TRAJECTORIES OF EMOTIONAL PROBLEMS IN AN ETHNICALLY DIVERSE SAMPLE OF IMMIGRANTS

by

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy
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ABSTRACT

The purpose of this dissertation was to examine mental health trajectories in immigrants living in Canada. The first study examined the rates of emotional problems among parents, versus non-parents, using all three waves of data from a sample of immigrants in Canada (N = 7055). After controlling for a variety of socio-demographic covariates, results from multilevel logistic regression models indicated that immigrant parents have higher odds of reporting emotional problems in comparison to non-parent immigrants, and these differences are stable across the first four years following immigration. These effects were evident after ethnicity was included in the model and after controlling for relevant socio-demographic characteristics, such as age, gender, socioeconomic status, and immigrant category, suggesting an effect of caregiver strain. In terms of ethnic differences, more Black, Arab, South Asian and East Asian respondents report emotional problems over time than White immigrants. Results revealed that immigrants who endorsed being divorced without children are also particularly vulnerable. The second study examined depressive symptoms in a sample of mothers who were evaluated closely after the birth of a baby using four waves of data from the Kids Families and Places study. Results from latent growth curve models indicated that immigrant mothers showed significantly more depressive symptoms in comparison to Canadian born mothers. More specifically, Asian immigrants and Black immigrants were found to have higher levels of depressive symptoms in comparison to White Canadian mothers. It was
found that socioeconomic indicators were among the best predictors of maternal
depression in Asian immigrant and Black immigrant mothers. The overall goal of this
dissertation is to highlight the importance of studying immigrants, as there are a number
of stressors and challenges associated with immigration, which may lead to increased
rates of mental health problems. These challenges may be even more burdensome for
immigrants who must care for economically dependent children.
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ADDRESSING THE SCOPE OF THIS DISSERTATION

The first study was completed using a pre-existing data set collected by Statistics Canada. The second study was part of the Kids, Families, and Places (KFP) study. My contribution to the KFP study went beyond the work that was included as part of this dissertation. I was responsible for the training and supervision of undergraduate and masters level research students. I have also contributed to data collection and coding for the KFP study.
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General Introduction

According to the most recent census data (Statistics Canada, 2011), immigrants represent approximately 20.6% of the total population of Canada. The proportion of immigrants living in Canada has reached its highest in over 70 years and is expected to continue to increase. Canadian cities such as Toronto, Vancouver and Montreal have the highest proportion of immigrants. In Toronto alone, immigrants account for 46% of the population. Of the overall total population of immigrants in 2011, 61.3% were visible minority groups including South Asian, Chinese and Black. There is an emerging body of research on mental health in immigrant adults, (Kirmayer et al., 2011; Khanlou et al., 2002) however, the field has reached little consensus on the mental health needs of immigrants.

The main objective of these studies is to identify trajectories of mental health over time in a heterogeneous sample of immigrants. The following studies examine mental health disparities from a social determinants framework. The World Health Organization defines the social determinants of health as conditions in which individuals are born and live and how these circumstances influence the distribution of money, power and resources (Commission on Social Determinants of Health, 2008). The following studies examine mental health over time at different stages of the life course (Study 1: immigrants upon arrival to Canada and Study 2: immigrant and non-immigrant groups subsequently after childbearing). This research provides insight into which immigrant groups may require additional services and support after arriving to Canada.

Immigration and Mental Health

Immigration into Canada is a time of tremendous opportunity, characterized by the possibility of new social and economic beginnings for immigrants and in many cases, their
families. Simultaneously, it can be a time of tremendous challenge. Immigrants are required to negotiate a variety of transitions, adjusting to the cultural, social, political and economic contexts in their new home country. The stresses of resettlement have been associated with an increased risk of psychological distress in immigrants, where compared to native-born citizens, immigrants are at a higher risk of depression (Beiser, 2005).

Newcomers face a host of pre and post immigration challenges that can contribute to mental health problems. For instance, immigrants experience less social support (Pernice & Brook, 1996), fewer job opportunities (Schellenberg, 2004), cultural barriers (Pernice & Brook, 1996; Miranda et al., 2008), difficulty accessing quality health and mental health care (Miranda et al., 2008), discrimination (Yip, Gee, & Takeuchi, 2008; Pernice & Brook, 1996) and feelings of isolation. In addition, immigrants have been consistently shown to be more economically disadvantaged in comparison to Canadians (Beiser et al., 2002).

On the other hand, there is a large body of literature that suggests immigrants have lower risk, described as the immigrant paradox. This research suggests that despite the factors that ordinarily confer risk, such as poverty, linguistic and cultural barriers (Beiser et al., 2010, Ali, 2012), immigrants have better physical (Coll & Marks, 2012; Markides and Coreil, 1986; Singh & Yu, 1996; Escobar, 1998; McDonald & Kennedy, 2004) and mental health outcomes.

Overall, there is a lack of consistency across studies, with some studies suggesting immigrants are at higher risk and other studies reporting that immigrants are at lower risk in comparison to their native-born counterparts. It is possible that these discrepancies arise as a result of different sampling methods and measurement approaches.

Over the past few decades, immigrants arriving to Canada have largely been from non-European countries, and as a result, some immigrants may be more likely to experience
acculturative stress due to notable cultural change and difficulty having their credentials recognized (Yoo et al., 2012). The increase in mental health problems have been interpreted as immigrants arriving to their host country with hopes and expectations that may not be realized due to the many obstacles of settling in a new country, including risk factors such as, systemic racism and discrimination (Noh & Kaspar, 2003; Noh et al., 1999).

**Heterogeneity of Immigrant Groups**

Although there are common experiences that immigrants share in the process of settlement, immigrants are exposed to unique cultural influences depending on their country of origin. The literature on immigrant mental health is often dominated by broad groupings such as, “immigrant” vs. “non-immigrant,” thus unable to examine within group heterogeneity. Some researchers have only included one target ethnic group or sample sizes insufficient to examine differences across ethnic groups. This is problematic because immigrants are a heterogeneous group, with a great deal of within group variability. In addition, using broad categories may mask important sub-group differences within the immigrant population (with some groups at higher risk and others at lower risk, taking the average would mask these divergent patterns of risk). For example, minority status immigrants may have poorer mental health outcomes in comparison to non-minority immigrants.

Literature on the social determinants of mental health in non-immigrant populations, illustrates that minority populations, in particular those who identify themselves as Black are likely to experience poorer mental health outcomes in comparison to majority groups (Jackson et al., 2007; Spence et al., 2011). Similarly, a Canadian study on postpartum depression in immigrant women found that visible minority immigrant groups had higher depressive symptoms (25%) in comparison to immigrant women from majority groups (8.3%) (Mechakra-
Tahiri et al., 2007). Research on understanding disparities in mental health outcomes has shown that minority groups have higher rates of unemployment, lower socioeconomic status and are more likely to experience systemic racism and discrimination in comparison to non minority groups (Willms, 2002; Williams et al., 2007; Ward & Heidrich, 2009). Most of the research on understanding ethnic disparities has been examined in the United States, not representing the ethnic diversity seen in Canada. It is important to study mental health in immigrant families in the Canadian context, as there are differences in factors such as, immigration policies, mental health care and immigration patterns.

Only two Canadian studies were located that included multiple ethnicities in their analysis studying depression among immigrants. Miszkurka et al (2010) conducted a cross-sectional study that found variation in the Center for Epidemiological Studies Depression Scale (CES-D) according to ethnicity, where women from the Caribbean, South Asia, and specific regions in Africa endorsed higher rates of antenatal depression in comparison to immigrants of European origins. Miszkurka (2010) and colleagues excluded women who were unable to communicate in either English or French, indicating a potential selection bias. Contrary to these results, Xu et al (2010) found that Asian and Black immigrants were less likely to have mental health problems in comparison to their white counterparts (native born). Xu and colleagues included a sample of men and women. In addition, authors used an aggregated index of mental health problems consisting of stress, depression, alcoholism and suicidal ideation, which may explain why their findings differ from those of Miszkurka and colleagues. In terms of depressive symptoms over time, Miszkurka and colleagues (2010) found that depressive symptoms increased for European and Southeast Asian immigrants, decreased for Maghrebian, Sub-Saharan African, Middle Eastern, East Asian, and fluctuated for Latin American and Caribbean
participants. These studies suggest there is little consensus on which immigrant ethnic groups are most likely to suffer from depressive symptoms. These inconsistencies in findings across studies are most likely due to differences in the following ways: the operationalization of ethnic groups, measurement of mental health outcomes, how the sample was selected, and whether the study included non-English speaking participants.

**Immigration and Parenthood**

Similar to the research on the heterogeneity of immigrant groups in mental health, there is limited research on the relationship between parenthood and mental health among immigrants. Studies have indicated that parenthood is associated with poorer mental health outcomes (DeKlyen et al., 2006; Evenson & Simon, 2005; McKenzie et al., 2013). These results have been explained by social psychology theories that suggest the emotional benefits do not exceed the emotional costs associated with parenthood (Evenson & Simon, 2005). It is unknown to what degree these findings can be extended to immigrant populations (Umberson et al., 2010), however, there are numerous reasons to expect that for immigrants, parenthood may represent a greater burden in comparison to non-immigrant parents. It is possible that individuals in different social contexts, such as newcomers, are more likely to experience parenting as a burden, because they encounter more life strains around parenting (Crouter & Booth, 2004). One research study was located which showed that second-generation Turkish immigrant mothers endorsed more daily stress (Parenting Daily Hassles questionnaire) and marital problems in comparison to Dutch mothers (Yaman et al., 2010). In some cultures extended family play a large role in childcare, particularly during post-partum, infancy and toddlerhood periods, and new immigrant parents may experience less social support and help with their children in their host country than native-born mothers (Harrison et al., 1990).
It is also possible that immigrant parents experience parenthood distress that may be different from native-born populations, such as, intergenerational conflicts with their children due to acculturation gaps. Immigrant parents that come from collectivist cultures may have a difficult time negotiating between their traditional beliefs and customs and the culture of their host country (Kim et al., 2009). For example, some cultures emphasize the importance of family duty and obligation, respect for elders and family cohesion, whereas North American culture values autonomy and individuality (Kim et al., 2009). School related experiences allow children born in immigrant families to be immersed in the culture of their host country at a faster rate than their parents. For traditional immigrant parents, they may view their children adopting a new culture as a rejection of their own culture. These parents may also feel they have less influence over their children’s value system, contributing to greater levels of stress and mental health problems (Dinh & Nguyen, 2006).

**Aims of the Present Studies**

Mental health in immigrant populations is likely determined by numerous multiplicative factors. The present studies attempt to elucidate the factors associated with differences in mental health trajectories of immigrants over time. In order to achieve this goal two separate areas of study, (1) immigration and mental health and (2) parenthood and mental health are integrated.

Study 1 explored emotional problems over time in a sample of immigrants to Canada and Study 2 explored depressive symptoms over time in a sample of immigrant and non-immigrant parents. Logistic regression and growth curve models were used to examine the trend of mental health problems over time. Study 1 explored whether ethnic groups are more likely to report emotional problems in comparison to White immigrants upon arrival to Canada (initial levels) and over the first four years of settling in Canada (over time). Study 2 explored whether White
immigrant, Black immigrant and Asian immigrant mothers experience more depressive symptoms compared to Canadian born mothers after the birth of a baby (initial) and overtime. These studies overcome the problems that many previous studies have had in treating immigrant status as a homogeneous category and using cross sectional designs.

In Study 1, I explored whether ethnicity predicts initial emotional problems and rate of change (prevalence rates increasing). The crux of this study is to identify whether immigrants with dependent children are more likely to report emotional problems compared to immigrants without dependent children. Based on research examining parenthood and mental health (Evenson & Simon, 2005; Mckenzie, & Carter, 2013), it was proposed that immigrants with children would be more likely to report emotional problems initially and over time in comparison to immigrants without children. In addition, it was proposed that immigrants who identify themselves as a visible minority (non-Aboriginal, non-Caucasian and non-European) would be more likely to report emotional problems initially and over time in comparison to non-visible minority immigrants.

The first study used data from the Longitudinal Study of Immigrants to Canada (Statistics Canada, 2007). The main strength of this survey is that it captures the diversity of immigrants coming to Canada and followed the same cohort of newcomers for the first four years of the settlement process. This study is also able to compare immigrants with dependent children to immigrants without children, exploring the effect of parental status on emotional problems. It is important to note that eligibility criteria in many studies require respondents to be well versed in English. As a result, many studies exclude a group of immigrants based on language barriers. The following study was conducted in 15 different languages to ensure inclusion of these immigrant groups and reducing the potential of selection bias (Kramer et al., 2009). Despite the
many strengths of this survey, the mental health measure used for this study is a single item measure of emotional problems. In addition, there is no comparison group of Canadian born respondents. Finally, the specific age of all children living in the household was not collected in the study.

Study 2 made comparisons between immigrants and non-immigrants and examined the factors that may explain these differences. Mothers were followed across the postpartum period to see which groups are most likely to endorse symptoms of depression. It was hypothesized that visible minority immigrants would have higher levels of depressive symptomology after giving birth to a baby in comparison to Canadian born mothers. If visible minority immigrants report higher levels of depressive symptoms, these findings raise an important question: What accounts for these higher levels of depressive symptoms among immigrant mothers? Present and past risk factors (explanatory variables) such as being single, marital conflict, low income and fewer assets, and past risk factors such as childhood adversity are explored to see whether they explain differences in trajectories of depressive symptoms between immigrants and Canadian born mothers.

The second paper used data from the Kids Families and Places study. This study utilized a stronger measure of maternal depression developed by the Center for Epidemiologic Studies, (CES-D), which has been shown to have cross-cultural equivalence (Van Lieshout et al., 2011). The KFP study collected data on all children living in the household. This study also has a strong comparison group, since it includes native-born Canadian mothers in the sample. However, there were no visible minority native-born comparison group in this study and to be eligible for the study respondents were required to be able to speak English.

