. The authors concluded that both measures would produce a “virtually identical answer to substantial questions” (F. Cheung & Lucas, 2014, p. 2809). Other researchers have similarly concluded that the single-item life satisfaction measure has adequate test-retest reliability (Jovanović & Lazić, 2020). Additionally, single-item measures have the benefit of reducing respondent burden when the item is incorporated into a much larger survey as is the case for the LISA (Streiner et al., 2015).

Independent Variables

Overqualification

In prior research, overqualification has been operationalized through several different approaches. The first conceptualizes overqualification as a subjective phenomenon and utilizes an array of self-assessment tools to assess whether individuals feel overqualified for their jobs (Hartog, 2000). For example, the Scale of Perceived Overqualification (SPOQ), asks individuals to answer a series of questions (e.g., “I have more abilities than I need in order to do my job”, and “I have job skills that are not required for this job”) to quantify feelings of overqualification (Maynard et al., 2006, p. 536). Single question approaches are also used where respondents are asked to rate their perception of being overqualified as a single metric. Aside from self-assessment techniques, content analyses of open-ended interview responses have also been used to identify perceptions of overqualification (Dean & Wilson, 2009).

Although subjective measures of overqualification are commonly used and easy to implement, there are notable drawbacks to this approach. Namely, response bias is a concern

as respondents may systematically over or underestimate the level of education required for their occupation (Hartog, 2000; Maltarich et al., 2011). Furthermore, measures of perceived overqualification might be influenced by personality factors. For example, one study reported that higher scores on the exploitiveness-entitlement subscale of the Narcissistic Personality Inventory (NPI) is associated with illusory perceptions of overqualification (Maynard et al., 2015).

The second approach operationalizes overqualification as an objective metric, which reduces response bias. To measure objective overqualification, individual education and employment information are compared with occupational classification systems (Hartog, 2000). Occupational classification systems are taxonomies created by “professional job analysts, [which contain] the required level and type of education” for thousands of occupations (Hartog, 2000, p. 132). For example, Canada’s occupational classification system is called the National Occupational Classification (NOC), which was developed by the department of Employment and Social Development Canada (ESDC) and Statistics Canada (Statistics Canada, 2023b). The NOC system collapses approximately 30 000 job titles in to 500 unique occupational groupings (Employment and Social Development Canada, 2021). Each group is assigned 1 of 4 “skill levels”, which identifies the qualifications necessary for a particular occupation: A) bachelor’s degree or higher; B) a college education or technical/vocational training; C) a high school education; and D) no formal education (Employment and Social Development Canada, 2021). By comparing individual education and occupational classification systems such as the NOC, one can determine if one is overqualified based on education-occupation mismatch (Hartog, 2000).

The third approach is referred to as the realized matching method, which involves calculating the average educational attainment of individuals working in a particular occupation (Banerjee et al., 2019; Hartog, 2000). Any individuals with above average qualifications are considered to be overqualified (Hartog, 2000). Some researchers argue that the realized matching approach may simply reflect hiring practices determined by labour market conditions as opposed to true instances of overqualification (Banerjee et al., 2019; Hartog, 2000). As such, the realized matching method has fallen out of favour, and is considered inferior to the subjective and objective measurement approaches described above (Banerjee et al., 2019; Hartog, 2000).

For this study, the objective approach to measuring overqualification was used. Frank and Hou's (2018) operational definition of overqualification was borrowed: 1) overqualification, 2) marginal overqualification, 3) qualified. Overqualification refers to university or professional degree holders that are employed in occupations that only require secondary education; marginal overqualification refers to university or professional degree holders employed in occupations that "require some post-secondary education, but not a university degree" (Frank & Hou, 2018, p. 891). For a full breakdown of the procedure for assigning overqualification status, please see Appendix C.

Immigration Recency

Different definitions have been used in past research to classify individuals as a recent or established immigrant. Statistics Canada operationalizes recent immigrants as individuals having resided in Canada for no greater than five years after acquiring their permanent residency status (Statistics Canada, 2017). Other researchers have considered recent

immigrants to be individuals who have lived in Canada for less than ten years (Hou et al., 2020). For this study, recent immigrants were operationalized as individuals holding permanent residency status and having resided in Canada for less than 10 years.

Immigration Category and Immigration Status

The LISA categorizes immigrants by the program by which they were admitted into Canada. The immigration program categories include the following: the points system or economic immigrants, refugees, family-related immigrants, immigrants that arrived in childhood, and other. The “other” category was omitted from analyses due to interpretative difficulty and small cell count. For the majority of the analysis, immigration status will be treated as a dichotomous variable (i.e., 1 = immigrant, 0 = non-immigrant). For two analyses, immigration status was further categorized, as specified above.

Control Variables

Age, biological sex, marital status, visible minority status, socio-economic status, region of origin, and the presence of dependents less than five years old were included as control variables. All covariates were selected based on previous research on overqualification and immigrant health. Age was operationalized as a variable containing 5 categories: 1) 18 to 27, 2) 28 to 37 3) 38 to 47, 4) 48 to 57, and 5) 58 to 67. The oldest group was used as the reference category in accordance with previous research (e.g., Frank & Hou, 2018). Marital status contained 4 categories: 1) married; 2) divorced, separated, widowed; 3) common Law; 4) single. The married group acted as the reference group. Visible minority status consisted of three groups (i.e., 0 = non-minority, 1 = visible minority, and 2 = Indigenous), and socio-economic status was based on income and contained 5 groups (i.e., 1 = less than \$29, 999 (low), 2 =

\$30,000 – \$49,999 (low-mid), 3 = \$50,000 – \$69,999 (mid), 4 = greater than \$100,000 (high), 0 = \$70,000 – \$99,999 (upper-middle)). The socio-economic status variable uses the same categorization as Frank and Hou (2017). Region of origin included, Asia, Africa, Europe, Latin America & the Caribbeans, with North America as the reference group. Oceania was removed from the variable due to insufficient cell count. Lastly, biological sex (i.e., 0 = female, 1 = male) and the presence of dependents (i.e., 0 = no children or children are equal to or greater than 5 years of age, 1 = presence of children less than 5 years of age) were both binary variables.

ANALYTICAL PROCEDURE

To analyze the longitudinal data, multi-level or mixed-effects modelling techniques were used. Such approaches have several benefits over traditional approaches to analyzing longitudinal data. For instance, multi-level modeling techniques do not require assumptions of compound symmetry, that is, equal variances and covariances (Hedeker & Gibbons, 2006). Furthermore, maximum likelihood estimation procedures used in mixed-effects modelling can mitigate some issues of data missing at random (Hedeker & Gibbons, 2006). On the other hand, other approaches such as repeated measures ANOVA, require complete case analysis, which results in the loss of statistical power if attrition is too large (Hedeker & Gibbons, 2006). The terminology, methodology, and equation notation for multi-level modelling closely follow the conventions set by Singer and Willet (2003).

According to Statistics Canada guidelines, all analyses were performed using sampling weights to make the data representative of the population. The majority of the descriptive statistics have been reported in their weighted form to protect the anonymity of the participants. Furthermore, any raw descriptive statistics have been rounded to the nearest 5. To check for model assumptions of residual normality and homoscedasticity of variance, quantile-quantile plots and residual plots were visually examined, respectively. All data cleaning procedures were completed in R 4.3 (R Core Team, 2021) and all models were fit using STATA's *mixed* command (StataCorp, 2021). For all models, maximum likelihood estimation was used to compute parameter estimates.

Model A: Overqualification, Immigration Status & Mental Health

Empirical growth plots were fitted for a random subset of LISA respondents to assess functional form and variability in the intercept and slope over time. Secondly, the unconditional means model was fit to the data. Its purpose was to estimate the between-person and within-person variance components in the absence of predictor variables.

Equation 1:

$$Y_{ij} = \pi_{0i} + \varepsilon_{ij} \text{ (Level 1)}$$

$$\pi_{0i} = \gamma_{00} + \zeta_{0i} \text{ (Level 2)}$$

Y_{ij} is the outcome variable, K10, for participant i at time j . π_{0i} is the mean for participant i , and ε_{ij} is the within-person error for participant i at time j . ε_{ij} is assumed to be normally distributed with a mean of zero and constant variance, $\varepsilon_{ij} \sim N(0, \sigma_{\varepsilon}^2)$. γ_{00} is the grand mean, and ζ_{0i} is the between-person error for participant i . The between-person error is also assumed to be normally distributed with a mean of zero and constant variance, $\zeta_{0i} \sim N(0, \sigma_0^2)$. The variance components for the error terms, σ_{ε}^2 and σ_0^2 , was used to compute the intraclass correlation coefficient (ICC), which describes how much of the outcome variation is ascribable to between-person differences. Furthermore, the variance components were tested to see if they were statistically different from zero. Non-zero variance provides justification for adding predictor variables into the multi-level model (Singer & Willett, 2003). After fitting the unconditional means model, the unconditional growth model was fitted to the data. This model introduces time ($time_{ij}$) as a variable into the level 1 equation.

Equation 2:

$$Y_{ij} = \pi_{0i} + \pi_{1i}time_{ij} + \varepsilon_{ij} \text{ (Level 1)}$$

$$\pi_{0i} = \gamma_{00} + \zeta_{0i} \text{ (Level 2)}$$

$$\pi_{1i} = \gamma_{10} + \zeta_{1i} \text{ (Level 2)}$$

$$\varepsilon_{ij} \sim N(0, \sigma_{\varepsilon}^2)$$

$$\begin{bmatrix} \zeta_{0i} \\ \zeta_{1i} \end{bmatrix} \sim N \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_0^2 & \sigma_{01} \\ \sigma_{01} & \sigma_1^2 \end{bmatrix} \right)$$

π_{1i} is the slope for participant i , γ_{10} is the mean slope across all participants, and ζ_{1i} is the between-person error for the slope. Similar to the unconditional means model, each sub-level has a variance component as described above. The covariance estimate (σ_{01}) expresses the association between π_{0i} and π_{1i} . An important purpose of fitting the unconditional growth model is to establish a benchmark by which successive models will be compared. Upon fitting the unconditional models, the main analyses were performed with all predictor variables.

Equation 3 is the composite formulation of the multi-level model, which contains the key predictor variables under investigation (not all covariates are shown for the sake of space).

Equation 3:

$$\begin{aligned} Y_{ij} = & \gamma_{00} + \gamma_{10}time_{ij} + \gamma_{01}OQ_i + \gamma_{02}MOQ_i + \gamma_{03}IMM_i \\ & + \gamma_{04}OQ_{ij} * IMM_i + \gamma_{05}MOQ_i * IMM_i \\ & + \gamma_{11}OQ_{ij} * time_{ij} + \gamma_{12}MOQ_{ij} * time_{ij} + \gamma_{13}IMM_i * time_{ij} \\ & + \gamma_{14}OQ_i * IMM_i * time_{ij} + \gamma_{15}MOQ_i * IMM_i * time_{ij} \\ & + \zeta_{0i} + \zeta_{1i} * time_{ij} + \varepsilon_{ij} \end{aligned}$$

OQ_i represents the binary predictor variable, overqualification (0 = qualified, 1 = overqualified) for participant i ; MOQ_i represents the binary predictor variable, marginal

overqualification (0 = qualified, 1 = marginally overqualified) for participant i ; IMM_i represents the binary predictor variable, immigration status (0 = non-immigrant, 1 = immigrant) for participant i .

Five, two-way interaction terms are present in the model: 1) immigration status*time; 2) marginal overqualification*time; 3) overqualification*time; 4) marginal overqualification*immigration status; and 5) overqualification*immigration status. The non-immigrant category acted as the reference group for the binary immigration status variable. The qualified (i.e., education-job matched) category acted as the reference group for the overqualification variable. To test if immigration status moderates the linear association between overqualification and mental health, two, three-way interaction terms were also included in the model: 1) marginal overqualification*immigration status*time; and 2) overqualification*immigration status*time.

Post-hoc or post-estimation analyses were performed to unpack the meaning of any significant interaction effects. For significant three-way interactions, the data were first stratified by the moderator. Then, the remaining two-way interactions were investigated. For significant two-way interactions, an analysis of simple slopes and simple effects were performed. Simple slopes analysis determines if the slope of the line for a continuous variable held at one level of a second categorical variable is non-zero; simple effects analysis determines if the value of a continuous variable significantly differs across levels of a second categorical variable.

In the event that three-way interactions were statistically insignificant, they were removed from the model in an attempt to improve model fit. The change in model fit will be

assessed using AIC and BIC values. AIC values will be interpreted according to a modified version of Burnham and Anderson's (2004) guideline. A change of greater than 10 is a large improvement; delta change between 4 and 7 are considered to be a slight-to-medium improvement; and delta change that is less than or equal to 2 is negligible improvement (Burnham & Anderson, 2004). Changes in BIC values will be interpreted according to Raftery's (1995) rules of thumb. A change in BIC values between 0 – 2, 2 – 6, 6 – 10, >10 are interpreted to be weak, positive, strong, and very strong, respectively (Raftery, 1995).

Model B: Overqualification, Immigration Status & Life Satisfaction

Similar to Model A, empirical growth curves were fitted for a random subset of LISA respondents. Next, the unconditional means and growth models were fit to the data. After examining the unconditional models to justify further analysis, the full model was fitted, which contained all predictor variables and covariates. The equations for Model B is identical to those illustrated for Model A – the only difference is the dependent variable. The same procedure was followed for insignificant three-way interactions, that is, they were removed from the model to improve model fit. An analysis of simple slopes and simple effects were performed for any significant two-way interactions.

Model C: Overqualification, Immigration Recency & Mental Health

To investigate if immigration recency moderates the association between overqualification and mental health, a separate model was fit to the data (Model C). The variable, immigration recency, could not be included in Models A or B due to collinearity with the immigration status variable. As well, immigration recency is a variable unapplicable to non-immigrants. Therefore, to investigate immigration recency effects, a multi-level model was fit

to a stratified version of the data containing only immigrants. Model C contains five, two-way interaction terms: 1) marginal overqualification*time; 2) overqualification*time; 3) immigration recency*time; 4) marginal overqualification*immigration recency; and 5) overqualification*immigration recency. The two, three-way interaction terms were: 1) marginal overqualification*immigration recency*time; and 2) overqualification*immigration recency*time.

