QUANTITATIVE RESEARCH

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Disentangling the effects of primary and secondary international migration on psychological distress: the role of mastery

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Abstract

Objectives This study examined the effect of mode of migration—primary immigration (direct migration from origin country) and secondary immigration (migration from a country of residence other than the origin country)—by level of economic development of country of origin on psychological distress of immigrants to Canada. The study focused on the explanatory role of mastery in the relationship between mode of migration/level of economic development of origin country and distress. Mastery is the belief that one can and does master, control, and shape one's own life.

Methods Data from the Neighbourhood Effects on Health and Well-being study, which contains important measures such as the mode of migration, was used to assess the study objectives. The analytic sample included 1496 Canadian-born and 387 foreign-born (non-refugee) participants. Hierarchical linear modeling was used to address the study objectives.

Results Results point to a "healthy immigrant effect"—lower distress among the foreign-born than the native-born—but only among *primary immigrants* from less-developed countries. Secondary immigrants from less-developed countries report *higher* distress than the native-born and their primary-immigrant counterparts. The higher distress among secondary immigrants was due in part to lower mastery among this group. Immigrants from developed origin countries did not report different levels of distress than the native-born, irrespective of mode of migration.

Conclusion This study fills an important gap in the literature on immigration and mental health and reveals that the healthy immigrant effect is not generalizable to all immigrants; it is contingent on the mode of migration/level of economic development of the country of origin.

Résumé

Objectifs Examiner l'effet du mode de migration – immigration primaire (migration directe du pays d'origine) et immigration secondaire (migration d'un pays de résidence autre que le pays d'origine) – selon le niveau de développement économique du pays d'origine sur la détresse psychologique des immigrants au Canada. L'étude porte sur le rôle explicatif de la « maîtrise de la situation » dans la relation entre, d'une part, le mode de migration et le niveau de développement économique du pays d'origine, et d'autre part, la détresse. La maîtrise de la situation est. la conviction de pouvoir maîtriser, contrôler et façonner sa propre vie.

Méthode Les données de l'étude Neighbourhood Effects on Health and Well-being, qui contient d'importants indicateurs, comme le mode de migration, a servi à évaluer les objectifs de l'étude. L'échantillon analytique englobait 1496 participants nés au Canada et 387 participants (non réfugiés) nés à l'étranger. Les objectifs de l'étude ont été abordés par modélisation linéaire hiérarchique.

Résultats Les résultats indiquent la présence d'un « effet de l'immigrant en bonne santé » – une détresse moins élevée chez les personnes nées à l'étranger que chez celles nées au Canada – mais seulement chez les *immigrants primaires* des pays en développement. Les immigrants secondaires des pays en développement font état d'une détresse *plus élevée* que les personnes nées au Canada et les immigrants primaires. La détresse plus élevée des immigrants secondaires s'explique en partie par la moins bonne maîtrise de la situation dans ce groupe. Les immigrants de pays développés ne font pas état de niveaux de détresse différents de ceux des personnes nées au Canada, peu importe le mode de migration.

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Conclusion L'étude comble une lacune importante dans la littérature sur l'immigration et la santé mentale: elle révèle que l'effet de l'immigrant en bonne santé n'est pas généralisable à tous les immigrants, mais dépend du mode de migration et du niveau de développement économique du pays d'origine.

Introduction

International migration is often a multistage process (Wanigaratne et al. 2015). This is partly due to selective immigration policies of "desirable" destination countries—such as the points system in Canada, coupled with the high cost associated with securing a visa—which have made migration difficult for those who do not possess the requisite financial, social, and human capital (Wanigaratne et al. 2015; Paul 2011; Urquia et al. 2010). Immigrants, especially those from less-developed origin countries who cannot gain access to their desired destination country directly, have adapted an alternative mode of migration (MOM): *secondary migration* (Paul 2011; Urquia et al. 2010; Takenaka 2007). Secondary immigrants enter the destination country from a country of residence other than their origin country, as opposed to primary immigrants, who make one permanent cross-border movement (Urquia et al. 2010). The majority of secondary immigrants tend to use intermediary countries that are easier to enter as stepping stones to gain entry into a desired destination country—often in the West (Paul 2011; Takenaka 2007). Research on migrants to the USA and Canada suggest that at least 10% of immigrants to Canada are secondary migrants (Wanigaratne et al. 2015; Urquia et al. 2010; Takenaka 2007). To date, research on immigrant health has ignored the effect of MOM on the *psychological* health of immigrants—an important distinction for advancing research on the well-being of immigrants. Immigration is the *most significant* contributor to current and future demographic growth in Canada (Yassaad 2012). As the percentage of foreign-born Canadians continues to increase as a proportion of the total Canadian population, the significance of the well-being of immigrants becomes an increasingly important public health matter.