Together, both of these studies identify immigrant groups across Canada that may be
more likely to suffer from mental health problems. These studies also provide insight into the trajectories of mental health over time across different ethnic groups, Study 1 exploring the trend for newly arriving immigrants and Study 2 for mothers who have recently given birth to a baby. Study 1 is an exploratory study examining when and who is at risk of emotional problems, and Study 2 expands on Study 1 by identifying potential factors that account for higher risk among immigrant groups.
Study 1

Emotional Problems Among New Canadian Immigrants: Examining the Effects of Parenting Status and Ethnicity Using a National Longitudinal Database

Mental health research has not kept pace with the rapid changes in immigration to Canada. Our understanding of the complex dynamics involved in mental health of diverse groups of immigrants in Canada, in particular immigrant parents is limited. This research is particularly important because the stress of immigration has been linked with an increased risk of depressive symptoms in immigrants (Beiser et al., 2002; Zelkowitz et al., 2004). A separate body of research has long demonstrated that there can be substantial stressors associated with parenting among non-immigrant populations (Abidin, 1992). Such parental stress has been linked to both environmental risk factors, in the form of socioeconomic disadvantage, and to mental health problems such as depression among parents (Evenson & Simon, 2005; McKenzie & Carter, 2013). Surprisingly, there have been no studies to date to understand whether newly immigrating parents experience more emotional problems in comparison to immigrants without children. This is a critical area of research given that children growing up in homes with a parent suffering from mental health problems report poorer developmental outcomes and higher levels of psychological maladjustment (Cummings et al., 1994; Cox et al., 1987).

The aim of the current longitudinal study is to examine emotional problems and parenthood in a sample of new immigrants to Canada. This study examines initial levels of emotional problems at 6 months post arrival and over four years post immigration among an ethnically diverse sample of immigrants, using the Longitudinal Survey of Immigrants to Canada (LSIC). By studying this group over time it is possible to differentiate the effects of ethnicity...
amongst a sample of immigrants. This study also explores how socio-demographic covariates including immigrant category (reasons for immigration), income and gender influence emotional problems above and beyond ethnicity predictors. The central aim of this paper is to examine whether initial emotional problems and rate of change would be predicted by ethnicity and parenting status above and beyond socio-demographic covariates.

**Mental Health Trajectories of New Immigrants**

Very few studies have examined immigrant mental health upon arriving in Canada and followed these same respondents over time. Of the cross sectional studies published, there is little consensus on the pattern of immigrant mental health and the course of immigrants’ depression is unclear.

Some studies suggest that immigrants’ depressive symptoms increase over time. Breslau & Chang (2006) utilized data from the National Epidemiological Survey of Alcohol and Related Conditions (NESARC). The survey instrument administered was the Alcohol Use Disorder and Associated Disabilities Interview Schedule – DSM-IV version, which examines mood disorders, anxiety disorders and substance use disorders. Results from this cross sectional survey indicated that as Asian immigrants settle and acculturate to their new life, they are more likely to report mood disorders to a level equal to that of US-born Asian-Americans (Breslau & Chang, 2006). Researchers excluded respondents with limited English language skills and involuntary immigrants from the sample. The study also included immigrants who were above the age of 18 years old but who arrived to the U.S as children (age 13 or earlier) (Breslau & Chang, 2006).

Similarly, a cross sectional study from the Canadian Community Health Survey found that immigrants reported higher rates of depressive symptoms with the increase in number of years since immigration, but this relationship was only observed for Asian immigrants (Tiwari &
Wang, 2008). Tiwari & Wang (2008) assessed their outcome variable using the World Health Organization’s composite international diagnostic interview-short form for major depression (CIDI-SFMD). Unfortunately, this study did not include other visible minority groups such as, black immigrants in the sample. Other studies have found similar findings of mental health among immigrants, where immigrants appear to have lower initial rates of depressive symptoms in comparison to their native-born counterparts; however, over time they report either poorer psychological health or rates similar to the general population (Beiser, 1988; Kirmayer et al., 2011; Nguyen et al., 1982; Setia et al., 2012;). 

There are also a handful of studies that have found both an increase and decrease in symptoms over a certain period of time. These studies suggest that immigrant emotional status initially declines and then improves as immigrants acculturate to their host country. In other words, as immigrants adjusted to their new lives, their mental health problems decrease, but only after a long period of resettlement has passed. For example, a community based cross-sectional survey of 311 adult Vietnamese American immigrants found that depression levels measured by the CES-D tend to be high during the first decade of resettlement and then depression levels decline (Tran et al., 2007). This study limited the analysis to Vietnamese Immigrants and had no comparison group. Similar results were found in another cross sectional study using cycle two from the National Population Health Survey that utilized the National Population Health Survey depression scale. This Canadian study included 10,972 women and 59,566 men and results indicated that there is a nonlinear relationship between time since immigration and mental health. More specifically, they found that symptoms of depression increased upon arrival to Canada and then declined after two decades (Wu & Schimmele, 2005). Unfortunately, this study did not include other visible minority groups such as, black immigrants in the sample and the
relationship between time since immigration and mental health was not examined as a function of ethnicity.

Finally, there have been studies indicating that depression is unrelated to years of arrival among immigrants (Takeuchi et al., 1998). A cross sectional study conducted in New Zealand investigated immigration and length of residence. This study included Southeast Asian refugees, Pacific Island immigrants and British immigrants through a convenience sample. Results indicated that there were no differences in mental health symptoms between the first 6 months and subsequent 6 years (Pernice & Brook, 1996). Similarly, a study that utilized all seven cycles from the National Population Health Survey in Canada found that time since immigration and psychological distress were not related (Setia et al., 2012). This study used the Comprehensive International Diagnostic Interview (CIDI) to measure self-reported psychological distress, which is a structured diagnostic interview to establish Diagnostic Statistical Manual disorders, and only compared white vs. non-white immigrants. These inconsistent findings from the National Population Health Survey are most likely due to differences in research design (longitudinal vs. cross sectional).

In sum, there is a need for stronger methodological research designs to explore the initial pattern of immigrant mental health and how it changes over time. Although some previous studies used large sample sizes, these surveys collect data at one point in time. Mental health in immigrants may be a time sensitive phenomenon, so this type of cross-sectional data is not ideal. A better comparison can be made with longitudinal data, where the same cohort of immigrants can be followed over time. Mixed findings regarding the course of depression in immigrants could result when research is not sensitive to the heterogeneity of immigrant groups. Studies that treat immigrants as a homogenous group fail to recognize the existence of sample subgroups,
such as ethnic groups that may have different patterns of depression trajectories. Another dimension of heterogeneity among immigrants are different classes of immigrants, (such as, refugee, economic and family class immigrants). Grouping immigrants into one category underestimates the fact that immigrants migrate to Canada for different purposes and under different circumstances. This paper addresses the gap in the literature in understanding differences in mental health across different categories of immigration.

**Categories of Immigration**

The high level of immigration in Canada can be explained by Canada’s interest in recruiting individuals who can contribute and fill labour market needs in Canada, facilitating family reunification and protecting people seeking refuge from outside of Canada. No studies to date were found that examined differences in mental health disparities across different categories of immigration. As a result, hypotheses for the following study are based on the theoretical differences between immigrant categories.

Under the broader category of economic class immigrants are skilled workers, who gain admission into Canada because they possess essential and transferable skills that can contribute to the Canadian labour market. These immigrants are assessed based on their education level, previous work experience, knowledge of language, age, employment prospects, and their ability to adapt to Canada. Similarly, business immigrants are under the larger category of economic class, where they are chosen based on their ability to create jobs for themselves and contribute to the Canadian economy. On the other hand, family class immigrants are accepted into Canada for the objective of family reunification. It is possible that family class immigrants would be most protected from mental health problems, as they are more likely to have family members who can aid and support them in the settlement process. Previous research has indicated that
immigrants who are less likely to have family near by are more likely to be depressed (Aroian & Norris, 2003). However, it is also possible that family class immigrants may be more vulnerable to symptoms of depression as they may not possess the same strengths as economic immigrants who undergo the competitive points system to gain admission into Canada.

Although there has been little research on the mental health of economic and family class immigrants to Canada, there has been more research about refugees. Unlike immigrants, refugees come to Canada to seek protection that their country can no longer offer. Refugees do not undergo the competitive points system process that is mandatory for immigrants. Instead, the Immigration and Refugee Board of Canada decide who is in need of refugee protection. Some refugees come to Canada to seek safety from circumstances of war, danger of torture, risk to their life, or risk of cruel and unusual treatment or punishment. Refugees can also come to Canada on the terms that they are unable to safely return to their home country due to fear of persecution based on race, religion, political opinion, nationality or membership of a particular social group (e.g. being female or homosexual) (Government of Canada, 2012).

Refugees have been shown to have much higher exposure to violence in their country of origin and are more likely to develop trauma related disorders (Kirmayer et al., 2011; Chung & Kagawa-Singer, 1993). One study conducted in Canada found that refugee participants had the highest rates of mental health problems compared to immigrants (Hansson et al., 2012). Refugees are at increased risk of psychopathology occurring as a result of traumatic life experiences, such as, exposure to war, violence and experience of various losses (Lustig et al., 2004; Steel et al., 2009). They are also subjected to on-going stressors in the host country where they are seeking refuge. These include uncertainty about where they would be living, inadequate housing, frequent moves and restrictions on working that can lead to financial difficulties.
Socioeconomic Conditions

Financial hardship has been identified as one of the strongest determinants of poor parental mental health (Leyendecker, Harwood, Comparini, & Yalcinkaya, 2005; McLoyd, 1990) and immigrants have been consistently shown to be more disadvantaged in comparison to Canadians (Beiser et al., 2002). An analysis of the Canadian census data revealed that visible minority immigrants had much higher rates of poverty compared to non-visible minority immigrants (Hansson et al., 2012; Walks & Bourne, 2006).

For Canadians, higher education has been shown to be associated with higher income. This trend is not seen within immigrant populations today, where recent immigrants have unexpectedly low incomes in spite of possessing the highest average levels of education among all Canadians (Schellenberg, 2004). In addition, many immigrants have difficulty finding jobs that match their educational attainment and that consist of safe and equitable work environments (Chen et al., 2010).

Immigration is often followed by a period of financial transition. The first four years after immigration may be characterized by fluctuating incomes for immigrants and their families. Despite changes in income levels for new immigrants, few previous studies have investigated income as a time-varying covariate. Allowing income to vary over time allows researchers to examine how changes in income are related to mental health over time.

Sociodemographic Risks

Women have been consistently identified in the literature as having higher rates of depression compared to males, universally (Weissman et al., 1996). Some scholars assert that women are at a higher risk due to both biological vulnerabilities and situational experiences.
(Kessler et al., 2005; Kessler, 2003). What is unknown is to what extent these risk factors apply to immigrant women.

Immigrant women have been shown to exhibit elevated levels of depressive symptoms that are significantly higher than Canadian born women (Stewart et al., 2008; Zelkowitz, 2004). Immigrant women may be more likely to be exposed to cultural expectations such as personal sacrifice, and family and cultural obligations, in comparison to males (Tang et al., 2007). As a result, immigrant women may carry the burden of looking after children in the home, which allows fewer opportunities to integrate into the community, increase knowledge of their new environment and to find appropriate employment (Tang et al., 2007).

Based on non-immigrant samples, studies suggest that depressed mothers also struggle with a host of adversities. For instance, such mothers are more likely to have dysfunctional marriages, a partner with a mental illness (Zuckerman & Beardslee, 1987), and experience domestic violence (Golding, 1999). Mothers experiencing depressive symptoms are also more likely to be young, isolated from friends and family, socioeconomically disadvantaged and encounter more stressful life events than mothers who do not exhibit depressive symptoms (Lorant, Deliege, Eaton, Robert, Philippot & Ansseau, 2003; Horowitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007).

**Parenthood and Mental Health**

Previous research among native-born populations has demonstrated that parenthood is associated with poorer mental health outcomes than non-parents (McKenzie et al., 2013; DeKlyen et al., 2006; Evenson & Simon, 2005). Stressors associated with parenting are most likely to occur in situations of environmental and familial risk, and during periods of life transition and struggle (Abidin, 1992). There is also an overwhelming amount of research that
indicates depression may be more prevalent during women’s childbearing years (O’Hara & Swain, 1996) and when women have young children (Brown & Harris, 1978). As a result, it is probable that immigrant parents have higher odds of reporting depressive symptomology in comparison to immigrants without children. Currently there is a paucity of research examining mental health outcomes of immigrant parents in Canada.

**Purpose and Hypotheses**

This is one of the first studies capturing the diversity of immigrants coming to Canada using a longitudinal design. This study compares immigrants with dependent children to immigrants without children, exploring the effect of ethnicity and parental status on emotional problems, after controlling for relevant socio-demographic characteristics, such as age, gender, socioeconomic status, and immigrant category.

The guiding questions of the current study are:

1. Are visible minority immigrants more likely to report emotional problems initially and over time in comparison to White immigrants?

   **Hypothesis One:** It is expected that visible minority immigrant groups, in particular Black immigrants, will be more likely to report emotional problems initially and over time in comparison to White immigrants.

2. Do socio-demographic covariates predict initial emotional problems and rate of change in prevalence among immigrants?

   **Hypothesis Two:** Initial emotional problems and rate of change in prevalence will be predicted by a number of socio-demographic covariates. More specifically, it is expected that immigrants who claim refugee status will have higher likelihood of reporting emotional problems at the first time of data collection in comparison to non-refugees. Due to the limited
research on both economic and family class immigrants, competing hypotheses are tested. Business class immigrants that include entrepreneurs and investors are expected to report less emotional problems than economic class immigrants. Next, it is expected that immigrants who report low incomes will have, on average, higher likelihood of emotional problems with the prevalence increasing over time. Similarly, it is expected that immigrants with fewer years of education upon immigration will have more emotional problems with an increase in prevalence over time (Dean & Wilson, 2009). Additionally, it is expected that the emotional problems of women are likely to deteriorate more rapidly following immigration in comparison to men.