Model D: Overqualification, Immigration Category & Mental Health

Model D examines the association between immigration category, overqualification and mental health. The variable, immigration category, could not be included in previous models due to collinearity with immigration status (Models A and B) and immigration recency (Model C). Model D contains eleven, two-way interaction terms: 1) marginal overqualification*time; 2) overqualification*time; 3) refugee*time; 4) family reunification*time; 5) moved in childhood*time; 6) marginal overqualification*refugee; 7) marginal overqualification*family; 8) marginal overqualification*moved in childhood; 9) overqualification*refugee; 10) overqualification*family; and 11) overqualification*moved in childhood. In addition, Model D contains six, three-way interaction terms: 1) marginal overqualification*refugee*time; 2) marginal overqualification*family*time; 3) marginal overqualification*moved in childhood*time; 4) overqualification*refugee*time; 5) overqualification*family*time; and 6) overqualification*moved in childhood*time.

Model E & Model F

Models E and F are the counterparts for Models C and D, respectively, with life satisfaction as the dependent variable.

RESULTS

The weighted sample size was $n = 3,772,080$ (unweighted $n = 1,340$). Approximately 20% of the sample were immigrants (49% female) at Wave 1. 55% of the non-immigrant sample identified as female. Among non-immigrants, 67% of the sample were qualified for their occupations, that is, their educational credentials matched occupational requirements. 24% of non-immigrants were marginally overqualified, and 9% were overqualified. In contrast, 58% of immigrants were qualified, 25% were marginally overqualified, and 17% were overqualified for their jobs.

Roughly half of the non-immigrant sample were married (51%). The rest of the non-immigrant sample reported that they were single (26%), in a common law relationship (17%), or divorced, separated, or widowed (6%). In comparison, 80% of immigrants were married, 10% were single, 7% reported that they were in a common law relationship, and only 3% reported that they were divorced, separated, or widowed. With respect to immigrants, approximately half of the sample (52%) were economic immigrants. The other 48% consisted of refugees (2%), family reunification (26%), moved in childhood (18%), and other (2%). In addition, 67% of immigrants were established immigrants who have resided in Canada for more than 10 years. For a full picture of the descriptive statistics, see Appendix A.

The sample sizes at Wave 1 and Wave 2 were $n = 1,340$ and $n = 1,412$, respectively. The sample size increased between waves for the following reasons. Firstly, 460 participants were included in Wave 2, that were not present in Wave 1. The newly included individuals were unemployed in the first wave but were employed in the second. Furthermore, some individuals supplied information for key outcome and predictor variables in Wave 2, but not in Wave 1.

Secondly, the attrition between Wave 1 and 2 was 388 participants. Some of these participants provided information in Wave 1 but were missing values in Wave 2. In addition, some individuals reported that they were employed in Wave 1 but were unemployed in Wave 2. For such individuals, Wave 1 data was used but Wave 2 data was removed from analyses as overqualification status could not be determined. A net gain of 72 (460 - 388) participants was observed between Wave 1 and Wave 2.

At Wave 3, the sample size was $n = 1,472$. The net increase in sample size occurred due to similar reasons. A total of 460 participants were added in Wave 3 that were not present in Wave 2. The additions include individuals who were unemployed in Wave 2 but were employed in Wave 3. They also include individuals who were employed in Wave 1, unemployed in Wave 2, and re-employed by Wave 3. The attrition between Wave 2 and Wave 3 was $n = 400$. As such, a net increase of 60 (460 - 400) participants was observed between Waves 2 and 3. On average, each participant contributed data at two times points.

Model A: Overqualification and Mental Health

A visual inspection of the growth plots indicated that mental health and overqualification may be linearly associated over time. The plots also showed that there is variability in both the intercept and slope for time. Thus, the intercept and slope were treated as random variables for the subsequent analyses. Note, the empirical growth plots are not shown as they contain unaggregated data.

According to the unconditional means model (Table 1.1), the K10 sample average was 15.60. Such a result suggests that a typical person in this sample has good mental health. The within-person variance was 8.68, 95% CI [7.60, 9.90], and the between-person variance was

8.28, 95% CI [7.01, 9.79]. Both variance estimates were non-zero, which gives justification for adding predictor variables in each level of the multi-level model. The ICC was 0.49, which indicates that 49% of the outcome variation is due to differences between people.

Table 1.1 Unconditional Means Model (Model A – K10)

Parameter	Estimate	SE	z	p	95% CI
Intercept	15.60	0.08	184.64	0.00	15.44, 15.77
<hr/>					
Var. Parameters	Estimate	SE	95% CI		
σ_{ϵ}^2	8.68	0.58	7.60, 9.90		
σ_0^2	8.28	0.71	7.01, 9.79		

Results from the unconditional growth model (Table 1.2) indicates that K10 scores increase over time, $b = 0.20$, $z = 2.80$, $p < 0.01$, 95% CI [0.06, 0.34]. Specifically, K10 scores increase by .20 units every two years. The within-person variance was 5.78, 95% CI [4.85, 6.89]. The between-person variance for the intercept was 9.35, 95% CI [7.41, 11.78], and the between-person variance for the rate of change was 2.96, 95% CI [2.23, 3.93]. To assess model fit, pseudo- R^2 was computed to compare the within-person variance components of the two unconditional models. Pseudo- R^2 was .33, which indicates that the unconditional growth model explained an additional 33% of the outcome variation at the within-person level. Subsequent analyses included all control variables and interactions terms to determine if mental health trajectories differ in relation to certain group characteristics.

Table 1.2 Unconditional Growth Model (Model A – K10)

Predictor	Estimate	SE	z	p	95% CI
Time	0.20	0.07	2.80	0.005	0.06, 0.34
Intercept	15.37	0.10	147.83	0.000	15.17, 15.57

Var. Parameters	Estimate	SE	95% CI
σ_{ε}^2	5.78	0.52	4.85, 6.89
σ_0^2	9.35	1.10	7.41, 11.78
σ_1^2	2.96	0.43	2.23, 3.93
σ_{01}	-1.80	0.55	-2.88, -0.72

The three-way interaction between marginal overqualification, immigration status, and time was insignificant, $b = -0.43$, $z = -0.94$, $p = 0.35$, 95% CI [-1.31, 0.46]. Similarly, the three-way interaction between overqualification, immigration status, and time was insignificant, $b = -0.30$, $z = -0.45$, $p = 0.65$, 95% CI [-1.57, 0.98]. Immigration status did not moderate the relationship between overqualification and mental health over time. Following the parsimony principle, the three-way interaction was removed from the model. Removing the three-way interaction term lowered the AIC value by 2.8 points and the BIC value by 15.5 points. The Δ AIC suggests a slight improvement in model fit, whereas the Δ BIC suggests a large improvement in fit (Burnham & Anderson, 2004; Raftery, 1995).

Table 1.3 presents the model output with the three-way interaction removed (see Appendix B for model including the three-way interaction). The interaction between marginal overqualification and time was insignificant, $b = -0.08$, $z = -0.43$, $p = 0.67$, 95% CI = [-0.45, 0.29]; however, the interaction between overqualification and time was significant, $b = 0.67$, $z = 2.51$, $p < 0.01$, 95% CI = [0.15, 1.19].

Table 1.3 Linear Mixed Model with Three-Way Interaction Removed (Model A – K10)

Predictors	Coef.	Std. Err.	z	p	95% CI
Overqualification (ref: Qualified)					
Marginal Overqualification	0.37	0.30	1.27	0.21	-0.20, 0.95
Overqualification	-0.20	0.36	-0.56	0.58	-0.91, 0.51
Immigration Status (ref: non-immigrant)					
Sex (ref: Female)	0.45	0.47	0.94	0.35	-0.48, 1.37
	-0.38	0.17	-2.30	0.02	-0.71, -0.06
Age Category (ref: 58 to 67)					
18 to 27	0.84	0.46	1.80	0.07	-0.07, 1.74
28 to 37	0.50	0.29	1.75	0.08	-0.06, 1.07
38 to 47	0.58	0.26	2.24	0.03	0.07, 1.08
48 to 57	0.14	0.24	0.60	0.55	-0.32, 0.61
Marital Status (ref: Married)					
Separated, Divorced, or Widowed	0.98	0.31	3.15	0.00	0.37, 1.59
Common law partner	0.56	0.22	2.58	0.01	0.13, 0.99
Single	0.30	0.26	1.16	0.25	-0.20, 0.80
SES (ref: Upper-middle)					
Low	0.85	0.26	3.29	0.00	0.34, 1.35
Low-mid	0.53	0.23	2.34	0.02	0.08, 0.97
Mid	0.19	0.20	0.93	0.35	-0.21, 0.58
High	-0.53	0.23	-2.33	0.02	-0.98, -0.09
Visible Minority (ref: non-minority)					
Visible Minority	0.58	0.50	1.16	0.25	-0.40, 1.57
Indigenous	1.85	0.76	2.44	0.02	0.36, 3.33
Presence of Children					
International Education	0.01	0.22	0.05	0.96	-0.43, 0.45
	-0.48	0.27	-1.75	0.08	-1.01, 0.06
Region of Birth (ref: North America)					
Africa	0.28	0.75	0.37	0.71	-1.19, 1.75
Asia	-0.17	0.64	-0.26	0.79	-1.42, 1.08
Europe	0.04	0.46	0.08	0.94	-0.87, 0.94
Latin America & the Caribbeans	-0.51	0.86	-0.59	0.55	-2.21, 1.18
Time					
	0.23	0.09	2.61	0.01	0.06, 0.40
Overqualification * Time					
Marginal overqualification	-0.08	0.19	-0.43	0.67	-0.45, 0.29
Overqualification	0.67	0.27	2.51	0.01	0.15, 1.19
Immigration Status * Time					
Immigrant	-0.32	0.19	-1.68	0.09	-0.69, 0.05
Overqualification * Immigration Status					
Marginal OQ & immigrant	0.33	0.40	0.83	0.41	-0.46, 1.13
OQ & Immigrant	0.43	0.62	0.68	0.50	-0.80, 1.65
Intercept	14.41	0.27	52.91	0.00	13.87, 14.94

For individuals experiencing persistent overqualification, a one unit increase in time corresponds with an additional 0.67 unit increase in K10 scores compared to qualified individuals, while holding all other variables fixed. To unpack the results of the significant two-way interaction, post-hoc analyses were performed to assess simple slopes (Table 1.4) and simple effects (Table 1.5). The analysis of simple slopes revealed that the K10 trajectory of education-job matched individuals ($b = .16, z = 1.88, p = 0.06, 95\% \text{ CI } [-0.01, 0.33]$) and marginally overqualified individuals ($b = 0.08, z = 1.88, p = 0.62, 95\% \text{ CI } [-0.24, 0.40]$) were no different from zero. In contrast, the slope for overqualified individuals was significantly different from zero, $b = .83, z = 3.32, p = < .01, 95\% \text{ CI } [0.34, 1.32]$. The analysis of simple effects showed that at all three time points, K10 scores were comparable between the qualified group and the marginally overqualified group. Similarly, K10 scores were comparable between the qualified and overqualified group at time 0. However, at Time 1 and Time 2, the K10 scores were significantly greater for the overqualified group compared to the qualified group. Overall, the results illustrate that the overqualified group was the only condition in which people experienced a rise in psychological distress over a 4-year period (Fig 1). Main effects were found for socio-economic status (SES), marital status, Indigenous identity, age, and sex (Table 1.3). Compared to upper-middle SES, people with low SES ($b = 0.85, z = 3.29, p = < 0.01, 95\% \text{ CI } [.34, 1.35]$) and low-mid SES ($b = 0.53, z = 2.34, p = 0.02, 95\% \text{ CI } [0.08, 0.97]$) had higher K10 scores, which is indicative of poorer mental health. No difference in K10 scores were found between upper-middle SES and middle-SES ($b = 0.19, z = 0.93, p = 0.35, 95\% \text{ CI } [-0.21, 0.58]$). Notably, people with high SES had significantly lower k10 scores compared to people in upper-middle SES ($b = -0.53, z = -2.33, p = 0.02, 95\% \text{ CI } [-0.98, -0.09]$). Such effects point to a

socioeconomic gradient where increases in mental well-being appear to be related to one's socioeconomic status.

Table 1.4 Analysis of Simple Slopes (Model A – K10)

Group	Slope	Std. Err.	z	p	95% CI
Qualified	0.16	0.09	1.88	0.06	-0.01, 0.33
Marginally Overqualified	0.08	0.16	0.50	0.62	-0.24, 0.40
Overqualified	0.83	0.25	3.32	0.00	0.34, 1.32

With respect to marital status, the married group had significantly lower K10 scores compared to individuals that were separated, divorced, or widowed, $b = 0.98$, $z = 3.15$, $p < 0.01$, 95% CI [0.37, 1.59]. Similarly, individuals in common law relationships had greater K10 scores than their married counterparts, $b = 0.56$, $z = 2.58$, $p = 0.01$, 95% CI [0.13, 0.99]. Married people and individuals currently not in a relationship had comparable K10 scores. When comparing age categories, most age groups had similar K10 scores. The only difference was found between the 58 to 67 group and the 38 to 47 group, $b = 0.58$, $z = 2.24$, $p = 0.03$, 95% CI [0.07, 1.08]. Visible minorities and non-minority individuals had similar K10 scores. However, Indigenous persons reported higher K10 scores, on average, relative to their White counterparts, $b = 1.85$, $z = 2.44$, $p = 0.02$, 95% CI [0.36, 3.33]. Lastly, a significant sex difference was found in K10 scores: men reported significantly lower K10 scores than women, $b = -0.38$, $z = -2.30$, $p = 0.02$, 95% CI [-0.71, -0.06].