The majority of contemporary research on (non-maternal) immigrant psychological health finds that immigrants are healthier than the native-born—healthy immigrant effect (HIE). However, this advantage deteriorates with tenure in the host country (Montazer and Wheaton 2017; Ali 2002; Aglipay et al. 2013; Vang et al. 2017; Kennedy et al. 2015; Kirmayer et al. 2011). While some research on self-rated health and mortality finds that the HIE varies by gender, results for mental health in general suggest that, in Canada, the

HIE exists for non-refugee men and women migrants (Montazer and Wheaton 2017; Ali 2002; Aglipay et al. 2013; Vang et al. 2017; Kennedy et al. 2015; Kirmayer et al. 2011). Two popular theories explain the HIE. According to the first, immigrants are self-selected because only the most able—in terms of health and resources—can migrate. The second theory assumes receiving countries' immigration policies affect the health profile of the immigrant population (Kennedy et al. 2015). The points system in Canada, for example, selects immigrants who are well educated, skilled, employed, parents and married (Montazer and Wheaton 2017; Boyd and Vickers 2000). All of these factors predict better emotional outcomes (Mirowsky and Ross 2003). These theories, however, are not mutually exclusive; Canada's attempt to select the most qualified immigrants may also induce positive self-selection since only those individuals who have the greatest chance of gaining entry apply in the first place (Kennedy et al. 2015). All immigrants, irrespective of origin country, are selected on health and health-ameliorating factors. However, researchers argue that health selection is highest among immigrants from the poorest and most underdeveloped countries, in part because the cost of migration from these countries is greater and may in turn require more resources (Montazer and Wheaton 2017; Jasso et al. 2004). Yet, this mental health advantage may also result from the hope and expectation that migration from a less-developed country to one with better opportunities and life conditions entails (Rote et al. 2014). Based on these ideas, the first hypothesis is that, at average length of residence, immigrants from less-developed origin countries, irrespective of MOM, will have lower psychological distress than the native-born *and* immigrants from developed origin countries (H1).

The second hypothesis considers the MOM: secondary immigrants from less-developed origin countries have higher psychological distress than the native-born *and* primary immigrants from less-developed countries (H2). The reason for this hypothesis is as follows. Because primary immigrants from less-developed countries have gained entry into Canada directly, they are selected by the points system at the time of migration (Kennedy et al. 2015). The same factors that result in direct selection by the points system also tend to lead
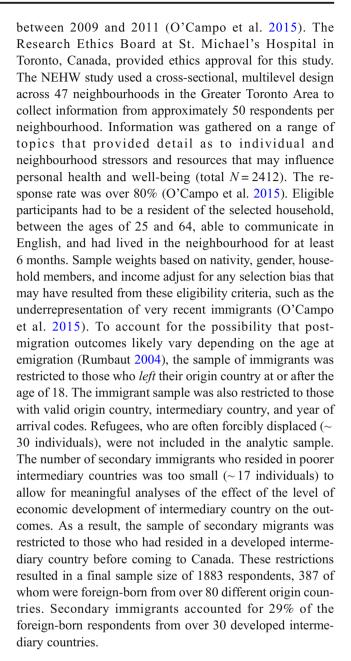
to better mental health outcomes among this group. Conversely, one can argue that secondary immigrants from these countries are not able to gain admission to Canada—at least not initially—partly because they lack these health-ameliorating factors. Secondary migrants often gain new skills and education, expand their social network, become proficient in speaking English during their time in transit (Takenaka 2007), and eventually go through a selection process in the intermediary country prior to gaining admission to their final destination. However, they often lead more stressful lives in the process; these immigrants are often under-employed, have stressful work conditions and live in uncertainty while waiting to gain entry to their desired destination country (Paul 2011; Içduygu 2000). Further, living in an (often developed) intermediary country (Takenaka 2007) may also imply that the process of acculturation, and the accompanying stressors—such as the possible experience of discrimination—associated with a decline in mental health post-arrival among primary immigrants from less-developed countries in Canada (Montazer and Wheaton 2017) begins for secondary migrants in the intermediary country(ies) (Urquia et al. 2010).