**Hypothesis Three:** Initial emotional problems and rate of change in the prevalence of emotional problems will be predicted by parenting status. Immigrating and settling in Canada with dependent family members may be particularly stressful in comparison to those who settle in Canada without children. For this reason, it is expected that immigrants who are parents will have higher likelihood of reporting emotional problems at the first point of contact compared to immigrants who are not parents. Additionally, it is expected that these differences in the prevalence of reported emotional problems would increase over time, as parents deal with the social, psychological and economic burden of childcare in a new country. Moreover, these effects may be more pronounced among lone parents, due to a relative absence of social support from a partner (Cairney et al., 2003).

**Methods**

**Sample**

The Longitudinal Survey of Immigrants to Canada (LSIC) is a longitudinal study designed to understand how new immigrants adjust to life in Canada (Statistics Canada, 2007). Participants were identified as immigrants from the Citizenship and Immigration Canada.
database of all landed immigrants to Canada. The sample was created using a stratified sampling method. The LSIC followed a sample of 12040 respondents at time 1, 9322 respondents at time 2 and 7716 respondents at time 3 (6 months post-landing, 2 years and 4 years post-landing respectively). To be eligible, participants must have been 15-years of age at baseline and have landed between October 1st, 2000 and September 20th, 2001 from abroad. Refugees claiming asylum from within Canada were excluded from the survey.

The first time point of data collection took place between April 2001 and May 2002, the second time point between December 2002 and December 2003 and the third time point between November 2004 and November 2005. The longitudinal respondent (LR) is the person selected to answer the LSIC questionnaire data at each time point of collection. Data on a variety of constructs were collected in person or by telephone using computer-assisted interviewing in 1 of 15 possible languages. The interviews lasted on average one to one and a half hours. Proxy interviews were not permitted, however, if the LR was unable to answer income related questions the interviewer was directed toward the person most knowledgeable regarding household finances. The average age of study participants was 34.93 (SD=11.34) at 6 months post immigration. A more detailed description LSIC is available elsewhere (Longitudinal Survey of Immigrants to Canada, Wave 3 – User Guide) (Statistics Canada, 2007).

Outcome Variable

**Emotional Problems.** Respondents were asked the following questions at Time 1, Time 2 and Time 3 respectively: “Since you came to Canada, have you had any emotional or mental problems?” “Since your last interview, have you experienced any emotional problems? By emotional problems, I mean persistent feelings of sadness, depression, loneliness, etc.” “In the past 12 months, have you experienced any emotional problems? By emotional problems, I mean
persistent feelings of sadness, depression, loneliness, etc.” Responses were originally coded as “Yes”, “No”, “Refused”, or “Don’t Know”. This mental health variable was then recoded as, “Yes” = 1, “No” = 0, “Other” = missing.

**Predictor Variables**

**Time.** An indicator variable for time was created that took the following values: 0 = time 1 or 6 months post-arrival, 1 = time 2 or 2 years post-arrival, and 2= time 3 or 4 years post arrival.

**Age at immigration.** Age of respondents was assessed at 6 months post immigration in years (and decimals).

**Sex.** Gender of longitudinal respondent. Gender was represented by a dummy variable, coded “1” for females and “0” for males.

**Income.** At time 1, respondents were asked to provide their total income from all sources over the past 6 months, while at times 2 and 3 they were asked to provide this over the past 12 months. To establish the same metric across times an average monthly income variable was computed. Due to an extreme positive skew (i.e. some economic immigrants earning very high incomes), a “low income” variable was computed (a log transformation did not resolve the problem). Dichotomous variables at less than vs. equal to or greater than the 15\(^{th}\), 20\(^{th}\) and 25\(^{th}\) percentiles were constructed and tested in models. Results did not vary across different percentile cut-offs. As a result the 20\(^{th}\) percentile was used as the low-income cut-off. The 20\(^{th}\) percentile monthly income at time 1, 2, and 3 was $466.67, $1490.00 and $2018.27, respectively. This corresponds to 20\(^{th}\) percentile annual incomes of $5600.04, $17,800.00 and $24,219.24 across times, respectively. All income values are in Canadian Dollars. Although Statistics Canada provides Low Income Cut-Off’s (LICO), the distribution of income in immigrants is
significantly lower than the general population, with a large number of immigrants falling well below the poverty line, such that the LICO does not represent immigrants well. As a result, the LICOs were not applied, and a specific low-income cut-off was created using the LSIC sample.

**Education.** Number of years of formal full-time education was collected at time 1. Respondents were asked, “In total, how many years of full-time education have you completed, both inside and outside Canada, excluding kindergarten?” Updates on this variable were not collected in subsequent waves of data collection.

**Immigration Category.** Respondents were asked which immigration category they belonged to from the Field Operated Support System (FOSS). The original immigration categories were collapsed into the following five immigrant groups; Family class (Family class – Spouses and Fiancés (principal applicants), Family class – Parents and Grandparents (principal applicants and spouses) and Family class – Other), Business Immigrants (Business Immigrants (principal applicants) and Business Immigrants (spouses and dependents), Refugees (Government Sponsored Refugee, Privately Sponsored Refugees and Other Refugees Abroad), Skilled Workers (Skilled Workers (principal applicants) With Relatives in Canada, Skilled Workers (principal applicants) Without Relatives in Canada and Skilled Workers (spouses and dependents) Without Relatives in Canada), and Other Immigrants (Provincial Nominees (principal applicants), Provincial Nominees (spouses and dependents), Other Immigrants Abroad). A series of dummy codes were created for the above immigrant categories, with Skilled Workers as the reference category. Any longitudinal respondent that did not fit into these categories were excluded from the analysis (Valid skip, Don’t Know, Refused and Not Stated).

**Parenting Status.** Preliminary analyses were carried out to construct properly differentiated variables to represent the construct of parenting status. Several status variables
were relevant. The family type variable captured whether the respondent was married, single or divorced. ‘Parent’ captured whether the respondent had or did not have children living in the household. Family type has been extensively studied. Divorce has been associated with high levels of maternal depression and this is with and without the presence of children (Davies et al., 1997; Amato, 2000). Being single has been associated with high levels of depression when it involves children or is a consequence of divorce, but is associated with lower levels of risk when the single state is continuous or does not involve children (Amato, 2000). Our goal was to isolate the effects of being a parent, while appropriately accounting for different types of marital transition, which covary with being a parent. Both ‘family type’ and ‘parent’ can vary over time. The decision was made to treat predictors as time invariant (see under Analysis Plan) and thus time was treated as described below. Combinations of family type, time and parenting status resulted in 16 combinations that can be seen in Appendix A. As 5 groups had cell sizes below 10 they were combined with their most similar large group, resulting in 11 groups. These 11 groups were further reduced to 4 groups using theoretical principles and based on their relationship to the outcome variable (emotional problems). If on the basis of theory one category could be combined with another, I ensured that the categories did not differ significantly from one another on their relationship to the outcome. A series of analyses were carried out, changing the reference category sequentially to check the categories combined did not differ significantly from one another. This resulted in the following categories used in the analysis: Two parent, Lone parent, Divorced non-parent and Non-parent. Two parent was defined as caring for one or more children equal to or less than 18 years of age at any time point and identifying themselves as either “married” or “common-law” at all time points or “single” to “married” at any time point. “Lone parent” was defined as a parent caring for one or more children equal to or less than
18 years of age at any time point and identifying themselves as divorced, separated or widowed at either time 1, 2 or 3. “Divorced non-parent” was defined as the person not being a parent at all time points and being divorced, separated or widowed at either time 1, 2 or 3. The reference category is respondents who are not caring for children less than 18 years of age at all cycles and are either partnered or never married (Non-parent). The divorced non-parent category was not collapsed into the broader non-parent category because it was associated with significantly higher levels of emotional problems than other non-parent groups. All parenting status variables were mutually exclusive.

**Ethnic/Racial Group.** Respondents were asked which ethnic group they identified with from the following categories established by Statistics Canada, “White” (1), “Chinese” (2), “South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)” (3), “Black” (4), “Filipino” (5), “Latin American” (6), “Southeast Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese, etc.)” (7), “Arab” (8), “West Asian (e.g., Afghan, Iranian, etc.)” (9), “Japanese” (10), “Korean” (11), “Visible Minority n.i.e” (12) “Multiple Visible Minorities” (13) “Don’t know” (97), “Refused” (98). The original ethnic groups were collapsed to the following broader ethnic groups; White, South Asian, East Asian (Chinese, Japanese, Southeast Asian and Korean), Black, Arab/West Asian, Latin American and Filipino. Ethnic groups were dummy-coded with “White Immigrants” being the reference category. Any longitudinal respondent that responded as either a Visible Minority, Multiple Visible Minorities, don’t know or refusal, were excluded from the analysis.

**Analytic Plan**

The aforementioned predictors (with the exception of income) were treated as time invariant. This was done for several reasons. First, some of the variables of interest (e.g.,
parenting status) showed low rates of change such that time varying estimates would have been unreliable and the output would not have passed Statistics Canada criteria for safe disclosure. Second, although levels of the variable changed over time there were high levels of rank-order stability (e.g., income). For these reasons time invariance represented the most safe and parsimonious approach to the inclusion of our predictors.

In terms of the modeling approach, the goal of this present study was to determine whether ethnicity (South Asian, East Asian, Black and Arab/Middle East, Latin American, Filipino versus the reference category White) and parenting status predicted initial status and rate of change in self-reported emotional problems, after accounting for a number of socio-demographic characteristics. Thus, model building took place in three steps: (1) ethnic dummy variables, (2) demographic variables and (3) parenting dummy variables. Model fit was evaluated using the Likelihood Ratio Test, Akaike’s Information Criterion (AIC) and the Bayesian Information Criterion (BIC).

**Preliminary Analysis**

Longitudinal patterns of self-reported emotional problems were modeled in several different ways. That is, sensitivity analyses were conducted to see if model assumptions impacted substantive results. Multilevel Mixed Effects Logistic Regression was conducted first, which is a subject-specific approach for modeling outcomes that are both repeated measures and dichotomous. Preliminary analyses demonstrated that there were significant within-subject dependencies in the response variables, thereby requiring an observation that accounts for this non-independence. Similar to regular Logistic Regression, a Binomial distribution was assumed and the Logit Link was employed. A random intercept can be included which allows the intercept to vary across subjects. When this term is significant, it indicates that there is
significant between-subject variability in the intercept that is not being accounted for by variables in the model.

However, the multilevel approach does not permit the employment of survey weights, as the weights are assigned at the person level and cannot represent the within-person portion of the model. Thus, a population-averaged approach (i.e. a marginal model) was tested using Generalized Estimating Equations, with and without survey weights. Due to reasons cited in the missing data section, parsimony and model invariance, the least restrictive model is reported below (i.e. Multilevel Mixed Effects Logistic Regression using Listwise Deletion).

**Missing Data Procedures**

Of the original longitudinal sample ($N=7716$), 86 respondents were removed for not meeting ethnic group inclusion criteria (mentioned above). An additional 575 were removed for having any missing data on income or emotional problems at time 1, time 2 or time 3. Although the employed analysis (multilevel mixed effects logistic regression) permits the inclusion of participants with incomplete data, the policy of Statistics Canada prevent the reporting of statistics with small cell size changes over time due to risk of residual identity disclosure. Thus, these respondents were removed entirely from the analysis. The final sample consisted of 7055 longitudinal respondents, which represented 91.43% of the initial sample ($N=7716$).

Procedures for handling missing data for the final models were considered. Although missingness is described in accordance with recommendations outlined by Graham (2009), statistical techniques to account for missingness (e.g. Multiple Imputation) were not appropriate for the final model due to the categorical nature of the data. That is, missing data imputation and estimation techniques are much less developed for categorical data (both outcomes and predictors) compared to continuous data (McKnight et al., 2007). Previous studies have
suggested that Multiple Imputation can produce biased estimates when employed in conjunction with categorical data. Moreover, population survey weights are inappropriate to use when 100% of the sample is not included in the analysis (Lee, 2005). That is, the sample weight for an individual participant is computed based on their representativeness of the population relative to all other persons in the data-set. Given these limitations, the unweighted and non-imputed model output was deemed to be the most reliable. Nevertheless, models were run in several different ways (see preliminary analysis) with no observable difference. In summary, the unweighted and non-imputed results are reported, but substantive results did not change as a function of missing data treatment.

**Missing Data Patterns**

Individuals with complete data (N=7055) were compared to individuals with missing data (N=661) on a variety of covariates at baseline using chi-square goodness-of-fit tests. Two-parent respondents were more likely to be complete (95.2%) than Non-parent respondents (85.3%), $\chi^2(1) = 4571.66, p = .001$. Lone parent respondents were also more likely to be complete (94.4%) than Non-parent respondents (91.0%), $\chi^2(1) = 57.91, p = .001$. Divorced non-parent respondents were less likely to complete (81.6%) than Non-parent respondents (91.5%), $\chi^2(1) = 766.82, p = .001$. White respondents were more likely to complete (93.3%) versus non-Whites (91.9%), $\chi^2(1) = 67.52, p = .001$. Persons of low income at baseline were less likely to be complete (89.5%) compared to those who were not low income at baseline (93.8%), $\chi^2(1) = 627.18, p = .001$. Family Class Immigrants were less likely to complete (85.3%) than Skilled Workers (93.2%), $\chi^2(1) = 2352.67, p = .001$. Business Class Immigrants were less likely to complete (83.4%) than Skilled Workers (91.5%), $\chi^2(1) = 676.46, p = .001$. Interestingly, Refugees were more likely to complete (92.1%) than non-Refugees (91.0%), $\chi^2(1) = 13.25, p = .001$. Females were less likely
to complete (90.4%) than male respondents (91.7 %) $\chi^2(1) = 78.82, p = .001$. Finally, respondents with more education were more likely to complete in comparison to respondents with less education (94.0 %) $\chi^2(5) = 4080.39, p, .001$. Though the raw differences are proportionally small, results should be interpreted in conjunction with these significant differential patterns of missingness.