Table 1.5 Analysis of Simple Effects (Model A – K10)

Group (ref: Qualified)	Estimate	Std. Err.	z	p	95% CI
Marginal Overqualification					
Time 0	0.45	0.27	1.63	0.10	-0.09, 0.98
Time 1	0.37	0.19	1.97	0.05	0.00, 0.73
Time 2	0.29	0.25	1.13	0.26	-0.21, 0.78
Overqualification					
Time 0	-0.11	0.35	-0.31	0.75	-0.79, 0.57
Time 1	0.56	0.26	2.13	0.03	0.04, 1.08
Time 2	1.23	0.40	3.06	0.00	0.44, 2.03

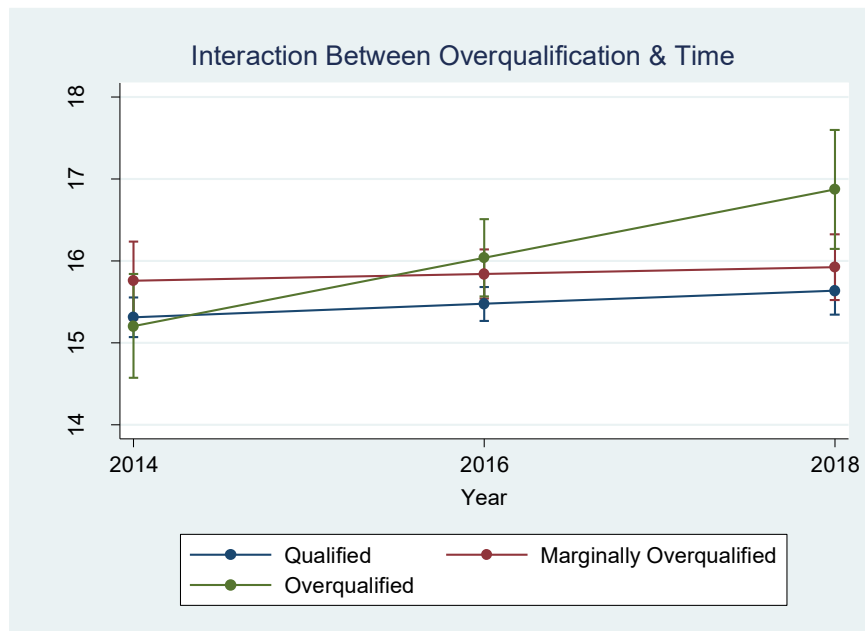


Figure 1. Model A. Interaction between overqualification and time. Psychological distress levels increase at a greater rate for overqualified individuals.

Model B: Overqualification and Life Satisfaction

A visual inspection of the growth plots indicated that life satisfaction and overqualification may be linearly associated. The plots also showed that there was variability in both the intercept and slope for time. As such, the intercept and slope were treated as random variables. The results of the unconditional means model (Table 2.1) indicates that the typical

person in this sample reported high life satisfaction scores, $b = 7.95$, $z = 290.89$, $p < .001$, 95% CI [7.89, 8.00]. The within-person variance was 0.89, 95% CI [0.79, 1.00], and the between-person variance was 0.88, 95% CI [0.76, 1.00]. Similar to Model A, the variance estimates were significantly different from zero, which gives justification for adding predictor variables in each level of the model. According to the ICC value (ICC = 0.50), roughly half of the outcome variation is due to differences between people.

Table 2.1 Unconditional Means Model (Model B – Life Satisfaction)

Predictor	Estimate	SE	z	p	95% CI
Intercept	7.95	0.03	290.89	0.000	7.89, 8.00

Parameters	Estimate	SE	95% CI
σ_{ϵ}^2	0.89	0.06	0.79, 1.00
σ_0^2	0.88	0.06	0.76, 1.00

The unconditional growth model (Table 2.2) suggests that life satisfaction remains stable over time, $b = 0.04$, $z = 1.72$, $p = 0.09$, 95% CI [-0.01, 0.08]. However, the possibility remains that life satisfaction trajectories may differ between certain groups of individuals, as the between-person variance for the slope was non-zero, $\sigma_1^2 = 0.30$, 95% CI [0.23, 0.41]. The between person variance for the intercept was 1.28, 95% [1.07, 1.53], and the within-person variance was 0.61, 95% CI [0.52, 0.72]. The pseudo- R^2 was 0.31, which indicates that the addition of time into the model explained a further 31% of the within-person variation. The next set of models assess the relationship between overqualification, immigration status, and life satisfaction while controlling for various covariates.

Table 2.2 Unconditional Growth Model (Model B – Life Satisfaction)

Life Satisfaction	Coef.	Std. Err.	z	p	95% CI
Time	0.04	0.02	1.72	0.09	-0.01, 0.08
Intercept	7.91	0.04	216.82	0.00	7.84, 7.99

Random-effects Parameters	Estimate	Std. Err.	95% CI
σ_{ε}^2	0.61	0.05	0.52, 0.72
σ_0^2	1.28	0.12	1.07, 1.53
σ_1^2	0.30	0.05	0.23, 0.41
σ_{01}	-0.32	0.06	-0.44, -0.20

The three-way interaction (Table 2.3) between marginal overqualification, immigration status and time was not significant $b = 0.23$, $z = 1.63$, $p = 0.10$, 95% CI [-0.05, 0.50]; however, the three-way interaction between overqualification, immigration status and time was significant, while controlling for age, biological sex, marital status, visible minority status, socioeconomic status, region of origin, and the presence of dependents ($b = 0.51$, $z = 2.16$, $p = 0.03$, 95% CI [0.05, 0.98]). Similar to Model A, main effects were found for socioeconomic status, marital status, and age. For socioeconomic status, the low, low-mid, and middle income categories reported significantly lower life satisfaction scores compared to the upper-middle income reference group. No difference in life satisfaction was found between the upper-middle and high income categories. With respect to marital status, married individuals reported higher levels of life satisfaction than any other group. Lastly, life satisfaction scores were comparable across most age groups. The only difference was found between the 18 to 27 group and the 58 to 67 group. On average, the younger age group reported greater life satisfaction than the older age group.

To probe the significant three-way interaction, the sample was stratified by overqualification status to facilitate comparisons between immigrants and non-immigrants

within the same overqualification category. Thus, three stratified sub-samples were created: 1) overqualified sample; 2) marginally overqualified sample; 3) qualified sample. Within each stratified sample, a two-way interaction between immigration status and time was examined. For overqualified individuals, the interaction between immigration status and time (Fig 2) was significant ($b = 0.45$, $z = 2.04$, $p = 0.041$, 95% CI [0.02, 0.88]) (see Appendix B2). Specifically, for every one unit increase in time, life satisfaction improved by 0.45 points for immigrants compared to their non-immigrant counterparts. Although the linear rate of change between immigrants and non-immigrants were statistically different from each other, an analysis of simple slopes revealed that the growth rate for both immigrants and non-immigrants were no different from 0 (Table 2.4). An examination of the simple effects showed that overqualified immigrants had significantly lower life satisfaction scores than their non-immigrant counterparts ($\Delta = -0.82$) at time 0 (Table 2.5). At Time 1 ($\Delta = -0.37$) and Time 2 ($\Delta = 0.08$), the differences in life satisfaction scores were no different between the two groups (Fig 2). Such an observation indicates that at the onset of this study, overqualified immigrants, on average, had lower life satisfaction scores than overqualified non-immigrants.

For marginally overqualified individuals, the two-way interaction was not significant, $b = 0.10$, $z = 0.87$, $p = 3.86$, 95% CI [-0.12, 0.34]. Simple slopes analysis showed that the rate of change for both immigrants and non-immigrants were no different from zero (Fig 3). Furthermore, immigrants and non-immigrants had comparable life satisfaction scores at all time points for the marginally overqualified sub-sample.

Table 2.3 Linear Mixed Model Results (Model B – Life Satisfaction)

Predictors	Coef.	Std. Err.	z	p	95% CI
Overqualification (ref: qualified)					
Marginal Overqualification	0.03	0.10	0.28	0.78	-0.17, 0.22
Overqualification	-0.02	0.15	-0.13	0.90	-0.32, 0.28
Immigration Status (ref: Non-immigrant)					
Sex (ref: Female)	0.07	0.16	0.42	0.68	-0.24, 0.38
	-0.10	0.05	-1.78	0.08	-0.20, 0.01
Age Category (ref: 58 to 67)					
18 to 27	0.34	0.13	2.67	0.01	0.09, 0.59
28 to 37	0.16	0.10	1.62	0.11	-0.03, 0.35
38 to 47	0.05	0.09	0.56	0.58	-0.12, 0.22
48 to 57	0.07	0.08	0.94	0.35	-0.08, 0.23
Marital Status (ref: Married)					
Separated, Divorced, or Widowed	-0.57	0.13	-4.38	0.00	-0.83, -0.32
Common law partner	-0.18	0.07	-2.45	0.01	-0.32, -0.04
Single	-0.52	0.09	-5.94	0.00	-0.69, -0.35
SES (ref: upper-middle)					
low	-0.37	0.09	-4.07	0.00	-0.54, -0.19
low-mid	-0.17	0.08	-2.12	0.03	-0.33, -0.01
mid	-0.16	0.07	-2.15	0.03	-0.30, -0.01
high	0.09	0.08	1.07	0.29	-0.07, 0.25
Visible Minority (ref: non-minority)					
Visible minority	-0.35	0.18	-1.91	0.06	-0.71, 0.01
Indigenous	-0.26	0.20	-1.32	0.19	-0.65, 0.13
Presence of Children					
International Education	0.01	0.07	0.13	0.89	-0.13, 0.14
	0.11	0.10	1.06	0.29	-0.09, 0.30
Region of Birth(ref: North America)					
Africa	0.13	0.25	0.53	0.60	-0.36, 0.63
Asia	-0.09	0.23	-0.37	0.71	-0.54, 0.37
Europe	-0.15	0.15	-1.03	0.30	-0.45, 0.14
Latin America & the Caribbeans	0.25	0.29	0.87	0.39	-0.32, 0.83
Time					
	0.06	0.03	2.10	0.04	0.00, 0.12
Overqualification * Time					
Marginal Overqualification	-0.06	0.07	-0.92	0.36	-0.19, 0.07
Overqualification	-0.17	0.11	-1.56	0.12	-0.38, 0.04
Immigration Status * Time					
Immigrant	-0.08	0.07	-1.11	0.27	-0.21, 0.06
Overqualification * Immigration Status					
Marginal OQ & immigrant	-0.17	0.20	-0.85	0.40	-0.57, 0.22
OQ & immigrant	-0.48	0.33	-1.44	0.15	-1.14, 0.17
Overqualification * Immigration Status * Time					
Marginal OQ & immigrant	0.23	0.14	1.63	0.10	-0.05, 0.50
OQ & immigrant	0.51	0.24	2.16	0.03	0.05, 0.98
Intercept	8.20	0.10	84.83	0.00	8.01, 8.39

Table 2.4 Analysis of Simple Slopes on Overqualified Sub-Sample (Model B – Life Satisfaction)

Group	Slope	Std. Err.	z	p	95% CI
Non-immigrant	-0.10	0.10	-1.06	0.29	-0.29, 0.09
Immigrant	0.35	0.20	1.73	0.08	-0.05, 0.74

Table 2.5 Analysis of Simple Effects on Overqualified Sub-Sample (Model B – Life Satisfaction)

Group (Ref: Non-Immigrants)	Estimate	Std. Err.	z	P	95% CI
Time 0	-0.82	0.41	-2.01	0.04	-1.62, -0.02
Time 1	-0.37	0.35	-1.07	0.28	-1.06, 0.31
Time 2	0.08	0.42	0.18	0.86	-0.74, 0.89

For qualified individuals (Fig 4), the two-way interaction effect between immigration status and time was also not significant ($b = -0.10$, $z = -1.55$, $p = 1.22$, 95% CI $-0.24, 0.03$). This finding indicates that the rate of life satisfaction change for qualified immigrants and non-immigrants were similar. Simple slopes analysis determined that the rate of change for the non-immigrant group was statistically significant, $b = 0.07$, $z = 2.45$, $p = 0.01$, 95% CI $[0.02, 0.13]$; the slope for the immigrant group was not significant, $b = -0.03$, $z = -0.49$, $p = 0.62$, 95% CI $[-0.14, 0.09]$. At all 3 time points, life satisfaction scores were similar between immigrants and non-immigrants in the education-job matched sub-sample.

Model C: Mental Health and Immigration Recency

The three-way interaction between marginal overqualification, immigration recency, and time was not significant, $b = -0.28$, $z = -0.34$, $p = 0.73$, 95% CI $[-1.87, 1.31]$. Similarly, the interaction between overqualification, immigration recency, and time was not significant, $b = -0.23$, $z = -0.20$, $p = 0.84$, 95% CI $[-2.46, 2.00]$ (see Appendix B). Following the parsimony principle, the three-way interaction terms were removed, and the model was re-fit to the data. The ΔAIC was 3.86 and ΔBIC was 13.24, which suggests that removing the three-way interaction

resulted in a better model fit. The improved model was refit to the data to assess interactions between overqualification and immigration recency on reported K10 scores.

The two-way interaction between marginal overqualification and immigration recency was not significant, $b = -0.57$, $z = -0.80$, $p = 0.43$, 95% CI [-1.98, 0.84]; the interaction between overqualification and immigration recency was similarly not significant, $b = -1.44$, $z = -1.32$, $p = 0.19$, 95% CI [-3.57, 0.70]. As such, recency of immigration did not modify the effect of overqualification on K10 scores.

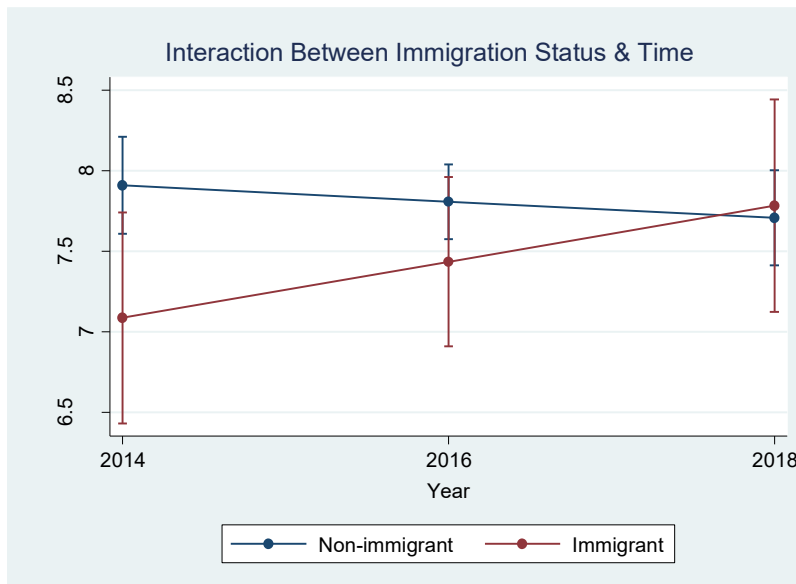


Figure 2. Model B. Interaction between immigration status and time for the overqualified sub-sample.