The deteriorating effect of stressors associated with living in uncertainty, coupled with acculturative stressors, accumulates over time in the intermediary country, eroding protective buffers, such as the sense of mastery over one's life. Mastery—the belief that one can and does master, control, and shape one's own life—is *key* for combating the experience of psychological distress (Mirowsky and Ross 2010). Thus, while primary immigrants from less-developed origin countries should experience lower rates of psychological distress, secondary immigrants from these same countries should experience higher rates of distress as compared to the native-born *and* primary immigrants as a result of lower levels of mastery. The final hypothesis presumes that (a) secondary immigrants from less-developed countries will have lower levels of mastery than primary immigrants and the native-born (H3a), and (b) that lower levels of mastery will in part account for the higher rate of distress among this group (H3b). Migrants from developed origin countries, irrespective of MOM, should not experience different levels of distress or mastery than the reference group because of the similarity in life outcomes that minimize the stress and health effects of migration, or re-migration, between developed countries (Urquia et al. 2010; Montazer and Wheaton 2017).

Methods

Sample

The analyses are based on data from the Neighbourhood Effects on Health and Well-Being (NEHW) study, conducted between 2009 and 2011 (O'Campo et al. 2015). The Research Ethics Board at St. Michael's Hospital in Toronto, Canada, provided ethics approval for this study. The NEHW study used a cross-sectional, multilevel design across 47 neighbourhoods in the Greater Toronto Area to collect information from approximately 50 respondents per neighbourhood. Information was gathered on a range of topics that provided detail as to individual and neighbourhood stressors and resources that may influence personal health and well-being (total $N = 2412$). The response rate was over 80% (O'Campo et al. 2015). Eligible participants had to be a resident of the selected household, between the ages of 25 and 64, able to communicate in English, and had lived in the neighbourhood for at least 6 months. Sample weights based on nativity, gender, household members, and income adjust for any selection bias that may have resulted from these eligibility criteria, such as the underrepresentation of very recent immigrants (O'Campo et al. 2015). To account for the possibility that post-migration outcomes likely vary depending on the age at emigration (Rumbaut 2004), the sample of immigrants was restricted to those who *left* their origin country at or after the age of 18. The immigrant sample was also restricted to those with valid origin country, intermediary country, and year of arrival codes. Refugees, who are often forcibly displaced (~ 30 individuals), were not included in the analytic sample. The number of secondary immigrants who resided in poorer intermediary countries was too small (~ 17 individuals) to allow for meaningful analyses of the effect of the level of economic development of intermediary country on the outcomes. As a result, the sample of secondary migrants was restricted to those who had resided in a developed intermediary country before coming to Canada. These restrictions resulted in a final sample size of 1883 respondents, 387 of whom were foreign-born from over 80 different origin countries. Secondary immigrants accounted for 29% of the foreign-born respondents from over 30 developed intermediary countries.

Measures

Dependent variable

The focal dependent variable is psychological distress, which is one of the most widely used mental health outcomes in research for over 30 years (O'Campo et al. 2015). It is measured by taking the mean across 16 items adapted from Radloff's Center for Epidemiologic Studies Depression Scale (1977) (CES-D) (Radloff 1977). Respondents were asked how often within the past 2 weeks, for example, "did you think that your life had been a failure," "did you feel lonely," and "did you worry over possible misfortunes." Possible responses included "none of the time" (1), "a little

of the time" (2), "some of the time" (3), "most of the time" (4), or "all of the time" (5). Higher scores represent greater distress ($\alpha = 0.93$). Given the skewed nature of psychological distress in the analytic sample, this variable is log-transformed.