**Results**

Data were combined into the person-period format. Three observations were available for all participants included in the study (N=7055) resulting in a completely balanced and fixed-interval, person-period data structure. Weighted descriptive statistics for dichotomous variables were presented using frequencies and percentages for the overall sample. Weighted descriptive statistics are presented in Table 1. Table 2 shows the results from the unweighted multilevel models. First a null model was fit including only an intercept in the fixed and random parts of the model. The likelihood ratio test comparing the Multilevel Model with a simple Logistic Regression was significant $\chi^2(1) = 400.77, p < .001$, indicating that a Multilevel Model that accounted for within-subject data-dependency was necessary. Model 1 examined the impact of ethnic predictors and this model was a significant improvement over the null model based on the Likelihood Ratio Test, $\chi^2(14) = 33.16, p < .001$, and a reduced AIC and BIC. Model results are reported as odds ratios as they provide a clear interpretation of the variable’s effect, with an odds ratio greater than one indicating an increased likelihood of reported emotional problems for those in that category. The reverse is true for odds ratios less than one. At 6 months post immigration, White immigrants have a 1-in-10 chance of reporting emotional problems (OR = 0.09, see constant). South Asians and East Asians have odds of reporting emotional problems that are 29% (OR = 0.71) and 20% (OR= 0.80) lower than White immigrants, respectively. For each

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1 The RDC only permitted researchers to vet weighted descriptive data although data in models could be weighted or unweighted.
additional time of data collection, the odds of reporting emotional problems for White immigrants increases by OR of 2.01 (see main effect of time). The slope of South Asian and East Asian respondents’ odds of emotional problems are 1.21 and 1.20 times higher than that of White immigrants, respectively. The slope of Black respondents’ odds of emotional problems were the highest at 1.38 times higher than that of White immigrants. Lastly, the slope of Arab respondents’ odds of reporting emotional problems were 1.31 times higher than that of White immigrants (Refer to Figure 1).

Figure 1. Ethnic differences in post-immigration emotional problems
(Note: Latin Americans were removed from the graph due to both non-significant difference from white immigrants and large confidence intervals).

Model 2 examined the impact of demographic covariates, over and above ethnic predictors. This model was a significant improvement over the previous model based on the
likelihood ratio test, \( \chi^2(16) = 259.01, p < .001 \), in addition to lower values of the AIC and BIC.

The odds of reporting emotional problems did not differ as a function of age initially or over time. At 6 months post-landing female immigrants had a 47% (OR = 1.47) higher odds of reporting emotional problems than post-landing male immigrants. Over time the odds of reporting emotional problems increased at a higher rate (OR = 1.12) for female immigrants in comparison to men. The odds of reporting emotional problems were the same for low and high-income immigrants initially. Although being in the low-income category does not impact emotional problems at 6 months, low-income respondents’ odds of reporting emotional problems increase by 16% from cycle to cycle (OR = 1.16), a rate that is significantly higher than non low-income respondents. Respondent’s level of education was not found to impact emotional problems at 6 months. Refugees’ odds of reporting emotional problems at 6 months post-arrival are 74% (OR = 1.74) higher in comparison to skilled workers. On the other hand, family class immigrants and business class reported odds of emotional problems that were 34% (OR = 0.66) and 38% (OR = 0.62) lower in comparison to Skilled Workers, respectively. Immigrant categories (assessed by interaction terms) were also examined, however, the odds of reporting emotional problems in family class, business, refugee and skilled workers increased prevalence in a similar fashion over time.

Finally, in model 3 the impact of the parenting variables on initial levels of depression were examined. Two parent respondents had a 1.12 higher odds of reporting emotional problems in comparison to respondents that were non-divorced non-parents (p < .05). Lone parent respondents had a 2.24 times higher odds of reporting emotional problems in comparison to respondents that were non-divorced non-parents (p < .001) and the confidence interval for this parenting category does not overlap. Finally, Divorced non-parents had a 1.30 times higher odds
of reporting emotional problems in comparison to non-divorced non-parents (p < .05). The odds of reporting emotional problems in Two parent, Lone parent, Divorced non-parent and Non-parent increase over time in a similar fashion (assessed by interaction terms). This model received some penalty from the AIC and BIC for inclusion of these non-significant parameters. Thus the model without insignificant interactions was selected as the best fitting model, and was an improvement over model 2 based on the likelihood ratio test, $\chi^2 (3) = 20.5, p < .001$, and a lower AIC and BIC.
Table 1

*Weighted Frequencies of key demographic variables in the sample*²

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>1471</td>
<td>20.85</td>
</tr>
<tr>
<td>South Asian</td>
<td>1851</td>
<td>26.25</td>
</tr>
<tr>
<td>East Asian</td>
<td>1910</td>
<td>27.08</td>
</tr>
<tr>
<td>Black</td>
<td>333</td>
<td>4.73</td>
</tr>
<tr>
<td>Arab</td>
<td>775</td>
<td>10.99</td>
</tr>
<tr>
<td>Latin America</td>
<td>192</td>
<td>2.73</td>
</tr>
<tr>
<td>Filipino</td>
<td>519</td>
<td>7.37</td>
</tr>
<tr>
<td>Female</td>
<td>3538</td>
<td>50.16</td>
</tr>
<tr>
<td>Low Income (Time 1)</td>
<td>1485</td>
<td>21.05</td>
</tr>
<tr>
<td>Low Income (Time 2)</td>
<td>1226</td>
<td>17.38</td>
</tr>
<tr>
<td>Low Income (Time 3)</td>
<td>1235</td>
<td>17.51</td>
</tr>
<tr>
<td>Skilled Worker</td>
<td>4381</td>
<td>62.11</td>
</tr>
<tr>
<td>Family Class Immigrant</td>
<td>1787</td>
<td>25.34</td>
</tr>
<tr>
<td>Business Immigrant</td>
<td>359</td>
<td>5.10</td>
</tr>
<tr>
<td>Refugee</td>
<td>440</td>
<td>6.25</td>
</tr>
<tr>
<td>Other Immigrant</td>
<td>85</td>
<td>1.21</td>
</tr>
<tr>
<td>Non-Parent (partnered or never married)</td>
<td>2256</td>
<td>31.99</td>
</tr>
<tr>
<td>Two Parent</td>
<td>4315</td>
<td>61.17</td>
</tr>
<tr>
<td>Lone Parent</td>
<td>191</td>
<td>2.72</td>
</tr>
<tr>
<td>Divorced Non-Parent</td>
<td>290</td>
<td>4.11</td>
</tr>
<tr>
<td>Emotional Problems (Time 1)</td>
<td>364</td>
<td>5.17</td>
</tr>
<tr>
<td>Emotional Problems (Time 2)</td>
<td>2134</td>
<td>30.26</td>
</tr>
<tr>
<td>Emotional Problems (Time 3)</td>
<td>2029</td>
<td>28.77</td>
</tr>
</tbody>
</table>

Note. Percentages are calculated as a proportion of the total sample N=7055. N were rounded down to the nearest whole number.
Table 2

Unweighted Multilevel logistic regression output modeling the odds of reporting emotional problems across the first four years in Canada

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td><strong>Fixed Part</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.09*** (0.08, 0.10)</td>
<td>0.07*** (0.06, 0.09)</td>
<td>0.06*** (0.05, 0.08)</td>
</tr>
<tr>
<td>South Asian</td>
<td>0.71** (0.57, 0.89)</td>
<td>0.90 (0.71, 1.13)</td>
<td>0.91 (0.73, 1.15)</td>
</tr>
<tr>
<td>East Asian</td>
<td>0.80* (0.65, 1.00)</td>
<td>0.89 (0.71, 1.11)</td>
<td>0.90 (0.72, 1.12)</td>
</tr>
<tr>
<td>Black</td>
<td>0.86 (0.61, 1.21)</td>
<td>0.77 (0.54, 1.10)</td>
<td>0.73 (0.51, 1.04)</td>
</tr>
<tr>
<td>Arab</td>
<td>0.96 (0.75, 1.23)</td>
<td>0.83 (0.64, 1.08)</td>
<td>0.85 (0.65, 1.10)</td>
</tr>
<tr>
<td>Latin</td>
<td>1.56* (1.04, 2.35)</td>
<td>1.42 (0.95, 2.13)</td>
<td>1.40 (0.93, 2.10)</td>
</tr>
<tr>
<td>Filipino</td>
<td>0.96 (0.70, 1.33)</td>
<td>1.18 (0.84, 1.65)</td>
<td>1.20 (0.86, 1.68)</td>
</tr>
<tr>
<td>Time</td>
<td>2.01*** (1.83, 2.22)</td>
<td>1.83*** (1.62, 2.07)</td>
<td>1.84*** (1.62, 2.08)</td>
</tr>
<tr>
<td>South Asian*Time</td>
<td>1.21** (1.05, 1.39)</td>
<td>1.20* (1.03, 1.39)</td>
<td>1.20* (1.03, 1.39)</td>
</tr>
<tr>
<td>East Asian*Time</td>
<td>1.20* (1.04, 1.37)</td>
<td>1.15 (1.00, 1.33)</td>
<td>1.16* (1.00, 1.33)</td>
</tr>
<tr>
<td>Black*Time</td>
<td>1.38** (1.11, 1.72)</td>
<td>1.36** (1.09, 1.71)</td>
<td>1.37** (1.10, 1.72)</td>
</tr>
<tr>
<td>Arab*Time</td>
<td>1.31** (1.12, 1.54)</td>
<td>1.30** (1.10, 1.54)</td>
<td>1.30** (1.10, 1.54)</td>
</tr>
<tr>
<td>Latin*Time</td>
<td>1.08 (0.83, 1.41)</td>
<td>1.07 (0.82, 1.40)</td>
<td>1.07 (0.82, 1.40)</td>
</tr>
<tr>
<td>Filipino*Time</td>
<td>1.16 (0.95, 1.43)</td>
<td>1.13 (0.91, 1.40)</td>
<td>1.13 (0.91, 1.40)</td>
</tr>
<tr>
<td>Age</td>
<td>1.00 (0.99, 1.01)</td>
<td>1.00 (0.99, 1.01)</td>
<td>1.00 (0.99, 1.01)</td>
</tr>
<tr>
<td>Female</td>
<td>1.47*** (1.26, 1.72)</td>
<td>1.43*** (1.22, 1.65)</td>
<td>1.43*** (1.22, 1.65)</td>
</tr>
<tr>
<td>Low Income</td>
<td>1.18 (0.98, 1.42)</td>
<td>1.18 (0.98, 1.42)</td>
<td>1.18 (0.98, 1.42)</td>
</tr>
<tr>
<td>Education</td>
<td>1.02 (1.00, 1.05)</td>
<td>1.02 (1.00, 1.05)</td>
<td>1.02 (1.00, 1.05)</td>
</tr>
<tr>
<td>Family Class</td>
<td>0.66*** (0.53, 0.81)</td>
<td>0.67*** (0.54, 0.83)</td>
<td>0.67*** (0.54, 0.83)</td>
</tr>
<tr>
<td>Business</td>
<td>0.62** (0.43, 0.90)</td>
<td>0.63* (0.44, 0.91)</td>
<td>0.63* (0.44, 0.91)</td>
</tr>
<tr>
<td>Refugee</td>
<td>1.74*** (1.35, 2.23)</td>
<td>1.70*** (1.33, 2.19)</td>
<td>1.70*** (1.33, 2.19)</td>
</tr>
<tr>
<td>Other</td>
<td>1.05* (0.50, 2.21)</td>
<td>1.06 (0.50, 2.12)</td>
<td>1.06 (0.50, 2.12)</td>
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<tr>
<td>Age*Time</td>
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<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
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<tr>
<td>Female*Time</td>
<td>1.12* (1.02, 1.24)</td>
<td>1.13* (1.02, 1.24)</td>
<td>1.13* (1.02, 1.24)</td>
</tr>
<tr>
<td>Low Income*Time</td>
<td>1.16* (1.02, 1.32)</td>
<td>1.14* (1.01, 1.30)</td>
<td>1.14* (1.01, 1.30)</td>
</tr>
<tr>
<td>Education*Time</td>
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<td>1.00 (0.99, 1.02)</td>
<td>1.00 (0.99, 1.02)</td>
</tr>
<tr>
<td>Family Class*Time</td>
<td>1.08 (0.94, 1.24)</td>
<td>1.08 (0.94, 1.24)</td>
<td>1.08 (0.94, 1.24)</td>
</tr>
<tr>
<td>Business Class*Time</td>
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<td>1.13 (0.90, 1.43)</td>
<td>1.13 (0.90, 1.43)</td>
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<td>Other Immigra*Time</td>
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<td>Two Parent</td>
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<td>2.24*** (1.75, 2.88)</td>
<td>2.24*** (1.75, 2.88)</td>
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Divorced Non-Parent  

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* p < .05, ** p < .01, *** p < .001  

*Note.* OR = Odds Ratio
Discussion

The results of the current study expand on our understanding of emotional problems over time amongst a diverse sample of immigrants. More specifically, the findings disaggregate the immigrant population into heterogeneous ethnic groups and compares emotional problems across these groups. In addition, this study documents changes in emotional problems in the period immediately after arrival in Canada, focusing on six months, two years, and four years post-arrival, in the same cohort of immigrants. Of specific interest was identifying whether ethnicity and parental status predicted emotional problems amongst a diverse group of immigrants. Results revealed that South Asians and East Asians initially have lower odds of reporting emotional problems in comparison to White immigrants. However, over time, the prevalence of emotional problems increased at a faster rate for all visible minority immigrants in comparison to White immigrants. After controlling for a variety of socio-demographic covariates, results from multilevel logistic regression models indicated that parents have higher odds of reporting emotional problems in comparison to non-parent immigrants, and these differences are stable across the first four years following immigration. These effects were evident after controlling for relevant socio-demographic characteristics, such as ethnicity, age, gender, socioeconomic status, and immigrant category, suggesting an effect of caregiver strain, and not simply an effect of financial burden or pre-immigration hardship.