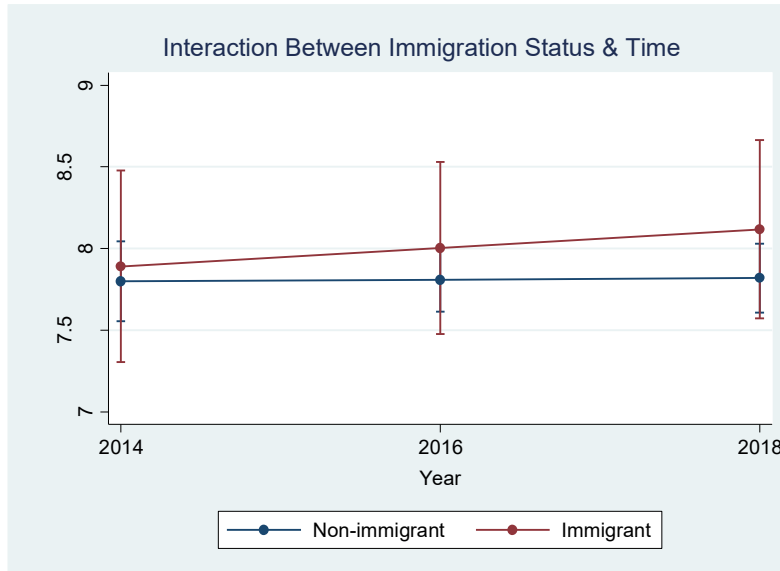


Figure 3. Model B. Interaction between immigration status and time for the marginally overqualified sub-sample.

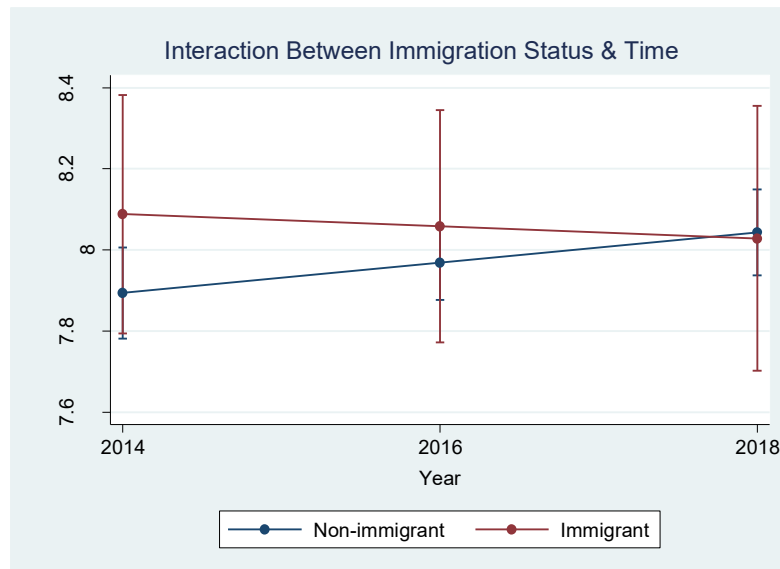


Figure 4. Model B. Interaction between immigration status and time for the qualified sub-sample.

The main effect of immigration recency was also insignificant, $b = 0.21$, $z = 0.30$, $p = 0.76$, 95% CI [-1.14, 1.56], indicating that K10 scores between recent and established immigrants were comparable, on average.

Model D: Mental Health and Immigration Category

To review, Model D contained six, three-way interaction terms: 1) marginal overqualification*refugee*time; 2) marginal overqualification*family reunification*time; 3) marginal overqualification*moved in childhood*time; 4) overqualification*refugee*time; 5) overqualification*family reunification *time; and 6) overqualification*moved in childhood*time. None of the above three-way interactions were significant, while controlling for covariates. Similar to previous models, the three-way interaction term was removed from the model in an attempt to improve model fit. The Δ AIC was 2.96 and Δ BIC was 30.91.

After re-fitting the model (Table 3.1), a significant two-way interaction effect was found for marginal overqualification*family reunification, $b = 1.71$, $z = 2.09$, $p = 0.04$, 95% CI [0.11, 3.31]. Two types of simple effects analysis were conducted to probe the interaction. The first type compared K10 scores among individuals within the same immigration category, but with differing degrees of overqualification. The second type compared K10 scores among individuals between different immigration categories with the same degree of overqualification.

A significant difference in K10 scores was found between qualified and marginally overqualified individuals within immigrants in the family reunification category, $b = 1.65$, $z = 2.46$, $p = 0.01$, 95% CI [0.33, 2.97]. On average, K10 scores were 1.65 points higher for the marginally overqualified group (Fig 5).

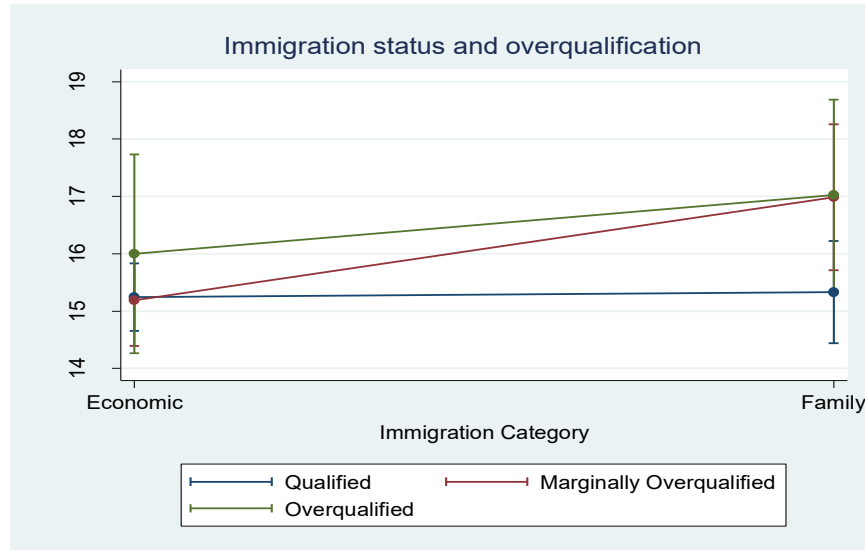


Figure 5. Model D. Interaction between immigration category and overqualification.

The difference between qualified and overqualified individuals within the family reunification category was verging on statistical significance, $b = 1.69$, $z = 1.89$, $p = 0.06$, 95% CI [-0.06, 3.44]. Specifically, the K10 scores were 1.69 points higher for overqualified workers compared to qualified workers. The comparison between economic and family reunification immigrants within the marginal overqualification category showed the following: K10 scores were 1.80 points higher for family reunification immigrants than economic immigrants, $b = 1.80$, $z = 2.36$, $p = 0.02$, 95% CI [0.30, 3.29]. Other notable results were found when comparing refugees to economic immigrants within the marginally overqualified category. Although statistical significance was not reached ($p = 0.06$), K10 scores were 2.03 points greater for marginally overqualified refugees compared to their economic immigrant counterparts. For overqualified refugees, K10 scores were 1.90 points greater than overqualified economic immigrants ($p = 0.30$).

Table 3.1 Linear Mixed Model with Immigration Category (Model D – K10)

Predictors	Coef.	Std. Err.	z	p	95% CI
Overqualification (ref: qualified)					
Marginal overqualification	0.44	0.66	0.66	0.51	-0.86, 1.74
Overqualification	0.66	1.13	0.58	0.56	-1.55, 2.87
Immigration category (ref: Economic)					
Refugee	0.32	2.23	0.14	0.89	-4.04, 4.68
Family	-0.43	0.66	-0.65	0.52	-1.73, 0.87
Moved in childhood	0.31	0.79	0.40	0.69	-1.23, 1.86
Sex (ref: Female)					
	-0.53	0.36	-1.46	0.14	-1.24, 0.18
Age Category (ref: 58 to 67)					
18 to 27	-0.50	1.36	-0.37	0.71	-3.17, 2.16
28 to 37	-0.73	0.76	-0.96	0.34	-2.23, 0.77
38 to 47	0.13	0.60	0.21	0.84	-1.06, 1.31
48 to 57	-0.74	0.55	-1.34	0.18	-1.83, 0.34
Marital status (ref: married)					
Separated, divorced, or widowed	0.31	0.70	0.45	0.66	-1.06, 1.69
Common law partner	-0.06	0.67	-0.08	0.93	-1.37, 1.26
Single	0.08	0.67	0.12	0.90	-1.24, 1.40
SES (ref: upper-middle)					
Low	0.82	0.57	1.44	0.15	-0.30, 1.94
Low-mid	0.57	0.52	1.09	0.28	-0.45, 1.59
Mid	0.61	0.48	1.26	0.21	-0.34, 1.55
High	-0.54	0.74	-0.73	0.47	-1.99, 0.92
Visible minority (ref: non-vis minority)					
Presence of children	1.19	1.31	0.91	0.37	-1.38, 3.76
International education	0.02	0.50	0.04	0.97	-0.95, 0.99
	-0.62	0.39	-1.61	0.11	-1.38, 0.14
Region of birth (ref: North America)					
Africa	0.44	1.46	0.30	0.76	-2.42, 3.29
Asia	-0.53	1.47	-0.36	0.72	-3.41, 2.36
Europe	0.30	0.82	0.37	0.71	-1.31, 1.91
Latin America & the Caribbeans	-0.68	1.62	-0.42	0.68	-3.86, 2.51
Time					
	-0.09	0.25	-0.37	0.71	-0.59, 0.40
Overqualification*Time					
Marginal overqualification	-0.47	0.41	-1.15	0.25	-1.27, 0.33
Overqualification	0.09	0.53	0.16	0.87	-0.95, 1.12
Immigration category*Time					
Refugee	1.37	1.39	0.98	0.33	-1.36, 4.09
Family	0.49	0.42	1.17	0.24	-0.33, 1.30
Moved in childhood	0.04	0.39	0.09	0.93	-0.73, 0.80

Table 3.1 Continued.

Predictors	Coef.	Std. Err.	z	p	95% CI
Overqualification*Immigration Category					
MOQ & Refugee	0.26	3.12	0.08	0.93	-5.85, 6.37
MOQ & Family	1.71	0.82	2.09	0.04	0.11, 3.31
MOQ & Moved when child	0.55	0.96	0.57	0.57	-1.34, 2.44
OQ & Refugee	0.12	2.41	0.05	0.96	-4.60, 4.85
OQ & Family	0.94	1.27	0.74	0.46	-1.55, 3.43
OQ & Moved when child	-0.85	1.29	-0.66	0.51	-3.37, 1.68
Intercept	15.32	1.01	15.11	0.00	13.34, 17.31

Model E: Life Satisfaction and Immigration Recency

The three-way interaction between marginal overqualification, immigration recency and time was not significant, $b = 0.15$, $z = 0.57$, $p = 0.57$, 95% CI [-0.36, 0.65]; the interaction between overqualification, immigration recency and time was also not significant, $b = -0.38$, $z = -0.89$, $p = 0.37$, 95% CI [-1.23, 0.46]. Therefore, immigration recency does not modify the effect of overqualification on life satisfaction over time.

As with previous models, the three-way interaction was removed, and the model was re-fit to the data. The ΔAIC was 1.65, which suggests that the improvement in model fit is negligible; however, the ΔBIC was 11.01, which is indicative of a large improvement in fit. For the re-fitted model, a significant two-way interaction was found between immigration recency and time, $b = -0.30$, $z = -2.44$, $p = 0.02$, 95% CI [-0.53, 0.06]. In particular, compared to established immigrants, recent immigrants experience a 0.30 unit drop in life satisfaction every two years, when other variables are held fixed. All other interaction effects did not reach statistical significance (Table 4.1).

Post-hoc analyses were performed to unpack the significant two-way interaction. The analysis of simple slopes (Fig 6) showed that the life satisfaction trajectory for established

immigrants was positive and significantly different from zero, $b = 0.20$, $z = 2.89$, $p < 0.01$, 95% CI [-0.07, 0.34]; the slope for recent immigrants was negative, although not statistically significant, $b = -0.09$, $z = -0.96$, $p = 0.34$, 95% CI [-0.29, 0.10].

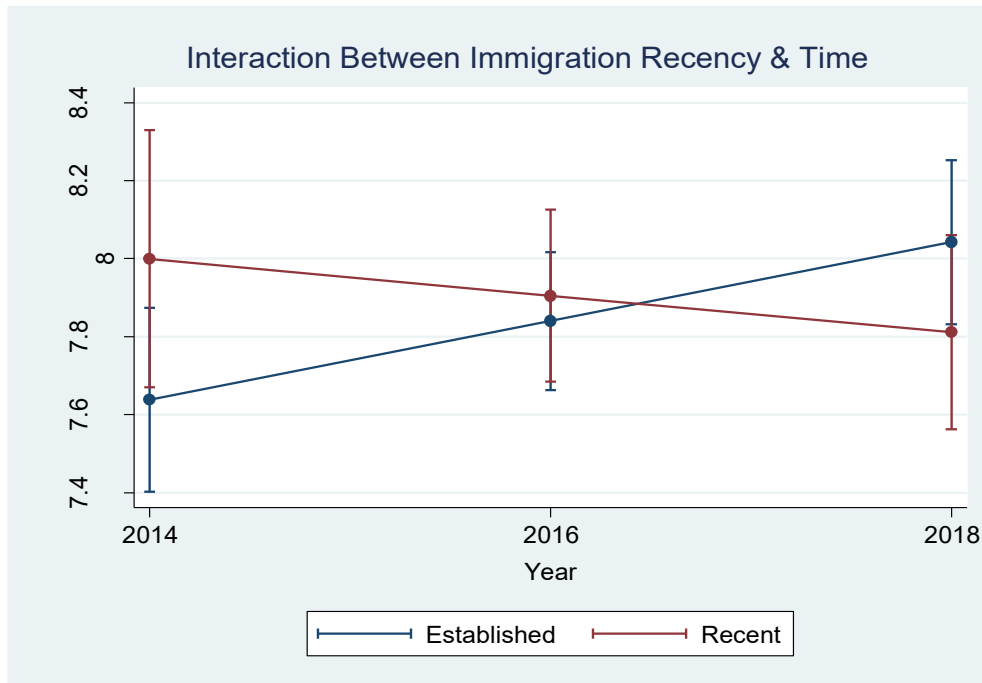


Figure 6. Model E. Interaction between immigration recency and time.

Table 4.1 Linear Mixed Model with immigration Recency (Model E – Life Satisfaction)

Predictors	Coef.	Std. Err.	z	P	95% CI
Overqualification (ref: qualified)					
Marginal overqualification	-0.16	0.22	-0.75	0.45	-0.58, 0.26
Overqualification	-0.59	0.41	-1.43	0.15	-1.39, 0.22
Immigration recency (ref: Established)					
Sex (ref: Female)	0.41	0.25	1.60	0.11	-0.09, 0.91
	-0.15	0.12	-1.25	0.21	-0.39, 0.09
Age category (ref: 58 to 67)					
18 to 27	0.61	0.34	1.77	0.08	-0.06, 1.28
28 to 37	0.45	0.22	2.00	0.05	0.01, 0.89
38 to 47	0.30	0.20	1.56	0.12	-0.08, 0.69
48 to 57	0.17	0.16	1.10	0.27	-0.13, 0.47
Marital status (ref: married)					
Separated, divorced, or widowed	-0.54	0.31	-1.73	0.08	-1.15, 0.07
Common law partner	-0.05	0.28	-0.18	0.86	-0.60, 0.50
Single	-0.56	0.21	-2.64	0.01	-0.98, -0.14
SES (ref: upper-middle)					
Low	-0.28	0.19	-1.44	0.15	-0.65, 0.10
Low-mid	-0.12	0.16	-0.72	0.47	-0.44, 0.20
Mid	-0.18	0.18	-1.02	0.31	-0.54, 0.17
High	0.25	0.22	1.13	0.26	-0.18, 0.68
Visible minority	-0.16	0.37	-0.45	0.65	-0.88, 0.55
Presence of children	-0.20	0.18	-1.11	0.27	-0.56, 0.16
International education	0.08	0.15	0.54	0.59	-0.21, 0.36
Region of birth (ref: North America)					
Africa	-0.43	0.41	-1.05	0.29	-1.24, 0.38
Asia	-0.53	0.43	-1.23	0.22	-1.38, 0.32
Europe	-0.42	0.24	-1.74	0.08	-0.89, 0.05
Latin America & the Caribbeans	-0.24	0.49	-0.49	0.63	-1.20, 0.72
Time	0.07	0.07	0.98	0.33	-0.07, 0.22
Overqualification*time					
Marginal overqualification	0.23	0.13	1.79	0.07	-0.02, 0.47
Overqualification	0.41	0.22	1.90	0.06	-0.01, 0.84
Immigration Recency*time	-0.30	0.12	-2.44	0.02	-0.53, -0.06
Overqualification*Immigration Recency					
Marginal OQ & recent immigrants	-0.14	0.26	-0.54	0.59	-0.65, 0.37
Overqualified & recent immigrants	-0.02	0.39	-0.06	0.95	-0.78, 0.73
Intercept	8.28	0.27	30.55	0.00	7.75, 8.81

Model F: Life Satisfaction and Immigration Category

Model F contains the same six, three-way interaction terms as model D. Of the six terms, only the interaction between overqualification*moved in childhood*time was significant, $b = -0.93$, $z = -2.53$, $p = 0.01$, 95% CI [-1.65, -0.21] (see Appendix B). To unpack the significant interaction effect, the data was stratified by overqualification status. Then, the two-way interaction between immigration category and time was examined for each stratified sub-sample.

For the overqualified sub-sample, a significant effect was found for the moved-in-childhood*time interaction, $b = -0.87$, $z = -1.99$, $p < 0.05$, 95% CI [-1.73, -0.01]. This indicates that the slope for life satisfaction trajectory differs between economic immigrants and immigrants who migrated in childhood. Specifically, compared to economic immigrants, immigrants who came to Canada in childhood experience an additional 0.873 unit drop in life satisfaction every two years.

Post-hoc analyses (Fig 7) showed that the life satisfaction trajectory or slope for immigrants that moved in childhood was negative, $b = -0.57$, $z = -1.71$, $p = 0.09$, 95% CI [-1.23, 0.08]. In contrast, the life satisfaction trajectory was positive for economic immigrants, $b = 0.30$, $z = 1.06$, $p = 0.29$, 95% CI [-0.25, 0.84]. The analysis of simple effects show that at the onset of the study, moved in childhood immigrants had significantly higher life satisfaction scores than economic immigrants, $b = 1.13$, $z = 2.01$, $p = 0.04$, 95% CI [0.03, 2.25]. By Time 2, there was no difference in life satisfaction scores between these groups, $b = 0.27$, $z = 0.55$, $p = 0.58$, 95% CI [-0.68, 1.21]. By time 3, life satisfaction scores for the moved-in-childhood group were lower than economic immigrants, although the difference was not significant, $b = -0.61$, $z = -0.83$, p

=0.41, 95% CI [-2.04, 0.82]. For the overqualified sub-sample, other noteworthy results were found for refugees. Although a formal analytical test was not applied to test for significant differences, life satisfaction scores of refugees are persistently lower at all time points when compared to any other group. For the marginally overqualified and qualified sub-samples, none of the two-way interactions between immigration category and time were found to be significant.

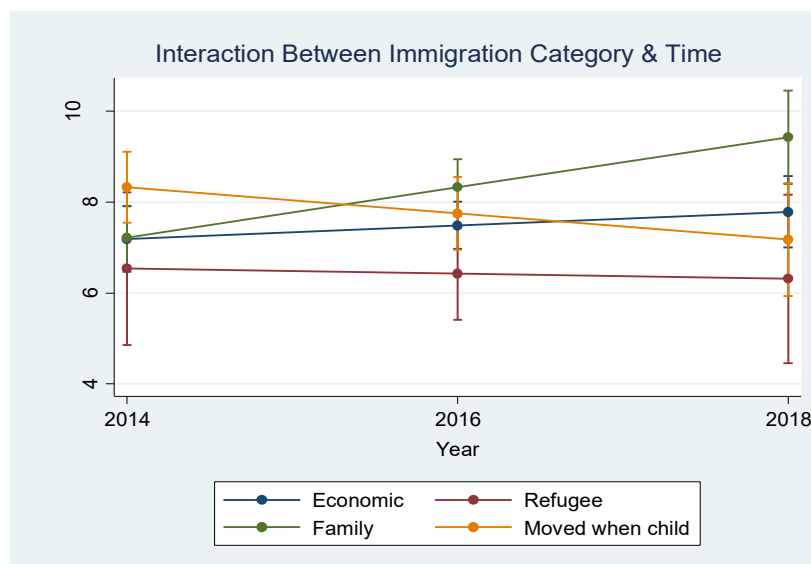


Figure 7. Model F. Interaction between immigration category and time.

DISCUSSION

In the near future, Canada aims to increase immigration levels to historically unprecedented highs. According to the Immigration Levels Plan, Canada intends to receive roughly 447, 000 and 451, 000 immigrants in 2023 and 2024, respectively (Immigration, Refugees and Citizenship Canada, 2022b). In 2025, Canada plans to admit half-a-million migrants (Immigration, Refugees and Citizenship Canada, 2022e). This planned increase in immigration levels is motivated by concerns over looming labour shortages stemming from an ageing work force (Immigration, Refugees and Citizenship Canada, 2022d; McMullin et al., 2004). Indeed, immigrants play an integral role in sustaining the Canadian economy. Equally true, however, is that immigrants are more likely to be overqualified for their jobs than non-immigrants (Cornelissen & Turcotte, 2020), which is associated with poor mental health (Chen et al., 2010). A large increase in immigration may unwittingly create a mental health concern among highly skilled immigrants in Canada.

To date, research on overqualification and well-being has primarily focused on cross-sectional analyses and qualitative investigations (Cornelissen & Turcotte, 2020). Moreover, very few studies have examined whether the impact of overqualification on well-being differs in magnitude between immigrants and non-immigrants. The present study sought to address such research gaps by studying the relationship between overqualification, immigration status and well-being over a four year-time frame. By studying the longitudinal effect of overqualification on well-being, this study hopes to shed light on the potential consequences of increasing the immigration rate.

Mental Health: Immigrants vs. Non-immigrants

In previous research, overqualified individuals reported having poor mental health (Dean & Wilson, 2009; Mawani, 2018), higher levels of depression (Bracke et al., 2013; Wassermann & Annekatrin, 2019) and emotional exhaustion (Gong et al., 2021). The current results support earlier findings – overqualification was found to be associated with poor mental health for immigrants and non-immigrants alike. In particular, psychological distress levels increased over time for overqualified individuals, but not for marginally overqualified or qualified individuals.

Notably, K10 scores never increased beyond 17 for any one group. Guidelines for interpreting K10 scores suggest that a score equal to or below 19 is indicative of little to no psychological distress (Andrews & Slade, 2001; Garland et al., 2023). Past research also shows that individuals with K10 scores between 10 and 19 have a low probability of meeting DSM-IV criteria for a mental disorder (Andrews & Slade, 2001). Therefore, the present study suggests that overqualification may not be a major source of psychological distress, which lead individuals to clinical illness. Nonetheless, an examination of a longer time period is warranted to provide further conclusions.

Other studies have found that the impact of overqualification on mental health may be more severe for immigrants than non-immigrants (Mawani, 2018). The current study examined whether immigration status moderated the linear association between overqualification and psychological distress through a three-way interaction. An interaction effect was not found, meaning that the rate of change in K10 scores did not differ between overqualified immigrants and non-immigrants. The findings of the present study do not support the idea that the

association between mental health and overqualification differs between immigrants and non-immigrants.

Mental Health: Recency of Immigration and Immigration Category

Two separate models were fit to an immigrant sub-sample to investigate the affect of immigration recency and immigration category on mental health, respectively. The findings indicated that the impact of overqualification on mental health was comparable between recent and established immigrants. Differences were found when comparing economic immigrants with those who migrated for family reunification purposes. Among marginally overqualified immigrants, K10 scores were higher for family reunification immigrants than economic immigrants. Similar findings were found for overqualified immigrants – family reunification immigrants reported higher K10 scores than economic immigrants (although $p = .06$ for this comparison).

In the current literature, it is unclear if family reunification acts as a protective or risk factor for mental health (Jurado et al., 2017). Some studies suggest that immigrants living apart from their families are more susceptible to negative mental health outcomes (Jurado et al., 2017). Other findings indicate that immigrants living alone experience less psychological distress than those living with family (Jurado et al., 2017). The present findings support the notion of family reunification as a potential risk factor for poor mental health. Although speculation, family reunification immigrants may be more vulnerable to the affects of post-immigration adversity than individuals belonging to other immigration classes.

Life Satisfaction: Immigrants vs. Non-immigrants

Among immigrants, many consider work to be an important life domain (Dean & Wilson, 2009). Underemployment is one of the major reasons why immigrants consider returning to their home country or moving elsewhere (George et al., 2012). As one might expect, overqualified immigrants report low levels of life satisfaction (Dean & Wilson, 2009; Piper, 2015). However, some scholars have speculated that life satisfaction among overqualified immigrants may increase with duration of stay in Canada (Frank & Hou, 2018; George et al., 2012).

The present results confirmed such suspicions, as life satisfaction increased among overqualified immigrants over a four year time frame. At the beginning of the LISA survey (i.e., 2012) overqualified immigrants had significantly lower levels of life satisfaction than overqualified non-immigrants. The cross-sectional differences in life satisfaction between immigrants and non-immigrants in 2012 suggests that the negative impact of overqualification was more severe among immigrants. However, life satisfaction reached comparable levels between both groups in 2014. By 2016, life satisfaction was slightly higher for overqualified immigrants (although the difference between groups was not statistically significant). Stated simply, overqualified immigrants had an increasing life satisfaction trajectory, whereas life satisfaction for overqualified non-immigrants remained constant over time. Such unanticipated results are difficult to explain through theoretical frameworks, such as relative deprivation, goal-striving stress, effort-reward imbalance, and person-environment fit. The above mentioned theories anticipate life-satisfaction to fall among overqualified individuals, not rise.

One idea that could explain the current findings was described by Frank and Hou (2018), when observing an increase in life-satisfaction among overqualified immigrants in cross-sectional data. They proposed that life satisfaction may increase among overqualified immigrants due to a “response shift” in how satisfaction with life is assessed. Response shift is a cognitive strategy that attempts to mitigate the toll of life adversity. Sprangers & Schwartz (1999) describe the process as “changing internal standards, values, and the conceptualization of quality of life” (Sprangers & Schwartz, 1999, p. 1507) to adjust to one’s life circumstances. For example, an individual may choose to dissociate oneself from goals that are perceived to be no longer obtainable and attach greater meaning to other aspirations (Wrosch & Scheier, 2003). Others describe this process as the redistribution or reallocation of importance assigned to various life domains (Wu, 2009).

Past findings show that individuals with the propensity to adjust their valuation of goals in the face of adversity experience an increase in life satisfaction (Wrosch et al., 2003; Wu, 2009). Specifically, life satisfaction has been found to improve when individuals redirect their attention to new and meaningful goals from seemingly unreachable desires (Wrosch et al., 2003). In health research, response shift is thought to be responsible for why many individuals with severe illnesses report comparable levels of quality of life as those without illness (Andrykowski & Hunt, 1993; Sprangers & Schwartz, 1999). An influential literature review on the quality of life of cancer patients found that self-assessed life satisfaction was similar between cancer patients and healthy controls (De Haes & Van Knippenberg, 1985).

With respect to overqualified immigrants, a response shift may help explain the increasing life satisfaction trajectory found in the present study. Many immigrants undoubtedly

perceive the work domain as an important component of their lives, especially among the educated (Dean & Wilson, 2009). Accordingly, overqualified immigrants report low levels of life satisfaction in the early years after immigration. With the progression of time, immigrants may undergo a response shift, that is, greater importance or emphasis is placed on other life domains, such as family and relationships, where one has been more successful (Frank & Hou, 2018). In summary, the present findings support the conclusions of Frank & Hou's (2018) cross-sectional findings: prolonged overqualification does not have a cumulative negative impact on life satisfaction.

Life Satisfaction: Recency of Immigration and Immigration Category

Similar to the models on psychological distress, separate models were fit to assess the influence of immigration recency and immigration category on life satisfaction. The results showed that immigration recency does not modify the impact of overqualification on life satisfaction. However, recent immigrants and established immigrants followed a different life satisfaction trajectory over the four year time period irrespective of overqualification status. Established immigrants experienced a significant increase in life satisfaction, whereas life satisfaction for recent immigrants remained stable or slightly declined. Although conjecture, recent immigrants may represent a pre response shift condition, and established immigrants may exemplify a post response shift condition (Frank & Hou, 2018). In essence, the standard by which life satisfaction is evaluated may differ between established and recent immigrants.

Lastly, six three-way interaction terms were examined when investigating the relationship between overqualification, immigration category, and time. Five of the six interaction terms were not significant. However, the three-way interaction between

overqualification, having arrived in childhood, and time was significant. Post-hoc analyses revealed that immigrants who migrated in childhood experienced a significant decline in life satisfaction over time compared to economic immigrants. Some researchers have suggested that age at arrival is “associated with a permanent reduction in educational attainment...” (Schaafsma & Sweetman, 2001, p. 1069). Canadian census data further indicate that children who immigrate past the age of nine have a greater risk of not completing their secondary education compared to those that arrive earlier (Corak, 2011). Arriving in Canada at the age of 15 to 18 appears to be the most unfavourable, as individuals that immigrate earlier or later tend to complete more years of schooling (Schaafsma & Sweetman, 2001). As educational attainment is correlated with life satisfaction (H. Y. Cheung & Chan, 2009), the age of immigration in childhood may be associated with life satisfaction trajectories in adulthood. To better understand the current results, future research should investigate life satisfaction trajectories of immigrants that moved in childhood according to age of arrival.