Ethnic Disparities in Mental Health

An important aim of the current study was to examine differences in emotional problems between immigrant groups. The results indicated that there was a significant effect of ethnicity on initial emotional problems. Respondents who identified themselves as South Asian and East Asian had a 0.71 and 0.80 lower odds of endorsing emotional problems at Wave 1, compared to
the reference category of White immigrants. Over time, South Asian, East Asian, Black, and Arab immigrant’s prevalence of reporting emotional problems increased much faster in comparison to the reference category. The initial lower emotional problems seen in South Asians and East Asians compared to White immigrants can be interpreted as immigrants arriving to their host country with many skills and strengths that helped them gain admission into Canada. The rapid increase in emotional problems can be interpreted as the expectations that may not be realized due to the many obstacles of settling in a new country, including, systemic racism, discrimination and inequality (Noh & Kaspar, 2003; Noh et al., 1999).

It is important to note that Black immigrants showed the highest prevalence of emotional problems over time. Research conducted in the United States showed that African Americans had a higher likelihood of experiencing chronic and severe depression, were less likely to have health insurance and access mental health services (Miranda et al., 2008; Jackson et al., 2007). Similarly, Canadian based studies have also found that Black immigrants have the highest mental health needs, but lowest levels of service utilization (Whitley et al., 2006; Fenta et al., 2006). These findings underscore the fruitfulness of adopting a between person variability approach to understanding ethnic disparities in mental health. Future research should focus on the causal mechanisms of these ethnic differences in order to reduce these ethnic disparities.

**Sociodemographic and Socioeconomic Contexts**

There was also between-person variability in rate of change that systematically varied as a function of gender, income and immigration status. More specifically, females were more likely to report emotional problems six months after immigration into Canada compared to male respondents. Similarly, the increase in prevalence of emotional problems across time is more rapid for females. Previous research supports this finding that women typically report a higher
prevalence of emotional disturbance, depression and anxiety (Weissman et al., 1996). The current finding supports internalizing forms of psychopathology in females during the period following immigration.

It is also important to consider the financial status of recent Canadian immigrants, given that the prevalence rates of emotional problems increase most rapidly for those in lower socioeconomic strata. The effects of socioeconomic status on mental health are complex and multifaceted, operating through a variety of mediating mechanisms including access to resources, health related behaviours, and psychosocial stress (Bradley & Corwyn, 2002). Also, the socioeconomic disparities in a variety of health outcomes have been well documented in Canada, where children and families living in lower socioeconomic strata tend to report lower levels of health quality (Williams, 2002). Based on the effect of post-immigration income on the rate of change in prevalence of emotional problems, it can be concluded that the income disparities in the mental health outcomes of immigrants are observable within 2 years following immigration. Additional research is needed that examines this trend in light of pre-immigration socioeconomic status, paying particular attention to the social mobility patterns of single parent families, divorced immigrants and mothers.

In terms of immigration status, Family Class Immigrants and Business Immigrants were less likely to report emotional problems in comparison to Skilled Workers. Perhaps Family Class Immigrants are receiving more social support from their family members who sponsor them to Canada. Previous research has indicated that social support and community cohesion have a positive impact on mental health outcomes among immigrants (Almeida et al., 2011; Jurcik et al., 2013). Understanding why Business Immigrants report fewer emotional problems is more difficult to understand due to the limited research on this group of immigrants. It is possible
these self-employed immigrants are coming to Canada with substantial capital and business experience that supports their success in the settlement process. On the other hand, Refugees were found to have higher odds of reporting emotional problems in comparison to Working Class Immigrants. This result is consistent with the literature that reports Refugees are more likely to report emotional problems in comparison to immigrants (Pernice & Brook, 1996). Although refugees constitute a minority of individuals who immigrate to Canada, their relatively high mental health needs warrants close attention. Results also indicated that regardless of immigrant status, the prevalence of emotional problems over time increases at a similar rate.

**Parenting Status and Mental Health**

Odds of emotional problems were higher among Two-parent and Lone parent groups in comparison to Non-parents. More specifically, the prevalence of emotional problems were greatest among Lone parent immigrants, whose odds of reporting emotional problems at any given time were approximately 2.24 times higher than Non-parent immigrants. Although a small effect, the prevalence of emotional problems were also higher among Two-parent immigrants, where the odds of reporting emotional problems were 1.12 times higher than Non-parents. These findings are consistent with previous research citing the association between parental stress and mental health problems among non-immigrant populations (Evenson & Simon, 2005; Mckenzie, & Carter, 2013). These results are supported by past research, which has documented that married persons consistently report significantly fewer symptoms of mental health problems in comparison to their unmarried counterparts (Mirowsky and Ross, 2003; Simon, 2002). Not surprisingly, studies show that unmarried persons living with dependent children report more mental health problems than their married peers (Kandel et al., 1985). Single parents’ greater
distress appears to be due in large part to the fewer social resources available to them (Pearlin and Johnson, 1977).

Next, the effects of time on self-reported emotional problems did not vary as a function of family structure. Each year immigrants are in Canada, the prevalence of reporting an emotional problem increases by 1.84 times, and this increase in risk is the same for Lone parent, Two parent, Divorced non-parent and Non-parent immigrants. Over time, the prevalence of emotional problems of all immigrants’ increases. The prevalence of emotional problems for Lone parents, Two-parents, Divorced non-parents and Non-parents increases in a parallel fashion. These findings are consistent with the research of Chung and colleagues (1993), who suggests that the mental health problems of immigrants increase with additional years in the country. These results also suggest that both targeted and universal mental health programs for immigrants may be important in supporting immigrants upon arrival to Canada and over time.

Not surprisingly, immigrants who reported being divorced with no children (Divorced non-parents) were also more likely to report emotional problems ($OR = 1.30$) in comparison to Non-parents who were either partnered or never married. There is literature to suggest that divorced individuals report more emotional problems and life stressors than married respondents among non-immigrant populations (Amato, 2000). Studies also suggest there is a selection effect where divorced individuals are more likely to have pre-existing mental health problems (Davies et al., 1997). However, these trends have not been well researched among immigrant populations, considering immigrants tend to have the highest rates of marriage (Cherlin, 2010). Of the few studies published, Chang (2004) and Hyman et al. (2008) found that one of the common reasons of divorce among immigrant women was due to intimate partner violence. It is also possible that some immigrant groups perceive divorce as taboo, which may further
marginalize divorced immigrants and explain why this group has higher odds of reporting emotional problems.

**Limitations and Future Directions**

There are a few limitations of the current study that should be mentioned. First, there is limited specificity of the outcome variable due to reliance on a single item operationalization of emotional problems. However, mental health epidemiology is rich with examples relying on such measurement, and previous studies have shown good convergence of these items with more detailed forms of measurement (John & Montgomery, 2009; Lefèvre et al., 2012). Secondly, there may be some measurement bias due to the reliance on self-reported emotional problems (Karasz, 2005; Pernice & Brook, 1996). However, these biases tend to be in the direction of under-reporting, suggesting that the estimates obtained in the current study are conservative (Sanchez & Gaw, 2007). Third, there are problems with measuring depression across different ethnicities. Some ethnic groups tend to express depressive symptoms as somatic symptoms (Sanchez & Gaw, 2007), and the results may not fully capture the extent of depression among immigrants, particularly visible minority immigrants. In other words, there may be differences in the way the item functions across ethnic groups — so that observed group differences could partly be a function of measurement differences rather than true substantive differences.

Lastly, results must be interpreted with caution as the wording of the outcome variable changed between Time 1 and Time 2. It is also possible that the increase in reporting emotional problems issues from Time 1 to time 2 is related to a better conceptual understanding of the question, or an increase in willingness to report emotional problems.

These limitations are balanced by the strengths of the LSIC, where measurement brevity is balanced by a large sample that is followed for 4 years. Finally, due to the nature of the LSIC,
comparisons between sub-groups of people were limited. The dataset did not allow us to examine parents who were not immigrants, or evaluate the effects of ethnicity outside of the context of immigration. Nevertheless, the results are still generalizable to the population of immigrants in Canada and by building models only using immigrant samples made it possible to understand the effect of time-since-immigration.

Future research should continue to use the LSIC in order to better understand the factors that are affecting the mental health of immigrants. Additionally, attention should be paid to the effects of culture, values, beliefs, and attitudes surrounding acculturation to help shed light on why certain ethnicities are more vulnerable to emotional problems in Canada. Most importantly, future research is needed to replicate findings that show visible minority immigrant groups reporting higher odds of emotional problems over time in comparison to White immigrants.

According to our knowledge, this is one of the few Canadian studies to observe ethnic disparities in mental health outcomes among immigrants. Finally, although the effects were small, it may also be important to understand these patterns of caregiver strain, as highly stressed parents endorse elevated levels of depression, anxiety and psychological distress, and tend to have children with the poorest developmental outcomes compared to parents who are less stressed (Ashman et al., 2008; Evenson & Simon, 2005; Mckenzie, & Carter, 2013).
Study 2

Trajectories of Maternal Depressive Symptoms

Immigrant mothers have been found to endorse depressive symptoms that are significantly higher than Canadian born women (Stewart et al., 2008; Zelkowitz, 2004). Immigrant mothers are not only exposed to the common stressors of being a parent, but also to the many stressors that immigrants face such as low income (Beiser et al., 2002), less social support (Pernice & Brook, 1996), fewer job opportunities (Schellenberg, 2004), language barriers (Miranda et al., 2008), cultural barriers (Pernice & Brook, 1996), difficulty accessing quality health and mental health care (Miranda et al., 2008), discrimination (Yip, Gee, & Takeuchi, 2008; Pernice & Brook, 1996) and feelings of isolation. Immigrant women may be exposed to cultural expectations such as personal sacrifice and family and cultural obligations (Tang et al., 2007). As a result, immigrant women may carry the burden of looking after children in the home, which allows fewer opportunities to integrate into the community, increase knowledge of their new environment and to find appropriate employment (Tang et al., 2007). The lack of extended family and social support could also have a pronounced effect in the post-partum, infancy and toddler years –especially in cultures where extended family traditionally play an important role in childcare.

Currently, the literature on maternal depression is mainly drawn from studies of majority White, middle-class samples. In addition, many studies have not used cross culturally valid maternal depression measures. As research is broadening to samples containing diverse populations and using methodologies that allow for the emergence of group differences, it is
becoming increasingly evident that there is a lack of research on maternal depression in immigrant populations. Furthermore, there are few studies that have followed White middle class or immigrant women during the postpartum period to 4 years after delivery (Horowitz & Goodman, 2004). Previous research has demonstrated women are more likely to experience emotional instability or negative feelings during the postpartum period where the vulnerability to depression is heightened (Robertson et al., 2003). Thus, the goal of the current study was to examine maternal depression over time among mothers who recently gave birth to a newborn baby, in order to identify 1) whether immigrants are at higher risk compared to non-immigrants, 2) which immigrant groups may be at elevated risk, and 3) what variables might account for these differences.

**Mental Health in Immigrant Populations**

Qualifying for immigration to Canada has become increasingly challenging, particularly after the introduction of the points system by the federal government. The points system assesses an individual’s educational attainment, language ability, work experience, age, arranged employment and adaptability to Canada. It is possible that that the points system may in fact be selecting well-functioning individuals, or individuals with more resilient personalities (Beiser et al., 2002). Considering immigrants generally come to Canada with a number of strengths; close knit families, two-parent households, high importance placed on educational attainment, strong work ethic (Georgiades et al., 2007), immigrant optimism and bilingual skills, there are a number of studies that report lower rates of mental health problems among immigrants in comparison to their native counterparts. This trend is consistent with a body of literature documenting a phenomenon called the *immigrant paradox*, whereby, despite factors that ordinarily confer risk,
such as poverty and linguistic and cultural barriers (Beiser et al., 2005), immigrants have better physical (Markides and Coreil, 1986; Singh & Yu, 1996) and mental health outcomes.

Other scholars in the field have hypothesized that immigrants experience higher rates of distress compared to native-born individuals. In fact, several Canadian studies have found elevated rates of depressive symptoms among immigrant women (Zelkowitz et al., 2004; Mechakra-Tahiri et al., 2007). As mentioned above, these researchers postulate that immigrant women are more depressed than native born women due to a host of risk factors including, unemployment, underemployment, problems with housing, social isolation, family separation, experience of discrimination and, lack of access to healthcare and mental health services (Miranda et al., 2005). These types of stressors have been found to be more common among immigrant women in comparison to native-born Canadians (Kirmayer et al., 1997).

There are several disadvantages to the studies mentioned above; first, some results were gleaned from cross sectional surveys, making it difficult to draw conclusions regarding trends over time. Second, some researchers have included immigrant status as a dichotomous variable that assumes all immigrants are the same despite their country of origin. Finally, few studies used depression scales that had measurement equivalence. Measurement equivalence indicates that the same construct is being measured across groups and is important as the conceptualization and expression of depression may differ across ethnicities.

The following study utilized an abbreviated version of the Center for Epidemiologic Studies Depression Scale that was found to function equivalently across groups (Van Lieshout et al., 2011), allowing for more meaningful comparisons between immigrant groups (Chentosova-Dutton, Tsai, & Gotlib, 2010). This measure helps establish substantive differences between groups that are not confounded by items functioning differentially in the measurement tool.
Chronicity of Maternal Depression

Research on chronicity of maternal depression is based largely on studies of majority White, middle-class samples and little is known to what extent this research extends to immigrant mothers. Chronically elevated symptoms of depression have been shown to be one of the most disabling mental health conditions (Klein, 2010), highlighting the importance of this area of research. Women who remain depressed for longer periods of time are more likely to experience functional impairment in comparison to non-chronic depression (Satyanarayana et al., 2009). Chronic depression has also been linked to greater suicidality and more hospitalizations (Klein, Shankman, & Rose, 2006). Several studies have examined a variety of determinants of symptoms of chronic depression. One of the most prominent predictors of chronic depression is experiencing childhood adversity (Riso et al., 2002; McMohan et al., 2005). More specifically, several studies reported childhood adversity such as sexual or physical abuse to predict chronic episodes of depression in women (Brewin et al., 2000; Brown & Moran, 1994). It was also found that women with persistent depression also reported that they experienced less sensitivity from their mothers in comparison to non-depressed women (Lovejoy et al., 2000; Chapman et al., 2004; Edwards et al., 2003; Leadbeater & Linares, 1992; Campbell et al., 1992).

Marital dissatisfaction has also been found to predict persistent symptoms of depression in women (McMohan et al., 2005; O’Hara & Swain, 1996; Brown & Moran, 1994). Women who endorse chronic depression are also more likely to view their partners as less supportive (Campbell et al., 1992). Zelkowitz et al. (2012) found that marital quality was among one of the best predictors of postpartum depression for foreign-born women. Marital relationship may be especially important as immigrant women may lack the support of their extended family (Fung & Dennis, 2010). Finally, women who suffered from chronic depression were more likely to be
single parents and live on their own (Weissman et al., 1987; Leadbeater & Linares, 1992).

**Socioeconomic Indicators**

In addition to the determinants of chronic depression discussed above, there is a large body of literature supporting the association between low SES and depression (Lorant et al., 2003). Past research has consistently demonstrated that immigrants are more socioeconomically disadvantaged in comparison to native-born citizens (Beiser et al., 2002, Georgiades, Boyle, & Duku, 2007; Pope & Arthur, 2009). An analysis of the Canadian census revealed that visible minority immigrants had much higher rates of poverty compared to European groups among immigrants and native-born individuals (Hansson et al., 2012). Immigrants may experience obstacles in achieving vertical socioeconomic mobility due to systematic racism, discrimination and lack of knowledge of the English language (Leyendecker, Harwood, Comparini, & Yalcinkaya, 2005; Pope & Arthur, 2009).

Additionally, the relationship between different indices of SES (i.e. income, education) may be weaker for immigrants in comparison to non-immigrants. For instance, higher education has been shown to be associated with higher income for Canadians, however this trend is not seen within immigrant populations today, where recent immigrants have unexpectedly low incomes in spite of possessing the highest average levels of education among all Canadians (Schellenberg, 2004). Unfortunately, even when immigrant and non-immigrant parents have similar levels of educational achievement and work experience, immigrants receive less pay and have much more difficulty entering prestigious professional positions (Pope & Arthur, 2009). Overall, many immigrants have difficulty finding jobs that match their educational attainment and less likely to work in safe and equitable work environments (Chen et al., 2010).
Purpose of the Present Investigation

No study to date has examined distinct trajectories of maternal depression over time, using a culturally sensitive measure in an ethnically diverse immigrant sample. Statistical tools, such as growth curve analyses allow us to investigate and contrast trajectories of depression across immigrant and non-immigrant groups and variables that might account for these differences. The purpose of this study is (a) to contrast maternal depressive symptom patterns amongst immigrants and non-immigrants over time and (b) to identify explanatory variables of change implicated in these trajectories. More specifically, these goals will be achieved by: (1) examining the explanatory variables that account for depressive symptoms in an ethnically diverse immigrant sample (European, Black and Asian immigrants); (2) studying depressive symptoms using a culturally sensitive measure to ensure the same construct is being measured across groups; (3) investigating depressive symptoms over time to obtain trajectories of maternal depressive symptoms and (4) addressing the paucity of research on trajectories of immigrant mental health from a Canadian context.

Research Questions and Hypotheses

The guiding questions of the current study are:

(1) Do White immigrant, Black immigrant and Asian immigrant mothers have more depressive symptoms than Canadian born mother’s overtime?

Hypothesis One: Visible minority immigrant groups (Black immigrant and Asian immigrant) women will have higher average levels of depressive symptoms in comparison to White immigrant and Canadian born women at each time point (level differences).

(2) How do depressive symptoms in White immigrant, Black immigrant and Asian immigrant change over time in comparison to Canadian born mothers?
**Hypothesis Two:** There will be variability in the rate of change across these immigrant subgroups, where Black and Asian immigrant groups increase faster over time in comparison to White immigrant and Canadian born mothers (slope differences).

(3) Do current explanatory variables, including risk factors such as being single, marital conflict, low income and fewer assets, and past risk factors such as childhood adversity account for higher levels of depressive symptoms among immigrant mothers?

**Hypothesis Three:** It is expected that Black and Asian immigrant mothers will have lower income and fewer assets and that these differences will account for the elevated rates of depressive symptoms. It is also expected that marital status, marital conflict and childhood adversity will account for higher levels of depressive symptoms among Black immigrant mothers.

**Method**

**Sample**

The Kids, Families and Places study is a prospective longitudinal study currently in wave five of data collection in the Greater Toronto Area and Hamilton. Participation was restricted to English-speaking mothers who gave birth in 2006-2007 to an infant over 1200 grams, lived in Toronto or Hamilton, and had another child less than four years of age. The intensive portion of the KFP study included 501 families at Time 1 (T1).

A large proportion of mothers were born outside of Canada (N = 45%). Immigrant groups with fewer than 20 individuals (T1) and that did not fit into broader ethnic categories (i.e., Asian, Black, White) were excluded from the analysis (Native/Aboriginal N = 2, Arab/West Asian N = 8, Latin-American N = 19, Filipino N =15). The reference category consisted of only White Canadian mothers. Those who endorsed being Canadian born including, Black Canadian, Asian Canadian or of mixed ethnicity Canadian (N=16) were excluded from the analysis. Accordingly,
a total of 60 mothers (44 immigrant and 16 non-immigrant) were excluded from the analysis, resulting in a final sample of 441 mothers. There were a total of 39 White Immigrant mothers, 121 Asian Immigrant mothers, 40 Black Immigrant mothers, and 241 White Canadian mothers who participated at T1. Of the 441 mothers in the sample, 24 endorsed being a refugee (White refugee $N=1$, Asian Refugee $N=9$ and Black refugee $N=14$).

The mean age of mothers in the current sample at T1 was 32.75 years (range = 18 – 48 years; $SD = 4.88$). On average women had 2.36 children at T1 (range 2 – 10 children under the age of 18; $SD = .83$). The mean age of these children at T1 was 2.20 years (range .00 – 16.58; $SD = 2.65$). I compared the KFP sample with the general population of Toronto and Hamilton using the 2006 Canada Census Data, limiting the census data to women between 15 and 54 years old. The comparison was based on the following variables of interest: immigrant status, number of persons in the household, family type, mother’s personal income and education. The KFP sample was similar to the census data (given in that order for following comparisons) when comparing number of persons in the household ($M=4.52$, $SD=1.01$ vs. $M=4.13$, $SD=1.22$) and personal income (30,000-39,999 vs. census population mean = 30,504.16 C$, $SD=37,808.12$ C$). The census could not be restricted to families that had recently given birth to a newborn child to match the KFP sample. The proportion of non-intact families was lower in the KFP than the general population (5% vs. 16.8% lone-parent-families; 4.3% vs. 10.3% step-families). The proportion of Canadian born versus immigrants to Canada was higher in the KFP sample (57.7% vs. 47.6%) than in the general population. This discrepancy is most likely related to our language exclusion criterion. Maternal education was also higher in the KFP sample (53.3% vs. 30.6% earned a bachelor degree or higher) compared to the general population (Meunier et al., 2013).
Mothers participated in an interview and completed paper and pencil questionnaires regarding demographic and family life items at four time points, approximately one year apart. A total of 49% of mothers participated at all four time points of data collection, 28% of mothers participated at three time points, 13% participated at two time points and 9% of mothers participated only at the first time point of data collection.

**Measures**

**Immigrant status and Ethnicity.** First variables were coded to determine whether the participant was an immigrant or a non-immigrant. The definition of an immigrant in this study is any individual who was born outside of Canada and permanently relocates to Canada (Statistics Canada, 1995). Next variables were coded to determine the participants’ ethnicity, and were asked, ‘How would you describe your race or colour’ from the following categories, “White” (1), “Arab/West Asian (e.g. Armenian, Egyptian, Iranian, Lebanese)”(2), “Black (e.g. African, Haitian, Jamaican, Somali)” (3), “Chinese” (4), “Filipino” (5), “Japanese” (6), “Korean” (7), “Latin-American” (8), “Native/Aboriginal people (e.g. North American Indian, Metis, Inu)” (9), “South Asian (e.g. East Indian, Pakistani, Punjabi, Sri Lankan)” (10), “South East Asian (e.g. Cambodian, Indonesian, Laotian, Vietnamese)” (11) , “Other” (12). Immigrant status and Ethnicity was then coded as dummy variables (White Immigrant (White), Asian Immigrant (Chinese, Japanese, Korean, South East Asian) Black Immigrant (Black)), where White Canadian constitutes as the reference category. The reference group was limited to White Canadians, removing Asian Canadians and Black Canadians. As mentioned earlier the following groups were dropped due to small cell sizes at Time 1 (Native/Aboriginal, Arab/West Asian, Latin- American, Filipino and Other).
Maternal depressive symptoms. Psychological distress in mothers was measured using the Center for Epidemiologic Studies Depression Scale (CES-D), a self reported measure (Radloff, 1977). Women in the study were administered the original, 20-item version of the CES-D, a scale designed to assess mood, somatic complaints, social interaction and motor functioning in the last week. The CES-D consists of 20 questions about the mothers’ feelings’, (e.g., ‘I did not feel like eating; my appetite was poor’) or behaviours (‘my sleep was restless’). Each item on the CES-D has 4 response options scored 0 (rarely or none of the time) to 3 (most or all of the time). Increasing scores correspond to worse impairment. The 20 items are summed with possible scores ranging from 0-60 (although our sample has maximum score of 33). Despite the existence of a cut-off thought to define likelihood depression cases (≥16), the CESD is not a diagnostic tool of major depressive disorder and only identifies potential depression cases. For this present study a 15 –item version of the scale was used because these items show measurement equivalence between immigrant and non immigrant groups (See Van Lieshou, Cleverley, Jenkins & Georgiades., 2011 for details). Internal consistency for this scale across T1 to T4 was, \( \alpha = .81 \), \( \alpha = .80 \), \( \alpha = .80 \) and \( \alpha = .85 \) respectively. This measure was centered to decrease multicollinearity and to improve interpretability of the model parameters (particularly the intercept).

Socioeconomic indicators: T1 family income and assets. At T1 mothers were asked to place their family’s total household income into a range of 16 categories starting with no income (1) to an income of over $105, 000 or more. Up until $35, 000 each category increased by $5000 and after this our response categories increased by $10, 000. All 16 categories were included in the composite. At T1, mothers also reported on three indicators of assets owned by the family: how many rooms in the family’s residence (total number), ownership or co-ownership of their
residence (yes/no), and ownership or co-ownership of a vehicle (yes/no). Family income and assets were highly correlated at T1 (r=0.72). Items were standardized, and a mean was derived between family income and assets, with higher numbers representing more income and assets owned (M = 0.12, SD = 0.81) (Boyle et al., 1993). The composite created is highly consistent over time (time 1 – time 4) (α=.96). As a result, only scores for time 1 are used in the present study.

Mother’s age. Mothers provided information on their age in years and months.

Child age’s. Mothers provided information regarding children’s age (in years) and number of children living in the household. A mean age of all children in the household was created.

Marital status. Marital status was measured at time 1 and coded into dummy variables, Single (never married), widowed, and divorced or separated (1), and Married (0) as the reference category.

Marital Conflict. Marital conflict as rated by mothers was assessed by asking mothers about the frequency and severity of marital conflict (e.g. ‘How often do you and your partner have minor disagreements”). The Conflict Frequency scale was based on 2 items rated on a 4-point scale, ranging from ‘Once a year or less’ (1) to ‘Just about every day’ (4). The mean of the items was calculated, with higher scores indicating more marital conflict. The internal consistency for these items in the KFP sample were α = 0.72 (Kerig, 1996).

Childhood Adversity Index. Eight possible childhood stressors occurring before the age of 16 drawn from the Ontario Child Heath Study (OCHS) and the Childhood Experience of Violence Questionnaire (Walsh et al., 2008) were included in this index: respondents mother’s level of education (exposure to a parent with lower educational attainment in childhood is
associated with higher likelihood of adverse experiences), witnessing verbal abuse, witnessing physical abuse, parent mental illness, parent drug or alcohol use, parent teenage pregnancy, target of physical abuse and target of sexual abuse. Each of the eight risk factors were standardized and a sum was derived to get an overall childhood adversity score, where higher scores correspond to more childhood adversity. Descriptions of the eight risk factors measured used to calculate the index are presented below. The internal consistency between all eight childhood stressors were $\alpha = 0.29$. Low internal consistency is common for measures of cumulative risk, because many risk factors have very low endorsement. In addition, internal consistency is expected to be low because items within the adversity index evaluate different phenomena and have different base rates (Mrug et al., 2008).

**Mother’s education.** Respondents were asked about their mother’s level of education: ‘Up to today, about how many years of school did your mother/person who raised you complete successfully?’ The scale was reverse coded, where higher values correspond to fewer years of education.

**Witnessing verbal abuse.** Mothers were asked to report how often they were exposed to verbal abuse within their home, they were asked: ‘Before age 16, how many times did you see or hear any one of your parents/caregivers who raised you say hurtful or mean things to each other or to another adult in your home.’ Mothers responded to these items using a five point Lykert scale: (1) never (2) 1 or 2 times (3) 3 to 5 times (4) 6 to 10 times (5) more than 10 times (Boyle et al., 1993).

**Witnessing physical abuse.** Respondents were asked to report on how often they were exposed to physical abuse: ‘How many times did you see or hear any one of your parents/caregivers hit each other or another adult in your home?’ Mothers responded to
these items using a five point scale: (1) never (2) 1 or 2 times (3) 3 to 5 times (4) 6 to 10 times (5) more than 10 times (Boyle et al., 1993).