Limitations

There are several limitations to this study. To narrow the scope of this study, I examined “vertical” overqualification (i.e., the mismatch between educational level and occupational requirements) as opposed to “horizontal” mismatches between one’s education and occupation (Banerjee et al., 2019). Horizontal mismatch refers to discrepancies between one’s field of education and job industry (Banerjee et al., 2019) and may offer additional insight regarding the relationship between well-being and overqualification. Secondly, in determining overqualification status, there were no means of distinguishing unintentional overqualification from intentional overqualification. As previously mentioned, overqualification’s impact on well-being may differ between those experiencing voluntary versus involuntary overqualification (Maltarich et al., 2011). The inability to identify such differences may influence the validity of study results. Thirdly, as the LISA does not collect detailed accounts of disease incidence (e.g., diabetes, heart attacks, etc.), this study did not assess the association between physical health and overqualification. Fourthly, the present investigation operationalized overqualification according to Frank and Hou’s (2018) three group system: qualified, marginally overqualified, and overqualified. This three group classification was chosen, as previous research has identified differences between marginally overqualified and overqualified individuals (Frank & Hou, 2018). Nonetheless, much of the prior work on this topic has operationalized overqualification as a binary construct: qualified and overqualified. Therefore, similarities and differences between the present and past findings need to be interpreted with caution. Another important limitation to this study is related to the exclusion criteria of the LISA. Households that consisted solely of foreign residents were excluded from data collection. Such

individuals could have provided more nuanced information regarding the experience of overqualification among non-permanent residents. Lastly, a person-means imputation was performed to estimate missing values for the K10 variable. More robust methods of imputation are available (e.g., multiple imputation) that might be considered in future research when managing missing values.

CONCLUSION

Research on the long-term impact of overqualification on well-being is important to monitor the health of the Canadian labour force. The present investigation revealed that prolonged overqualification may have a negative mental health impact on both immigrants and non-immigrants. Notably, the affect of overqualification on psychological distress was comparable between the two groups. Although psychological distress increased over time for overqualified individuals, distress levels did not increase beyond clinically significant levels. More research is required which examines the association between overqualification and mental health over a longer time period. The findings on the relationship between overqualification and life satisfaction substantiates past cross-sectional studies. Namely, overqualified immigrants experience an increase in life satisfaction whereas life satisfaction remains constant for non-immigrants. Future studies should try to assess if response shift is responsible for improvements in life satisfaction among overqualified immigrants.

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Appendix A: Descriptive Statistics

Table A1 Weighted Descriptive Statistics for Continuous Variables (Overall Sample)

Variable	Mean	SD
K10 Scores	15.70	4.09
Life satisfaction	7.82	1.39
Income (\$)	63,296.43	59,616.80
Age	41.10	10.42

Table A2 Weighted Descriptive Statistics for Continuous Variables (Sub-Sample)

Variable	Mean	SD
Non-immigrants		
K10 Scores	15.64	4.03
Life satisfaction	7.86	1.39
Income (\$)	63472.66	50167.06
Age	40.63	10.55
Immigrants		
K10 Scores	15.93	4.34
Life satisfaction	7.70	1.41
Income (\$)	62609.20	87328.56
Age	42.95	9.71

Table A3 Weighted Frequency and Proportions for Categorical Variables (Overall Sample)

Variable	Frequency	Proportions
Overqualification		
Qualified	2,448,376	0.65
Marginally overqualified	925,836	0.25
Overqualified	397,868	0.11
Immigration status		
Non-immigrant	769,867	0.20
Immigrant	3,002,213	0.80
Sex		
Male	1,733,507	0.46
Female	2,038,574	0.54
Marital Status		
Married	2,156,996	0.57
Divorced, Separated, Widowed	199,891	0.05
Common law	557,632	0.15
Single	857,561	0.23
Visible Minority		
Non-minority	3,045,166	0.81
Visible minority	659,874	0.18
Indigenous	67,040	0.02
Presence of Children		
No	2,999,594	0.80
Yes	772,487	0.21
International Education		
No	3,219,810	0.85
Yes	552,270	0.15
Region of Birth		
North America	3,033,111	0.80
Africa	77,775	0.02
Asia	405,251	0.11
Europe	255,944	0.07

Table A4 Weighted Frequency and Proportions for Categorical Variables (Non-immigrants)

Variable	Frequency	Proportions
Overqualification		
Qualified	2,006,576	0.67
Marginally overqualified	730,513	0.24
Overqualified	265,124	0.09
Sex		
Male	1,342,539	0.45
Female	1,659,675	0.55
Marital Status		
Married	1,543,144	0.51
Divorced, Separated, Widowed	176,331	0.06
Common law	503,729	0.17
Single	779,010	0.26
Visible Minority		
Non-minority	2,766,982	0.92
Visible minority	168,192	0.06
Indigenous	67,040	0.02
Presence of Children		
No	2,429,003	0.81
Yes	573,211	0.19
International Education		
No	2,860,552	0.95
Yes	141,661	0.05
Region of Birth		
North America	2,898,865	0.97
Africa	25,857	0.01
Asia	40,303	0.01
Europe	37,188	0.01

Table A5 Weighted Frequency and Proportions for Categorical Variables (Immigrants)

Variable	Frequency	Proportions
Overqualification		
Qualified	441,800	0.57
Marginally overqualified	195,324	0.25
Overqualified	132,744	0.17
Sex		
Male	390,968	0.51
Female	378,900	0.49
Marital Status		
Married	613,853	0.80
Divorced, Separated, Widowed	23,560	0.03
Common law	53,903	0.07
Single	78,551	0.10
Visible Minority		
Non-minority	278,185	0.36
Visible minority	491,682	0.64
Presence of Children		
No	570,591	0.74
Yes	199,277	0.26
International Education		
No	359,258	0.47
Yes	410,609	0.53
Region of Birth		
North America	134,245	0.17
Africa	51,918	0.07
Asia	364,948	0.47
Europe	218,756	0.28
Immigration Category		
Economic	397,450	0.52
Refugee	14,127	0.02
Family reunification	197,486	0.26
Moved in childhood	140,672	0.18
Other	12,467	0.02
Immigration Recency		
Established	513,490	0.67
Recent	254,820	0.33

Appendix B: Inferential Statistics

Table B1 K10 Linear mixed model with three-way interaction (Model A)

Predictors	Coef.	Std. Err.	z	p	95% CI
Overqualification (ref: qualified)					
Marginal overqualification	0.29	0.32	0.91	0.37	-0.33, 0.90
Overqualification	-0.26	0.37	-0.71	0.48	-0.99, 0.46
Immigration status (ref: non-immigrants)					
Sex (ref: female)	0.30	0.50	0.61	0.54	-0.67, 1.27
	-0.38	0.17	-2.28	0.02	-0.71, -0.05
Age category (ref: 58 to 67)					
18 to 27	0.84	0.46	1.81	0.07	-0.07, 1.74
28 to 37	0.51	0.29	1.75	0.08	-0.06, 1.07
38 to 47	0.57	0.26	2.24	0.03	0.07, 1.08
48 to 57	0.14	0.24	0.58	0.56	-0.33, 0.61
Marital status (ref: married)					
Separated, divorced, or widowed	1.00	0.31	3.19	0.00	0.38, 1.61
Common law partner	0.56	0.22	2.57	0.01	0.13, 0.99
Single	0.30	0.26	1.16	0.25	-0.20, 0.80
SES (ref: upper-middle)					
Low	0.84	0.26	3.29	0.00	0.34, 1.35
Low-mid	0.52	0.22	2.31	0.02	0.08, 0.96
Mid	0.19	0.20	0.94	0.35	-0.20, 0.58
High	-0.54	0.23	-2.35	0.02	-0.99, -0.09
Visible minority (ref: non-vis minority)					
Visible minority	0.58	0.50	1.16	0.25	-0.40, 1.57
Indigenous	1.84	0.76	2.44	0.02	0.36, 3.33
Presence of children					
International education	0.01	0.22	0.04	0.97	-0.43, 0.45
	-0.48	0.27	-1.75	0.08	-1.01, 0.06
Region of birth (ref: North America)					
Africa	0.27	0.75	0.36	0.72	-1.20, 1.75
Asia	-0.17	0.64	-0.26	0.79	-1.42, 1.08
Europe	0.03	0.46	0.07	0.95	-0.87, 0.93
Latin America & the Caribbeans	-0.52	0.86	-0.60	0.55	-2.21, 1.18
Time					
	0.20	0.09	2.22	0.03	0.02, 0.38
Overqualification*time					
Marginal overqualification	0.01	0.21	0.05	0.96	-0.40, 0.42
Overqualification	0.74	0.29	2.52	0.01	0.16, 1.32
Immigration Status*time					
Immigrant	-0.16	0.24	-0.65	0.52	-0.64, 0.32

Table B1 Continued

Predictors	Coef.	Std. Err.	z	p	95% CI
Overqualification*Immigration status					
Marginal OQ & immigrants	0.77	0.61	1.25	0.21	-0.43, 1.96
Overqualified & immigrants	0.70	0.88	0.79	0.43	-1.04, 2.43
Overqualification*Immigration status*Time					
Marginal Overqualification & immigrants	-0.43	0.45	-0.94	0.35	-1.31, 0.46
Overqualification & immigrants	-0.30	0.65	-0.45	0.65	-1.57, 0.98
Intercept	14.44	0.27	52.89	0.00	13.90, 14.97

Table B2 Stratified Analysis with Overqualified Sub-sample (Model B)

Predictors	Coef.	Std. Err.	z	p	95% CI
Immigration recency	-0.82	0.41	-2.01	0.04	-1.62, -0.02
Sex (ref: female)	0.14	0.17	0.85	0.39	-0.18, 0.47
Age category (ref: 58 to 67)					
18 to 27	0.50	0.41	1.24	0.22	-0.29, 1.30
28 to 37	0.25	0.30	0.82	0.41	-0.35, 0.84
38 to 47	0.48	0.28	1.68	0.09	-0.08, 1.04
48 to 57	0.43	0.22	1.89	0.06	-0.01, 0.87
Marital status (ref: married)					
Separated, divorced, or widowed	-0.29	0.22	-1.31	0.19	-0.73, 0.15
Common law partner	-0.17	0.28	-0.60	0.55	-0.72, 0.38
Single	-0.22	0.33	-0.68	0.50	-0.86, 0.42
SES (ref: upper-middle)					
Low	-0.41	0.27	-1.56	0.12	-0.93, 0.11
Low-mid	-0.42	0.25	-1.67	0.10	-0.92, 0.07
Mid	0.12	0.26	0.47	0.64	-0.39, 0.64
High	-0.04	0.28	-0.15	0.88	-0.60, 0.51
Visible minority	0.15	0.59	0.25	0.80	-1.01, 1.32
Indigenous	0.28	0.83	0.34	0.73	-1.34, 1.91
Presence of children	-0.05	0.24	-0.22	0.82	-0.52, 0.41
International education	0.81	0.38	2.11	0.04	0.06, 1.56
Region of birth (ref: North America)					
Africa	-0.22	0.94	-0.23	0.82	-2.07, 1.63
Asia	-0.62	0.66	-0.94	0.35	-1.92, 0.68
Europe	-0.10	0.36	-0.27	0.79	-0.81, 0.61
Latin America & the Caribbeans	-1.11	0.73	-1.53	0.13	-2.53, 0.31
Time	-0.10	0.10	-1.06	0.29	-0.29, 0.09
Immigration Status*time					
Immigrant	0.45	0.22	2.04	0.04	0.02, 0.88
Intercept	7.80	0.33	23.63	0.00	7.15, 8.45

Table B3 K10 Linear mixed model for immigration recency with three way interaction (Model C)

Predictor	Coef.	Std. Err.	z	p	95% CI
Overqualification (ref: qualified)					
Marginal overqualification	1.13	0.71	1.59	0.11	-0.26, 2.51
Overqualification	1.16	1.11	1.05	0.30	-1.02, 3.34
Immigration recency					
Sex (ref: female)	0.07	0.73	0.10	0.92	-1.36, 1.51
	-0.59	0.35	-1.67	0.10	-1.28, 0.10
Age category (ref: 58 to 67)					
18 to 27	0.06	1.33	0.04	0.97	-2.54, 2.66
28 to 37	-0.46	0.79	-0.59	0.56	-2.01, 1.09
38 to 47	0.38	0.63	0.60	0.55	-0.85, 1.60
48 to 57	-0.61	0.55	-1.11	0.27	-1.69, 0.47
Marital status (ref: married)					
Separated, divorced, or widowed	0.37	0.73	0.50	0.61	-1.06, 1.80
Common law partner	-0.02	0.72	-0.03	0.98	-1.42, 1.39
Single	-0.06	0.66	-0.09	0.93	-1.35, 1.23
SES (ref: upper-middle)					
Low	0.87	0.57	1.53	0.13	-0.24, 1.98
Low-mid	0.52	0.50	1.03	0.30	-0.47, 1.50
Mid	0.62	0.48	1.29	0.20	-0.32, 1.55
High	-0.59	0.74	-0.79	0.43	-2.05, 0.87
Visible minority	1.32	1.38	0.96	0.34	-1.38, 4.01
Presence of children	0.00	0.51	0.01	0.99	-0.99, 1.00
International education	-0.64	0.38	-1.66	0.10	-1.39, 0.11
Region of birth (ref: North America)					
Africa	0.40	1.60	0.25	0.80	-2.73, 3.53
Asia	-0.61	1.63	-0.37	0.71	-3.79, 2.58
Europe	0.27	0.84	0.32	0.75	-1.37, 1.91
Latin America & the Caribbeans	-0.67	1.78	-0.38	0.71	-4.15, 2.81
Time	0.01	0.26	0.03	0.98	-0.51, 0.52
Overqualification*time					
Marginal overqualification	-0.27	0.44	-0.62	0.54	-1.14, 0.59
Overqualification	0.48	0.82	0.59	0.56	-1.13, 2.10
Immigration Recency*time	0.02	0.45	0.04	0.97	-0.86, 0.90
Overqualification*Immigration Recency					
Marginal OQ & recent immigrants	-0.26	1.06	-0.25	0.80	-2.34, 1.81
Overqualified & recent immigrants	-1.20	1.62	-0.74	0.46	-4.37, 1.97
Overqualification*Immigration Recency*Time					
Marginal OQ & recent immigrants	-0.28	0.81	-0.34	0.73	-1.87, 1.31
Overqualified & recent immigrants	-0.23	1.14	-0.20	0.84	-2.46, 2.00
Intercept	15.10	0.99	15.20	0.00	13.15, 17.04

Table B4 Linear Mixed Model for Immigration Recency with Three-Way Interaction Removed (Model C)

Predictors	Coef.	Std. Err.	z	p	95% CI
Overqualification (ref: qualified)					
Marginal overqualification	1.24	0.68	1.84	0.07	-0.08, 2.56
Overqualification	1.25	0.91	1.37	0.17	-0.08, 3.04
Immigration recency					
Sex (ref: female)	0.21	0.69	0.30	0.76	-1.14, 1.56
	-0.59	0.35	-1.68	0.09	-1.28, 0.10
Age category (ref: 58 to 67)					
18 to 27	0.06	1.33	0.05	0.96	-2.55, 2.67
28 to 37	-0.46	0.79	-0.59	0.56	-2.00, 1.08
38 to 47	0.37	0.63	0.60	0.55	-0.85, 1.60
48 to 57	-0.61	0.55	-1.11	0.27	-1.69, 0.47
Marital status (ref: married)					
Separated, divorced, or widowed	0.37	0.73	0.51	0.61	-1.06, 1.80
Common law partner	-0.03	0.71	-0.05	0.96	-1.43, 1.36
Single	-0.07	0.66	-0.11	0.92	-1.36, 1.22
SES (ref: upper-middle)					
Low	0.87	0.57	1.52	0.13	-0.25, 1.98
Low-mid	0.52	0.50	1.05	0.29	-0.45, 1.50
Mid	0.62	0.48	1.28	0.20	-0.33, 1.56
High	-0.58	0.75	-0.78	0.43	-2.05, 0.88
Visible minority	1.32	1.38	0.96	0.34	-1.38, 4.01
Presence of children	0.00	0.51	0.00	1.00	-0.99, 0.99
International education	-0.64	0.38	-1.67	0.10	-1.39, 0.11
Region of birth (ref: North America)					
Africa	0.40	1.60	0.25	0.81	-2.74, 3.53
Asia	-0.60	1.62	-0.37	0.71	-3.79, 2.58
Europe	0.27	0.84	0.32	0.75	-1.37, 1.91
Latin America & the Caribbeans	-0.67	1.77	-0.38	0.70	-4.14, 2.79
Time	0.05	0.25	0.19	0.85	-0.45, 0.54
Overqualification*time					
Marginal overqualification	-0.38	0.39	-0.98	0.33	-1.14, 0.38
Overqualification	0.40	0.57	0.69	0.49	-0.72, 1.52
Immigration Recency*time	-0.11	0.35	-0.31	0.75	-0.80, 0.58
Overqualification*Immigration Recency					
Marginal OQ & recent immigrants	-0.57	0.72	-0.80	0.43	-1.98, 0.84
Overqualified & recent immigrants	-1.44	1.09	-1.32	0.19	-3.57, 0.70
Intercept	15.06	0.99	15.19	0.00	13.12, 17.00

Table B5 Linear Mixed Model for Immigration Category with Three-way Interaction (Model D)

Predictor	Coef.	Std. Err.	z	p	95% CI
Overqualification (ref: qualified)					
Marginal overqualification	0.50	0.79	0.63	0.53	-1.05, 2.04
Overqualification	0.25	1.23	0.21	0.84	-2.15, 2.66
Immigration Category (ref: economic)					
Refugee	6.02	4.09	1.47	0.14	-1.99, 14.04
Family	-0.64	0.77	-0.84	0.40	-2.14, 0.86
Moved in childhood	0.35	0.87	0.40	0.69	-1.35, 2.05
Sex (ref: female)					
	-0.50	0.37	-1.38	0.17	-1.22, 0.21
Age category (ref: 58 to 67)					
18 to 27	-0.45	1.32	-0.34	0.73	-3.05, 2.14
28 to 37	-0.69	0.76	-0.91	0.36	-2.18, 0.80
38 to 47	0.19	0.60	0.31	0.76	-0.99, 1.36
48 to 57	-0.60	0.54	-1.12	0.26	-1.66, 0.45
Marital status (ref: married)					
Separated, divorced, or widowed	0.34	0.70	0.49	0.63	-1.03, 1.71
Common law partner	-0.12	0.68	-0.17	0.86	-1.45, 1.22
Single	0.10	0.67	0.15	0.88	-1.22, 1.42
SES (ref: upper-middle)					
Low	0.79	0.58	1.37	0.17	-0.34, 1.92
Low-mid	0.61	0.52	1.18	0.24	-0.40, 1.63
Mid	0.59	0.48	1.23	0.22	-0.35, 1.54
High	-0.54	0.74	-0.73	0.47	-1.99, 0.91
Visible minority					
	1.17	1.30	0.90	0.37	-1.38, 3.73
Presence of children					
	0.05	0.50	0.09	0.93	-0.93, 1.02
International education					
	-0.63	0.39	-1.63	0.10	-1.39, 0.13
Region of birth (ref: North America)					
Africa	0.46	1.44	0.32	0.75	-2.37, 3.29
Asia	-0.53	1.46	-0.36	0.72	-3.39, 2.34
Europe	0.29	0.82	0.36	0.72	-1.31, 1.90
Latin America & the Caribbeans	-0.67	1.61	-0.41	0.68	-3.83, 2.50
Time					
	-0.12	0.27	-0.43	0.67	-0.66, 0.42
Overqualification*time					
Marginal overqualification	-0.51	0.57	-0.90	0.37	-1.63, 0.60
Overqualification	0.44	0.64	0.69	0.49	-0.82, 1.71
Immigration category*time					
Refugee	-2.87	1.57	-1.83	0.07	-5.94, 0.20
Family	0.70	0.57	1.23	0.22	-0.41, 1.81
Moved in childhood	0.00	0.58	0.00	1.00	-1.13, 1.14

Table B5 Continued

Predictors	Coef.	Std. Err.	z	p	95%CI
Overqualification*Immigration category					
MOQ & Refugee	-2.53	4.50	-0.56	0.57	-11.36, 6.30
MOQ & Family	1.43	1.28	1.12	0.27	-1.08, 3.94
MOQ & Moved when child	0.33	1.21	0.28	0.78	-2.04, 2.70
OQ & Refugee	-7.06	5.05	-1.40	0.16	-16.96, 2.84
OQ & Family	2.43	1.85	1.31	0.19	-1.20, 6.06
OQ & Moved when child	-0.42	1.66	-0.25	0.80	-3.67, 2.83
Overqualification*Immigration category*Time					
MOQ & Refugee	2.00	2.17	0.92	0.36	-2.26, 6.26
MOQ & Family	0.20	0.98	0.21	0.84	-1.71, 2.12
MOQ & Moved when child	0.22	0.94	0.23	0.82	-1.63, 2.06
OQ & Refugee	6.13	3.21	1.91	0.06	-0.17, 12.43
OQ & Family	-1.52	1.25	-1.21	0.22	-3.98, 0.93
OQ & Moved when child	-0.34	0.93	-0.37	0.71	-2.17, 1.48
Intercept	15.26	1.03	14.84	0.00	13.25, 17.28

Table B6 Analysis of Simple Effects (Model D)

Predictors	Estimate	Std. Err.	z	p	95% CI
Marginal overqualification					
Immigration Category					
Economic	-0.06	0.49	-0.12	0.91	-1.03, 0.91
Refugee	0.20	3.08	0.07	0.95	-5.83, 6.23
Family	1.65	0.67	2.46	0.01	0.33, 2.97
Moved when child	0.49	0.87	0.57	0.57	-1.21, 2.20
Overqualification					
Immigration Category					
Economic	0.75	0.95	0.79	0.43	-1.12, 2.62
Refugee	0.88	2.21	0.40	0.69	-3.46, 5.21
Family	1.69	0.89	1.89	0.06	-0.06, 3.44
Moved when child	-0.09	0.91	-0.10	0.92	-1.87, 1.68

Table B7 Analysis of Simple Effects 2 (Model D)

Predictors	Estimate	Std. Err.	z	p	95% CI
Refugees					
Overqualification					
Qualified	1.77	2.67	0.66	0.51	-3.46, 7.01
Marginally Overqualified	2.03	1.07	1.90	0.06	-0.07, 4.13
Overqualified	1.90	1.81	1.04	0.30	-1.66, 5.45
Family Reunification					
Overqualification					
Qualified	0.09	0.53	0.17	0.87	-0.95, 1.13
Marginally Overqualified	1.80	0.76	2.36	0.02	0.30, 3.29
Overqualified	1.02	1.20	0.85	0.39	-1.33, 3.38
Moved in Childhood					
overqualification					
Qualified	0.35	0.70	0.50	0.62	-1.02, 1.72
Marginally Overqualified	0.90	0.70	1.29	0.20	-0.47, 2.28

Table B8 Linear Mixed Model for Immigration Recency with Three-Way Interaction (Model E)

Predictors	Coef.	Std. Err.	z	p	95% CI
Overqualification (ref: qualified)					
Marginal overqualification	-0.08	0.22	-0.36	0.72	-0.51, 0.35
Overqualification	-0.78	0.47	-1.66	0.10	-1.70, 0.14
Immigration recency					
	0.38	0.26	1.48	0.14	-0.12, 0.88
Sex (ref: female)					
	-0.16	0.12	-1.31	0.19	-0.39, 0.08
Age category (ref: 58 to 67)					
18 to 27	0.60	0.34	1.76	0.08	-0.07, 1.27
28 to 37	0.46	0.22	2.10	0.04	0.03, 0.90
38 to 47	0.31	0.19	1.57	0.12	-0.08, 0.69
48 to 57	0.17	0.16	1.10	0.27	-0.13, 0.48
Marital status (ref: married)					
Separated, divorced, or widowed	-0.55	0.31	-1.77	0.08	-1.16, 0.06
Common law partner	-0.05	0.28	-0.16	0.87	-0.60, 0.50
Single	-0.56	0.21	-2.61	0.01	-0.97, -0.14
SES (ref: upper-middle)					
Low	-0.28	0.19	-1.49	0.14	-0.66, 0.09
Low-mid	-0.12	0.16	-0.72	0.47	-0.44, 0.20
Mid	-0.19	0.18	-1.07	0.28	-0.55, 0.16
High	0.25	0.22	1.11	0.27	-0.19, 0.68
Visible minority	-0.18	0.37	-0.49	0.62	-0.90, 0.54
Presence of children	-0.20	0.18	-1.11	0.27	-0.55, 0.15
International education	0.08	0.15	0.52	0.60	-0.21, 0.36
Region of birth (ref: North America)					
Africa	-0.42	0.41	-1.01	0.31	-1.22, 0.39
Asia	-0.51	0.43	-1.18	0.24	-1.36, 0.34
Europe	-0.41	0.24	-1.71	0.09	-0.89, 0.06
Latin America & the Caribbeans	-0.21	0.49	-0.42	0.68	-1.17, 0.76
Time	0.07	0.08	0.90	0.37	-0.08, 0.22
Overqualification*time					
Marginal overqualification	0.16	0.15	1.05	0.29	-0.13, 0.45
Overqualification	0.58	0.30	1.96	0.05	0.00, 1.16
Immigration Recency*time	-0.28	0.14	-1.98	0.05	-0.56, 0.00
Overqualification*Immigration Recency					
Marginal OQ & recent immigrants	-0.32	0.38	-0.84	0.40	-1.05, 0.42
Overqualified & recent immigrants	0.42	0.59	0.71	0.48	-0.74, 1.58
Overqualification*Immigration Recency* Time					
Marginal OQ & recent immigrants	0.15	0.26	0.57	0.57	-0.36, 0.65
Overqualified & recent immigrants	-0.38	0.43	-0.89	0.37	-1.23, 0.46
Intercept	8.29	0.27	31.01	0.00	7.76, 8.81

Table B9 Analysis of Simple Slopes (Model E)

	Estimate	Std. Err.	z	p	95% CI
Time					
Immigration Recency					
Established	0.20	0.07	2.89	0.00	0.07, 0.34
Recent	-0.09	0.10	-0.96	0.34	-0.29, 0.10

Table B10 Analysis of Simple Effects (Model E)

	Estimate	Std. Err.	z	p	95% CI
Immigration recency, at wave					
0	0.36	0.22	1.65	0.10	-0.07, 0.79
1	0.07	0.16	0.42	0.68	-0.24, 0.37
2	-0.23	0.17	-1.33	0.18	-0.57, 0.11

Table B11 Linear Mixed Model with Immigration Category (Model F)

Predictors	Coef.	Std. Err.	z	p	95% CI
Overqualification (ref: qualified)					
Marginal overqualification	-0.30	0.27	-1.10	0.27	-0.84, 0.23
Overqualification	-0.66	0.51	-1.29	0.20	-1.66, 0.34
Immigration category (ref: economic)					
Refugee	-0.87	1.04	-0.84	0.40	-2.90, 1.16
Family	-0.16	0.24	-0.68	0.50	-0.62, 0.30
Moved in childhood	0.09	0.28	0.31	0.76	-0.46, 0.64
Sex (ref: female)					
	-0.19	0.12	-1.60	0.11	-0.43, 0.04
Age Category (ref: 58 to 67)					
18 to 27	0.48	0.35	1.40	0.16	-0.20, 1.16
28 to 37	0.41	0.22	1.84	0.07	-0.03, 0.85
38 to 47	0.23	0.18	1.29	0.20	-0.12, 0.59
48 to 57	0.03	0.16	0.18	0.86	-0.28, 0.34
Marital status (ref: married)					
Separated, divorced, or widowed	-0.67	0.32	-2.12	0.03	-1.29, -0.05
Common law partner	0.04	0.26	0.17	0.87	-0.47, 0.56
Single	-0.56	0.22	-2.57	0.01	-0.98, -0.13
SES (ref: upper-middle)					
Low	-0.33	0.19	-1.72	0.09	-0.70, 0.05
Low-mid	-0.18	0.17	-1.06	0.29	-0.52, 0.15
Mid	-0.20	0.18	-1.07	0.28	-0.55, 0.16
High	0.17	0.22	0.75	0.45	-0.27, 0.60
Visible minority (ref: non-vis minority)					
Presence of children	-0.19	0.35	-0.54	0.59	-0.87, 0.49
International education	-0.19	0.18	-1.08	0.28	-0.54, 0.15
	0.10	0.14	0.69	0.49	-0.18, 0.38
Region of birth (ref: North America)					
Africa	-0.39	0.37	-1.05	0.29	-1.11, 0.33
Asia	-0.54	0.40	-1.37	0.17	-1.32, 0.24
Europe	-0.41	0.25	-1.67	0.10	-0.89, 0.07
Latin America & the Caribbeans	-0.24	0.45	-0.53	0.60	-1.13, 0.65
Time					
	-0.02	0.08	-0.26	0.79	-0.18, 0.14
Overqualification*Time					
Marginal overqualification	0.26	0.18	1.43	0.15	-0.10, 0.61
Overqualification	0.38	0.25	1.52	0.13	-0.11, 0.87
Immigration category*Time					
Refugee	0.28	0.44	0.64	0.52	-0.58, 1.15
Family	0.03	0.15	0.19	0.85	-0.27, 0.33