**Mental illness parent.** Mothers were asked to report on their parent’s mental health and were asked: ‘As far as you know, did your parent(s) caregivers ever have problems with their emotions or nerves?’ Mothers responded to these items using the following response categories: (1) Yes, my mother/maternal caregiver did (2) Yes, my father/paternal caregiver (3) Yes, both did (4) No.

**Drugs alcohol mother.** Respondents were asked to report on their parent’s drug use or alcohol use growing up until the age of 16. Mothers answered the following question: ‘Did your parent(s)/the people who raised you ever have problems with the use of alcohol or drugs?’ Mothers responded to these items using the following response categories: (1) Yes, my mother/maternal caregiver did (2) Yes, my father/paternal caregiver (3) Yes, both did (4) No.

**Teenage mother.** Respondents were asked: ‘How old was your mother when her first child was born?’ Mothers were asked to place their mothers age into the following age brackets: (1) Under 20 years (2) 20 to 24 years (3) 25 years or over.

**Physical abuse.** Early experience of physical abuse was assessed using a confidential self-administered questionnaire (Walsh, MacMillan, Trocmé, Jamieson & Boyle, 2006). Three questions that captured early exposure to physical abuse were asked: (1) ‘How many times before the age of 16 did an adult caregiver slap you on the face, head or ears or hit you with a hard object, such as a belt, stick, or wooden spoon?’, (2) ‘How many times before the age of 16 did an adult caregiver in your home push, grab, shove or throw something at you to hurt you?’, (3) ‘Before the age of 16 how many times
did an adult caregiver kick, bite, punch, choke, burn you, or physically attack you in some way?” Mothers responded to these items using a five point scale: (1) never (2) 1 or 2 times (3) 3 to 5 times (4) 6 to 10 times (5) more than 10 times. A cut-off of 2 was utilized for physical abuse (representing 12.6% of the sample). Items were standardized, and a mean was derived from the three items (Walsh et al., 2006).

**Sexual abuse.** Sexual abuse was assessed using the Childhood Experience of Violence Questionnaire (CEVQ, Walsh et al, 2008), a self-report measure of childhood exposure to violence for adults. Sexual abuse was assessed by two questions: ‘Before age 16, were you ever sexually assaulted or raped? If yes: ‘How many times did this happen’? As scales were highly skewed with most mothers reporting no experiences of abuse, I recoded the scales to be dichotomous, following the natural cut point of the distribution. A cut-off of 1 was used for sexual abuse (representing 9.3% of mothers). The measure shows good reliability and validity (Walsh et al., 2008).

**Data Analysis Plan**

Based on the research findings mentioned above on how indices of socioeconomic status may operate differently for immigrant and non-immigrant groups, the following study used a SES composite of income and assets. Education was excluded from the SES construct. In addition, SES predictors were treated as time invariant because these variables showed stability over time, measured by correlations ($\alpha=0.96$) and was not expected to change in short intervals.

Latent growth curve (LGC) modeling is based on the structural equation modeling framework and uses repeated measures of a construct to estimate a growth trajectory. The trajectory is characterized by three unobserved latent factors, the intercept (starting point), linear slope (linear rate of change) and quadratic slope (non-linear change over time) (Curran, 2000).
Unconditional models were estimated using robust maximum likelihood with Mplus V7.0 (Muthén & Muthén, 2010). Models containing indirect effects were estimated using Weighted Least Squares - means- and variances-adjusted (WLSMV) to accommodate the use of binary correlates.

In order to determine the shape of the grand mean trajectory, linear and quadric growth models were tested. I first fit a linear model (including the intercept and the linear term) and a quadratic model (including the intercept, a linear term and a quadratic term).

Once the shape of the model was determined, the first step in this analysis was to describe trajectories of maternal depressive symptoms across the four waves of data. This was accomplished by using the four data points to estimate an unconditional growth model of maternal depressive symptoms where no predictors were added to the model (in which each mother was allowed to have her own slope). The time 1 factor loading was set to zero to establish the first time point as baseline. In other words, the intercept was equivalent to time 1.

The mean of the latent intercept factor provides the group average on the starting point for the trajectory, whereas the mean of the latent slope factor represents the average linear rate of change. The mean quadratic factor represents the average non-linear change in depressive symptoms over time. Variances for the latent growth factors describe individual variation around the overall means for the intercept, slope and quadratic term.

The following widely used criteria were applied as guidelines to determine the model fit, Comparative Fit Index (CFI), Tucker-Lewis index (TLI) and Root Mean Square Error of Approximation (RMSEA). Values for the CFI range from 0.0 to 1.0 with values closer to 1.0 indicating good fit. Typically values that exceed 0.90 on the CFI and TLI are considered good, while values above 0.95 are considered excellent. The RMSEA is an absolute fit index, values
below 0.08 are considered to be good and values below 0.05 are considered excellent (Marsh, 2004).

Next, I investigated whether immigrant groups were at higher risk of depressive symptoms. Finally, I aimed to investigate whether explanatory variables (demographic, current and past risk factors) accounted for the association between immigrant groups and depressive symptoms over time. Figure 5a depicts a hypothetical model with a single explanatory variable. Path \(a\) represents the effect of the independent variable (in this case, ethnicity) on the hypothesized explanatory variable. Path \(b\) represents the association between an explanatory variable and the outcome (in this case, maternal depressive symptoms). Path \(c\) represents the direct effect: the association between the independent variable and the outcome. Path \(c'\) is the same as the direct effect after controlling for the hypothesized explanatory variable. The indirect effect represents the association between the independent variable and the outcome that is accounted by the hypothesized explanatory variable. This is obtained by multiplying paths \(a\) and \(b\) and is mathematically equivalent to the change between the path \(c\) and \(c'\) (Preacher & Hayes, 2008a). All risk factors were entered simultaneously because the risk factors in this study are likely to cluster with one another. Therefore, I report the specific indirect effect of each hypothesized covariate while controlling for all other demographic and risk variables. I also report the total indirect effect (the sum of all specific indirect effects) as well as total effect (the sum of all specific indirect effects and the direct effect). Mplus uses the default Delta method (Sobel, 1982) to calculate the standard error of the indirect effect. The Delta method uses the standard error of the product between two variables to calculate the significance of the indirect pathway.
Psychosocial risk factors of mental health tend to cluster together, thus it is important to
study multiple risk factors simultaneously in order to understand the mechanisms that contribute
to depression in immigrant women (Kraemer et al., 2001). This can be accomplished through a
multiple confounder model. The multiple confounder model is statistically identical to a multiple
mediation model. Both models measure change in the relationship between an independent and a
dependent variable after adding a third variable to the analysis and differ only conceptually
(Mackinnon et al., 2000).

**Missing Data Procedures**

Parameters were estimated using all available data from the 441 participating mothers
and mothers for whom there were some missing data under missing-at-random (MAR)
assumption. The full information strategy estimates model parameters using all available
information, even if some that information comes from cases with incomplete data. Usable
information can be gleaned from data with a single valid data point (Preacher et al., 2008).
Statistical techniques to account for structural missing data (e.g. Multiple Imputation) were not
appropriate due to skip patterns in the data. For example, single mothers did not respond to
marital conflict questions. Using multiple imputations to estimate variables that are not
applicable may produce biased estimates.
Results

Descriptive statistics for continuous and categorical variables are presented in Table 3 and Table 4 and intercorrelations among variables are presented in Table 5. Table 3 shows that Black immigrants consistently reported the highest levels of depressive symptoms across each time point, followed by Asian immigrants. Table 4 consists of the categorical variables in the study, representing the number of individuals in each group across time. Table 5 represents statistically significant positive correlations were found between marital status and depressive symptoms at each time point. Women who reported being single had higher levels of depressive symptoms. Marital conflict and maternal depressive symptoms were also correlated at each time point, with higher levels of marital conflict found to be associated with higher levels of maternal depressive symptoms. The correlation table also indicates significant associations between childhood adversity, income and assets and maternal depressive symptoms over time. Higher scores on history of childhood adversity (past history of abuse and past exposure to risky environments) were associated with higher levels of maternal depressive symptoms. Mothers who reported higher income and assets, reported lower rates of maternal depressive symptoms.
### Descriptive and Correlational Data

Table 3. Descriptive statistics of continuous study variables by groupings

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<tr>
<th></th>
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<th>Black Immigrant</th>
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<td>$M$</td>
<td>$SD$</td>
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<td>.54</td>
<td>.36</td>
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<td>time 4</td>
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Note. SD = standard deviation. $N = 441$. 
Table 4. Descriptive statistics of categorical study variables by groupings

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<td>1.36%</td>
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N = 441.
Table 5. Correlation Matrix

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<td>2. Mother's age</td>
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<td>.085</td>
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<td>.279**</td>
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<td>.043</td>
<td>.164**</td>
<td>.253**</td>
<td>.264**</td>
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<td>-.245**</td>
<td>.494**</td>
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<td>.072</td>
<td>.237**</td>
<td>.201**</td>
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<td>.476**</td>
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<td>.062</td>
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<td>.457**</td>
<td>.496**</td>
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Trajectories of Maternal Depressive Symptoms

In order to determine the shape of the grand mean trajectory, I compared the fit of the linear and quadratic models. The results of maternal depressive symptom trajectory are presented in Table 6. The fit indices indicate that the quadratic model was the best solution. In this model, the means of the intercept, linear growth and quadratic growth factors were estimated, as well as the variance of the intercept (intercept represents mothers’ initial depressive symptoms scores at time 1). The model fit for the quadratic LGC with no predictors was excellent, $\chi^2 (4) = 4.54$, $p > .05$, CFI = 1.0, TLI = 1.01, RMSEA = .000. Accordingly, dropping the quadratic slope significantly decreased the model fit, $\Delta \chi^2 (1) = 6.430$, $p < .01$. Thus, the model with linear and quadratic slopes was retained for further analyses.

Results indicated that there is variability across mothers in initial levels of depressive symptoms ($M = .47$, $p < .05$, variance of intercept = .06, $p < .000$). On the other hand variance of the linear and quadratic slopes were not significant, indicating that there were no individual differences in the rate of change over time. In other words, although individuals differ with regards to their initial level of depressive symptoms, everyone follows the same pattern of linear and non-linear change over time. The mean of the linear slope indicated that maternal depressive symptoms is decreasing by .08 units between time 1 and time 4 (Refer to Figure 2).
Figure 2. Quadratic unconditional growth curve model of maternal depressive symptoms over time. Circles represent actual means and triangles represent model estimated means.
Main Effect of Immigrant Groups Trajectories

Considering the unconditional growth curve trajectory is characterized by significant variation at the intercept, the next step in this analysis was to determine whether immigrant status is the source of this variation. To test this, the intercept and slope factors for each trajectory is regressed on each immigrant grouping. These models demonstrate how being an immigrant affects the starting point in depressive symptomatology.

Model 1 examined trajectories after adding immigrant grouping as a predictor. Asian and Black immigrants have significantly higher initial levels of depressive symptoms in comparison to White Canadians. Despite individuals not differing on the slope in the null model, when predictors were added to the model, results revealed that Asian immigrants significantly decreased over time in depressive symptoms in comparison to White Canadians. Figure 3 graphs the differences between White Canadians, European immigrants, Asian immigrant and Black immigrants in maternal depressive symptoms over time. Figure 4 graphs the differences between White Canadians, European immigrants, Asian immigrant and Black immigrants in maternal depressive symptoms over time adjusted for covariates. Estimates as well as their standard errors for the different groups are presented in Table 6. Based on the differences between Black and Asian immigrant and the reference category (White Canadian) in their starting off points and downward slope for Asian immigrants, I added predictors to the model that might explain these differences.
Figure 3. Growth curve model with different immigrant groupings
Mechanisms of Maternal Depressive Symptoms

Next, I explored whether current and previous risk factors explain why certain immigrant groups have more depressive symptoms than others. A multiple confounder model was employed to understand the mechanisms that contribute to depressive symptoms in immigrant women. Table 7 shows standardized specific indirect effects, direct effects and total indirect effects for the model.

The b path shows the associations between previously identified risk factors and maternal depressive symptoms. Results indicate that mother’s age, marital status, marital conflict,
childhood adversity and income/assets are all significantly related to depressive symptoms. More specifically, these results indicate that younger mothers endorse more depressive symptoms. Single mothers showed more depressive symptoms. Higher scores on marital conflict and childhood adversity are associated with higher levels of depressive symptoms. Finally, mothers with low income and fewer assets were more likely to report depressive symptoms.

The $a$ path shows the relationship between the immigrant grouping and each explanatory variable compared to the reference category (White Canadians). European immigrants are not significantly different from White Canadians on any demographic or predictor variable. The $a$ path reveals that Asian immigrants are less likely to be single and experience marital conflict. Asian immigrants are also less likely to experience childhood adversity. Both Asian immigrants and Black immigrants are more likely to have lower income/ fewer assets. Black immigrants are more likely to be younger mothers, have more children, have younger children and more likely to be single.

The results of indirect pathways (effect of immigrant grouping on maternal depressive symptoms through an explanatory variable) in Table 7 further indicate differences between immigrants and Canadian born women in the relationship between depressive symptoms and demographic and predictor variables.

For both Asian immigrants and Black immigrants, income and assets had a significant indirect effect on maternal depressive symptoms (Asian immigrant: $Z = 4.98, p = .00$; Black immigrants: $Z = 5.89, p < .001$). These results suggest that level of income/assets explain the relationship between higher levels of depressive symptoms seen in both Asian and Black immigrants. Marital conflict ($Z = -3.00, p = .00$), childhood adversity ($Z = -2.16, p = .03$) and being single ($Z = -1.961, p = .05$) showed significant indirect effects for Asian Immigrants only.
Asian immigrants report less marital conflict and less childhood adversity in comparison to Canadian born women. Thus Asian women experience both risk (income and assets) and protective factors (less likely to be single, low marital conflict, low childhood adversity) that when examined together cancel one another out. Thus there is no total indirect effect (Z=-1.42, p = >.05), and the direct effect is still significant. This means that even though Asian women experience higher levels of depressive symptoms because of their experience of low income, this risk is counter-balanced by low levels of marital conflict, childhood adversity and being single. Taking into account this balance of risk and protection, these predictors do not fully explain why Asian women show initial higher levels of depressive symptoms in comparison to Canadian mothers.