Table B11 Continued

Predictors	Coef.	Std. Err.	z	p	95% CI
Moved in childhood	0.02	0.16	0.12	0.91	-0.29, 0.33
Overqualification*Immigration Category					
MOQ & Refugee	1.63	1.12	1.46	0.14	-0.55, 3.82
MOQ & Family	0.86	0.48	1.80	0.07	-0.07, 1.80
MOQ & Moved when child	-0.36	0.44	-0.81	0.42	-1.23, 0.51
OQ & Refugee	0.48	1.05	0.46	0.65	-1.58, 2.54
OQ & Family	-0.01	0.68	-0.02	0.99	-1.34, 1.32
OQ & Moved when child	0.98	0.69	1.42	0.16	-0.38, 2.34
Overqualification*Immigration*Time					
MOQ & Refugee	-0.85	0.55	-1.56	0.12	-1.93, 0.22
MOQ & Family	-0.39	0.30	-1.30	0.19	-0.97, 0.19
MOQ & Moved when child	0.10	0.32	0.30	0.77	-0.54, 0.73
OQ & Refugee	-0.87	0.76	-1.14	0.25	-2.37, 0.63
OQ & Family	0.83	0.48	1.71	0.09	-0.12, 1.78
OQ & Moved when child	-0.93	0.37	-2.53	0.01	-1.65, -0.21
Intercept	8.55	0.31	27.89	0.00	7.95, 9.15

Table B12 Linear Mixed Model for Overqualified Sub-Sample (Model F)

Predictors	Coef.	Std. Err.	z	P	95% CI
Immigration category (ref: economic)					
Refugee	-0.65	0.92	-0.71	0.48	-2.45, 1.15
Family	0.03	0.55	0.05	0.96	-1.04, 1.10
Moved in childhood	1.14	0.57	2.01	0.04	0.03, 2.25
Sex (ref: female)					
	0.12	0.31	0.39	0.70	-0.48, 0.72
Age Category (ref: 58 to 67)					
18 to 27	-0.33	1.05	-0.32	0.75	-2.38, 1.72
28 to 37	-0.53	0.74	-0.71	0.48	-1.98, 0.93
38 to 47	0.46	0.56	0.83	0.41	-0.63, 1.55
48 to 57	0.54	0.40	1.32	0.19	-0.26, 1.33
Marital status (ref: married)					
Separated, divorced, or widowed	-1.07	0.69	-1.54	0.12	-2.42, 0.29
Common law partner	-1.77	1.09	-1.62	0.10	-3.91, 0.37
Single	0.75	0.73	1.03	0.30	-0.67, 2.17
SES (ref: upper-middle)					
Low	-1.23	0.65	-1.87	0.06	-2.51, 0.06
Low-mid	-1.67	0.71	-2.34	0.02	-3.07, -0.27
Mid	-0.61	0.92	-0.66	0.51	-2.42, 1.20
High	-0.85	0.86	-0.99	0.32	-2.53, 0.83
Visible minority (ref: non-vis minority)					
Presence of children	-0.56	1.48	-0.38	0.70	-3.46, 2.34
International education	0.42	0.60	0.70	0.48	-0.76, 1.61
	1.14	0.57	2.01	0.04	0.03, 2.26
Region of birth (ref: North America)					
Africa	1.90	1.91	0.99	0.32	-1.85, 5.64
Asia	0.74	1.68	0.44	0.66	-2.55, 4.02
Europe	1.06	0.76	1.39	0.17	-0.44, 2.56
Latin America & the Caribbeans	0.79	1.86	0.42	0.67	-2.85, 4.43
Time					
	0.30	0.28	1.06	0.29	-0.25, 0.85
Immigration category*Time					
Refugee	-0.41	0.80	-0.52	0.61	-1.97, 1.15
Family	0.80	0.44	1.84	0.07	-0.05, 1.66
Moved in childhood	-0.87	0.44	-1.99	0.05	-1.73, -0.01
Intercept					
	6.82	1.30	5.25	0.00	4.27, 9.37

Table B13 Analysis of Simple Slopes for Overqualified Sub-Sample (Model F)

	Estimate	Std. Err.	z	P	95% CI
Time					
Immigration Category					
Economic	0.30	0.28	1.06	0.29	-0.25, 0.85
Refugee	-0.11	0.74	-0.15	0.88	-1.56, 1.33
Family	1.10	0.32	3.50	0.00	0.49, 1.72
Moved when child	-0.57	0.34	-1.71	0.09	-1.23, 0.08

Table B14 Analysis of Simple Slopes 2 for Overqualified Sub-Sample (Model F)

	Estimate	Std. Err.	z	P	95% CI
Time					
Immigration Category					
Refugee vs Economic	-0.41	0.80	-0.52	0.61	-1.97, 1.15
Family vs Economic	0.80	0.44	1.84	0.07	-0.05, 1.66
Moved when child vs Economic	-0.87	0.44	-1.99	0.05	-1.73, -0.01
Family vs Refugee	1.22	0.82	1.49	0.14	-0.39, 2.82
Moved when child vs Refugee	-0.46	0.80	-0.58	0.56	-2.03, 1.10
Moved when child vs Family	-1.68	0.46	-3.62	0.00	-2.58, -0.77

Table B15 Analysis of Simple Effects for Overqualified Sub-Sample (Model F)

		Estimate	Std. Err.	z	P	95% CI
Refugees						
at						
	1	-0.65	0.92	-0.71	0.48	-2.45, 1.15
	2	-1.06	0.59	-1.80	0.07	-2.22, 0.10
	3	-1.47	1.06	-1.39	0.17	-3.55, 0.60
Family Reunification						
at						
	1	0.03	0.55	0.05	0.96	-1.04, 1.10
	2	0.83	0.45	1.86	0.06	-0.04, 1.71
	3	1.64	0.70	2.36	0.02	0.28, 3.00
Moved when child						
at						
	1	1.14	0.57	2.01	0.04	0.03, 2.25
	2	0.27	0.48	0.55	0.58	-0.68, 1.21
	3	-0.61	0.73	-0.83	0.41	-2.04, 0.82

Table B16 Linear Mixed Model for Marginally Overqualified Sub-Sample (Model F)

Predictors	Coef.	Std. Err.	z	P	95% CI
Immigration category (ref: economic)					
Refugee	0.68	0.45	1.52	0.13	-0.20, 1.56
Family	0.73	0.41	1.77	0.08	-0.08, 1.53
Moved in childhood	-0.14	0.43	-0.32	0.75	-0.98, 0.71
Sex (ref: female)					
	-0.26	0.21	-1.23	0.22	-0.68, 0.16
Age Category (ref: 58 to 67)					
18 to 27	0.91	0.57	1.61	0.11	-0.20, 2.03
28 to 37	0.69	0.33	2.13	0.03	0.05, 1.33
38 to 47	0.44	0.29	1.49	0.14	-0.14, 1.01
48 to 57	-0.08	0.31	-0.26	0.80	-0.68, 0.53
Marital status (ref: married)					
Separated, divorced, or widowed	-0.58	0.53	-1.09	0.28	-1.61, 0.46
Common law partner	0.22	0.54	0.41	0.68	-0.84, 1.28
Single	-1.03	0.33	-3.15	0.00	-1.67, -0.39
SES (ref: upper-middle)					
Low	-0.87	0.41	-2.15	0.03	-1.67, -0.08
Low-mid	-0.45	0.35	-1.29	0.20	-1.14, 0.24
Mid	-0.56	0.35	-1.57	0.12	-1.25, 0.14
High	-0.15	0.52	-0.30	0.77	-1.17, 0.86
Visible minority (ref: non-vis minority)					
	-0.53	0.46	-1.16	0.24	-1.43, 0.36
Presence of children					
	-0.10	0.23	-0.43	0.66	-0.55, 0.35
International education					
	-0.05	0.22	-0.24	0.81	-0.49, 0.38
Region of birth (ref: North America)					
Africa	-1.51	0.69	-2.20	0.03	-2.85, -0.16
Asia	-1.02	0.72	-1.41	0.16	-2.43, 0.40
Europe	-1.43	0.53	-2.68	0.01	-2.47, -0.38
Latin America & the Caribbeans	-1.13	0.71	-1.59	0.11	-2.53, 0.26
Time					
	0.24	0.16	1.52	0.13	-0.07, 0.56
Immigration category*Time					
Refugee	-0.55	0.38	-1.44	0.15	-1.29, 0.20
Family	-0.32	0.25	-1.25	0.21	-0.82, 0.18
Moved in childhood	-0.05	0.28	-0.18	0.86	-0.60, 0.50
Intercept					
	9.48	0.70	13.51	0.00	8.10, 10.85

Table B17 Linear Mixed Model for Overqualified Sub-Sample (Model F)

Predictors	Coef.	Std. Err.	z	P	95% CI
Immigration category (ref: economic)					
Refugee	-0.67	1.02	-0.66	0.51	-2.67, 1.32
Family	-0.33	0.25	-1.30	0.19	-0.82, 0.17
Moved in childhood	0.03	0.29	0.11	0.92	-0.54, 0.60
Sex (ref: female)					
	-0.13	0.17	-0.75	0.46	-0.46, 0.21
Age Category (ref: 58 to 67)					
18 to 27	0.27	0.41	0.66	0.51	-0.54, 1.09
28 to 37	0.38	0.27	1.39	0.17	-0.16, 0.92
38 to 47	-0.01	0.23	-0.06	0.95	-0.46, 0.44
48 to 57	-0.09	0.18	-0.49	0.63	-0.45, 0.27
Marital status (ref: married)					
Separated, divorced, or widowed	-0.38	0.31	-1.21	0.23	-0.99, 0.23
Common law partner	0.24	0.29	0.82	0.41	-0.34, 0.82
Single	-0.56	0.27	-2.08	0.04	-1.08, -0.03
SES (ref: upper-middle)					
Low	-0.22	0.24	-0.92	0.36	-0.70, 0.25
Low-mid	-0.10	0.23	-0.42	0.67	-0.55, 0.35
Mid	-0.11	0.21	-0.52	0.61	-0.53, 0.31
High	-0.03	0.22	-0.13	0.90	-0.46, 0.40
Visible minority (ref: non-vis minority)					
	-0.11	0.44	-0.25	0.80	-0.97, 0.75
Presence of children					
	-0.30	0.26	-1.16	0.25	-0.81, 0.21
International education					
	0.07	0.16	0.47	0.64	-0.24, 0.38
Region of birth (ref: North America)					
Africa	-0.08	0.38	-0.21	0.83	-0.83, 0.67
Asia	-0.74	0.46	-1.62	0.10	-1.64, 0.15
Europe	-0.48	0.28	-1.75	0.08	-1.03, 0.06
Latin America & the Caribbeans	-0.19	0.58	-0.33	0.74	-1.33, 0.95
Time					
	-0.03	0.08	-0.37	0.71	-0.18, 0.13
Immigration category*Time					
Refugee	0.15	0.39	0.40	0.69	-0.60, 0.91
Family	0.06	0.16	0.41	0.68	-0.24, 0.37
Moved in childhood	0.05	0.17	0.29	0.77	-0.28, 0.38
Intercept					
	8.73	0.35	25.03	0.00	8.05, 9.41

Appendix C: Coding of Overqualification

Table C1: NOC 2011 – Skill Category Codes

Information contained in this table is taken verbatim from Statistics Canada’s National Occupational Classification (NOC) 2011 webpage. Available at:
<https://www.statcan.gc.ca/en/subjects/standard/noc/2011/introduction>

Skill Category of Occupation	Second digit of NOC code
Skill Level A <ul style="list-style-type: none"> - University degree (including Bachelor’s, master’s, and PhD) - *Senior management occupations - *Specialized middle management occupations 	0 or 1 00 01 - 05
Skill Level B <ul style="list-style-type: none"> - Two to three years of post-secondary education at community college, institute of technology or CÉGEP - Two to five years of apprenticeship training - Three to four years of secondary school and more than two years of on-the-job training, occupation-specific training courses or specific work experience - Occupations with supervisory responsibilities are also assigned to skill level B. - Occupations with significant health and safety responsibilities (e.g., fire fighters, police officers and licensed practical nurses) are assigned to skill level B. - *Middle management occupations in retail, wholesale trade, and customer services. - *Middle management occupations in trades, transportation, production, and utilities 	2 or 3 06 07 - 09
Skill Level C <ul style="list-style-type: none"> - Completion of secondary school and some short-duration courses or training specific to the occupation - Some secondary school education, with up to two years of on-the-job training, training courses or specific work experience 	4 or 5
Skill Level D <ul style="list-style-type: none"> - Short work demonstration or on-the-job training - No formal educational requirements 	6 or 7

* The management occupations are classified into skill categories following Lu and Hou (2020)’s procedure.

Table C2: LISA Answer Categories for Highest Level of Attained Education

No formal education	01
Less than high school diploma	02
High school diploma or equivalent	03
Trade/vocational certificate (includes an attestation of VOC)	04
Apprenticeship certificate	05
CEGEP diploma or certificate	06
Non-university certificate or diploma from a college, school	07
University transfer program	08
University certificate or diploma below bachelor's degree	09
Bachelor's degree	10
University certificate above the bachelor's	11
First profession degree (medical, veterinary medicine, dentistry, optometry, law, etc.)	12
Master's	13
Ph.D.	14
Education not definable by level	15
Valid Skip	96
Don't know	97
Refusal	98
Not stated	99

Table C3: Classifying Education-Occupation Mismatch

<u>LISA</u> – Educational Level	<u>NOC</u> – Skill Category	Education-Occupation Status
10 – 14 (bachelor's and up)	0, 1, 00, 01, 02, 03, 04, 05	Match
10 – 14	2, 3, 06, 07, 08, 09	Marginally Overqualified
10 – 14	4, 5, 6, 7	Overqualified