However, for black immigrants there is a total indirect effect (Z=4.95, p< .001), and no direct effect (Z=-1.38 p = >.05), suggesting that maternal age, marital status and income/assets fully explains why Black immigrants report elevated levels of depressive symptoms.

Once current and previous risk factors were added to the model, Asian immigrants were not significantly different from White Canadian over time (results not reported in Table 7). In addition, no significant indirect effects accounted for the decrease in depressive symptoms seen in Asian immigrants over time.
Figure 5a. Single Confounder Model
Figure 5b. Multiple Confounder model
Table 6. Latent growth curve modeling maternal depressive symptoms across four waves of data

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<td>SE</td>
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<td>Asian immigrant</td>
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Model Fit

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<tbody>
<tr>
<td>Log Likelihood</td>
<td>-336.85</td>
<td>-322.64</td>
</tr>
<tr>
<td>AIC</td>
<td>693.69</td>
<td>679.28</td>
</tr>
<tr>
<td>BIC</td>
<td>734.56</td>
<td>748.75</td>
</tr>
<tr>
<td>ABIC</td>
<td>702.83</td>
<td>694.80</td>
</tr>
<tr>
<td>RMSEA</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>CFI</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>TLI</td>
<td>1.01</td>
<td>1.04</td>
</tr>
</tbody>
</table>
Table 7. Covariates of the relationship between ethnic grouping and maternal depressive symptoms

<table>
<thead>
<tr>
<th></th>
<th>European Immigrant</th>
<th>Asian Immigrant</th>
<th>Black Immigrant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Path b</td>
<td>Path a</td>
<td>a*b (indirect effect)</td>
</tr>
<tr>
<td>Child age</td>
<td>.06</td>
<td>-.03</td>
<td>-.00</td>
</tr>
<tr>
<td>Number of children</td>
<td>.05</td>
<td>-.07</td>
<td>-.00</td>
</tr>
<tr>
<td>Mother age</td>
<td>-.16**</td>
<td>.08</td>
<td>-.01</td>
</tr>
<tr>
<td>Marital conflict</td>
<td>.31***</td>
<td>-.07</td>
<td>-.02</td>
</tr>
<tr>
<td>Childhood adversity</td>
<td>.38***</td>
<td>-.12</td>
<td>-.05</td>
</tr>
<tr>
<td>Income &amp; assets</td>
<td>-.37***</td>
<td>-.03</td>
<td>.01</td>
</tr>
<tr>
<td>Single</td>
<td>.58***</td>
<td>-.73</td>
<td>-.04</td>
</tr>
<tr>
<td>Total Indirect</td>
<td></td>
<td>-.50</td>
<td>-.10</td>
</tr>
<tr>
<td>Direct c path</td>
<td>.52</td>
<td></td>
<td>.25**</td>
</tr>
</tbody>
</table>

Note: Path b are unstandardized coefficients for the entire sample

Path a varies for each group and is the relationship between immigrant grouping and the explanatory variable

Path a*b varies for each group and is the indirect effect of immigrant grouping to maternal depressive symptoms through the explanatory variable
Discussion

The current longitudinal study is the first to investigate maternal depressive symptoms in an ethnically diverse sample of immigrant mothers during the postpartum period using a cross culturally equivalent measure of depressive symptoms. Results indicated that immigrant women are more likely to report depressive symptoms during the postpartum period in comparison to Canadian-born mothers. More specifically, Asian immigrants and Black immigrants were found to have higher levels of depressive symptoms in comparison to White Canadian mothers. It was found that socioeconomic indicators were among the best predictors of depressive symptoms in Asian immigrant and Black immigrant mothers.

Ethnic Disparities in Mental Health

Asian and Black immigrants reported significantly higher initial levels of depressive symptoms after giving birth, in comparison to White Canadians. Black immigrant mothers reported elevated symptoms at all four time points, suggesting that Black immigrant women are more likely to show chronic symptoms of depressive symptoms that do not subside after the postpartum period. Past research has indicated that Black immigrants have a higher likelihood of experiencing chronic and severe depression (Miranda et al., 2008; Jackson et al., 2007) but are least likely to use mental health services (Whitley et al., 2006; Fenta et al., 2006). It has also been well documented that prolonged or recurrent periods of maternal depressive symptoms are associated with serious and long lasting child behavioural problems (Brennan et al., 2000; Stewart et al., 2003). In terms of slope differences, Asian immigrants significantly decreased over time in depressive symptoms in comparison to White Canadians and over time did not differ from White Canadians.
Variables Associated with Maternal Depression

Consistent with previous research on maternal depression, age, marital status, marital conflict, childhood adversity and income/assets are all significantly related to depressive symptoms. The following study was able to demonstrate that European immigrants and White Canadians did not differ on any of the above risk factors. On the other hand, Asian immigrants differed because they are less likely to be single, experience marital conflict or childhood adversity. Both Asian immigrants and Black immigrants were more likely to have lower income/fewer assets. Black immigrants are more likely to be younger mothers, have more children, have younger children and more likely to be single. These results suggest that the risk and protective factors associated with depressive symptoms are different across immigrants. More importantly, these results highlight the fact that there is no single aetiological pathway to depressive symptoms among mothers.

Explanatory Variables of Depression

Social Disadvantage

Results also indicated elevated rates of psychological distress among socially disadvantaged groups, namely Black immigrants and Asian immigrants. These results suggest that level of income/assets explain the relationship between higher levels of depressive symptoms seen in both Asian and Black immigrants. Even though Asian women experience higher levels of depressive symptoms because of their experience of low income, this risk is counter-balanced by low levels of marital conflict, childhood adversity and being married. Taking into account this balance of risk and protection of equal strength, these predictors do not fully explain why Asian women show higher levels of depressive symptoms in comparison to white native-born mothers. It is possible that other risk and protective factors not captured in the
present study are accounting for the initial elevated levels of depressive symptoms and the
decline in Asian immigrants self reported depressive symptoms over time. For example, one
review paper found that Asian immigrant families in the United States had a host of protective
factors, such as, coping skills, emotion regulation skills, family cohesion, more likely to maintain
their cultural heritage and belong to a strong ethnic community (Zhou et al., 2012).

Conversely, for Black immigrants maternal age, marital status and SES fully explains
why Black immigrants report elevated levels of depressive symptoms. It is not surprising that
SES explained most of the variance in depressive trajectories considering SES is widely
recognized as a fundamental cause of variation in well being (Link and Phelan, 1995) and an
important indicator of inequality and poor health (Evans and Takeuchi, 2007). SES is related to
level of exposure to psychosocial and environmental risks (Link and Phelan, 1995). Income can
decrease access to and utilization of mental health care services. Previous studies indicate that
our Canadian mental health care settings are more likely to support less severe psychiatric
disorders for individuals with high socioeconomic status than it supports care for disadvantaged
groups or those with more severe and persistent mental health problems (Steele et al., 2006).
This was found to be true even for immigrants in a low socioeconomic status group. It is
unknown whether these findings are patient driven or mental health care provider driven. More
research would be needed in this area to understand the directionality of these results.

This study highlights the importance of culturally sensitive assessment and treatment of
depressive symptoms in the postpartum period, particularly for visible minority immigrants.
Targeted services that support mothers with chronic impairment may be most needed as chronic
depression is the most disabling and likely to influence poorer mental health outcomes in
children. The current study adds to the small but growing body of research that examines
maternal depressive symptoms among a diverse sample of immigrants. Important extensions of the current study’s contributions should thus be carried forward. A relatively small percentage of the variance in Asian immigrant women was explained in the current study, leaving open a wide range of additional influences to be investigated. This includes research regarding the best way to prevent, detect and treat depressive symptoms in the postpartum period within diverse ethnic and socioeconomic groups. Longitudinal studies with large sample sizes that specifically measure the effects of promising interventions in immigrant women are urgently needed (Stewart et al., 2003).

Limitations

The above research was unable to tease apart ethnic and immigrant influences. These two variables are highly confounded in the current sample. There were few women in our sample who had non-Caucasian ethnicities but were born in Canada. Future research would require appropriate comparison groups in order to have a clear indication of how ethnicity and/or immigrant status influence depressive trajectories.

Furthermore, it is possible that Black and Asian immigrant mothers were also more likely to experience depressive symptoms prior and during their pregnancy, and the results in this study may not be specific to the postpartum period. It is possible that depression history and prepartum depression are predictive of depressive symptoms during the postpartum period (O’Hara et al., 1984).
General Discussion

The findings from these studies have a number of important implications for future research and clinical practice. For a field that is increasingly becoming aware of the importance of cultural competence, clinicians must be cognizant of the elevated levels of mental health problems seen in visible minority immigrants. Furthermore, programs geared at prevention of mental health problems should begin as immigrants arrive to Canada, particularly for visible minority immigrants. In addition, interventions would need to be approached from a social determinants of health model, as it appears that Black immigrants would benefit from more socio-economic support.

These findings also highlight the importance of providing support to parents and ensure their mental health is supported during this major life course transition. Currently there is a lack in institutional supports available for immigrants that would help ease the social and economic burdens and subsequent stressfulness associated with parenting, especially when children are dependent (Hewlett, Rankin and West, 2002).

This dissertation may inform models of service provided to recent immigrants, with more long-term services to assist in the acculturation process. Mental health providers also need to work together to promote awareness around mental health for migrant communities. These factors may be important determinants of the psychological functioning, and ultimately the civic success, of new immigrants into Canada. As the immigrant population in Canada continues to grow, these issues will become increasingly important in regards to the economic and social success of Canada.
Significance and Future Research

In Toronto alone, 46% of the population is of foreign-born status (Census of Canada, 2006). The rapid growth of this demographic has occurred in the last few decades and as a result, immigrant families have been neglected in areas of research and public policy (Hernandez & Charney, 1998). Of the research conducted on immigrants in Canada, few have looked at immigrant groups separately and little is known about the mental health of women in immigrant families. Based on some of the research outlined above, results suggest that there is an effect of parenting on depressive symptoms and an effect of immigration status and that these might be additive. These data converge to suggest there are a large number of children and adolescents living in immigrant families that are at risk of being exposed to maternal depressive symptoms. There is a tremendous amount of research to suggest that symptoms of depression are incompatible with effective parenting and that there is a strong link between maternal depression and poor child outcomes. Depressive symptomatology such as feeling down, loss of interest or pleasure in activities, loss of energy, lower self-esteem, poor concentration, indecisiveness and irritability make it difficult for parents to be attuned and responsive to their children’s needs and to effectively model appropriate socio-emotional functioning (Goodman & Gotlib, 1999; Cummings & Davies, 1994; Kochanska & Aksan, 2004; Feldman, 2007; Feldman & Masalha, 2010; Downey & Coyne 1990; Zuckerman & Beardslee, 1987). Children of depressed mothers have been shown to have impaired cognitive, behavioural and mental health outcomes through the lifespan and are particularly at risk when exposed to chronic maternal depression (Pettersson, 2001; Goodman & Gotlib, 2002; Downey & Coyne 1990; Brennan, 2000).

Furthermore the majority of the current research on immigrants and mental health utilize outdated data on less recent cohorts of immigrants. It is important to have research on immigrant
populations that reflect the current demographics of new immigrants (Immigration and Refugee Protection Act, 2002). Similarly, there is a strong need for ongoing research on immigrant families because the characteristics of immigrants continuously shift (Hernandaz, 2004), in part due to changes in Canadian immigration policies. Moreover, a large number of studies have been conducted outside of Canada and it is important to study mental health in immigrant families in the Canadian context, as there are differences in factors such as, immigration policies, health care and immigration patterns. Research in this area is urgently needed to elucidate the risk and protective factors for this growing population, to inform immigration and settlement policy, and to guide the provision of culturally sensitive mental health services for new Canadians and their families.
References


of Public Health, 96 (Supplement 2), S30-S44.


Hyman, I., Guruge, S., & Mason, R. The Impact of Migration on Marital Relationships:

Immigration and Refugee Protection Act, 2002.


Lefèvre T, Singh-Manoux A, Stringhini S, Dugravot A, Lemogne C, Consoli


Noh, S., Beiser, M., Kaspar, V., Hou, F., &Rummens, J. (1999). Perceived racial discrimination,


Immigrant and Minority Health, 14(1), 156-165. doi:http://dx.doi.org/10.1007/s10903-010-9408-7


doi:http://dx.doi.org/10.1177/0020764007075025


APPENDIX A

Parenting status originally had 16 possible groupings; (1) Married at all time points and children all time points, (2) Married at all time points and never had children; (3) Married at all time points and no children to children at some time point; (4) Married at all time points and children to no children at some time point; (5) Single at all time points and children at all time points; (6) Single at all time points and never had children; (7) Single at all time points and no children to children at some time point; (8) Single at all time points and children to no children at some time point; (9) Divorced at any time point and children at all time points; (10) Divorced at any time point and never had children; (11) Divorced at any time point and no children to children at some time point; (12) Divorced at any time point and children to no children at some time point; (13) Single to married and children at all time points; (14) Single to married and never had children; (15) Single to married and no children to children at some time point; (16) Single to married and children to no children at some time point. A total of 5 groups had cell sizes between 0 – 10 and were collapsed with groups that were theoretically similar. The remaining 11 groups were examined to create homogenous categories. When the outcome variable was not statistically different and fit together based on theoretical principles, they were collapsed into one group. For example, respondents who reported being married at all time points and single to married were not statistically different and collapsed into one group. In addition, models testing differences between respondents who had children at all time points, no children to children and children to no children were not statistically significant and collapsed together. These groupings were made because the reasons for changes in number of children over time were unknown (reunification, new born baby, departure from home based on age, loss etc.) and could not be grouped based on theoretical understanding.