Independent variables

Mode of migration (MOM) is measured with a question that asks foreign-born respondents whether they lived in another country other than their birth country for 6 months or more prior to coming to Canada to live: secondary migration (vs. primary migration). Level of economic development (LED) of origin country (and intermediary country(ies)) is operationalized using gross national product (GNP) per capita of the country *at the time* of emigration. Information on year of *departure* and intermediary/origin country were used to merge in World Bank data on GNP (The World Bank 2011; The World Bank 1962a; The World Bank 1962b). The World Bank categorizes economic development of countries based on four GNP categories: upper, upper middle, lower middle, and lower. Due to the small sample size in some GNP/MOM groups, upper and upper middle GNP were combined into an "upper" GNP category, lower and lower middle GNP were collapsed into a "lower" GNP category, with the Canadian-born as the reference group. This information, in combination with information on MOM, was used to create four dummy variables, with the native-born as the reference group ($N = $ 1468): lower-GNP primary immigrants ($N = 171$), upper-GNP primary immigrants ($N = 102$), lower-GNP secondary immigrants ($N = 79$), and upper-GNP secondary immigrants ($N = 35$).

The mastery index takes the average of seven items (Pearlin and Schooler 1978). Respondents were asked how strongly they agree (1)/disagree (5) with the following statements: "I have little control over the things that happen to me"; "There is really no way I can solve some of the problems I have"; "There is little I can do to change many of the important things in my life"; "I often feel helpless in dealing with problems of life"; "Sometimes I feel that I am being pushed around in life"; "What happens to me in the future mostly depends on me" (Reverse coded (R)); "I can do just about anything I really set my mind to"(R). Higher scores indicate greater mastery ($\alpha = $ 0.83).

Several covariates were taken into account, including: the length of residence in Canada (LOR) (among the foreign-born); socio-demographic variables, including female, age (years); married or common-law, number of children living in the household under the age of 18, respondent's ethnic/cultural identification; and number of negative life events. Analyses also control for immigration factors, such as immigration entrance category; limited English-speaking ability; number of intermediary countries; number of years worked for pay before coming to Canada; and, the combined length

of residence in all intermediary country/countries. These last three confounders, as well as LOR, are coded conditionally on foreign-born status and MOM to allow for the inclusion of the native-born—and primary immigrants who do not have a value for variables pertinent to secondary migrants only—in the analyses (Montazer and Wheaton 2017; Ross and Mirowsky 1992; Gee et al. 2008).

Analyses also adjust for socio-economic confounders such as years of education pre-migration (conditionally relevant variable), years of education in Canada (measured for both foreign and native-born respondents), annual household income (thousands), and employment.

Analytical strategy

The design of the NEHW study clusters respondents by neighbourhood. These data therefore violate key assumptions of ordinary least squares techniques, since error terms across respondents within the same neighbourhood are likely correlated. Thus, all multivariate analyses used hierarchical linear modeling (HLM); an approach that addresses clustering concerns and allows for separating the variance in outcome across neighbourhoods (level two) as a proportion of the total variability in outcome across individuals (level one) (Raudenbush and Bruk 2002). This method is also appropriate because there is random variance in distress ($\tau00 = 0.024$, $p < 0.01$) and mastery ($\tau00 = 1.25$, $p < 0.001$) at the neighbourhood level. All independent variables were grand-mean centered, making the intercept interpretable at the mean value of the predictor variables (Wu and Wooldridge 2005). Sample weights were incorporated in all analyses. Finally, multiple imputation techniques, with five datasets imputed, were used to replace missing values on focal variables (pre-imputation $N = 1797$) (Little and Rubin 1987).

Table 1 provides summary statistics for all variables used in the analyses disaggregated by level of GNP and MOM. Significant differences at the bivariate level between primary and secondary immigrants *within* each level of GNP and between each GNP and MOM group and the native-born were tested using chi-square tests for categorical variables and ANOVA (Bonferroni post hoc) for continuous variables. Auxiliary analyses indicate that the effect of GNP/MOM does not vary by gender (available upon request). Therefore, Tables 2 and 3 present results from the multivariate HLM regression models, which assess the impact of GNP/MOM on psychological distress and mastery, respectively, as compared to the native-born for males and females combined. Results of post hoc tests are used to indicate significant differences in distress (and mastery) between primary and secondary immigrants of the same origin country GNP. To test the hypothesis that immigrants from less-developed origin countries will have lower psychological distress than the native-born and immigrants from developed origin countries (H1),

Table 1 Descriptive statistics for all variables in the study (weighted)

| | | Foreign-born | | | |
| | | Upper-GNP | | Lower-GNP | |
	Canadian Proportion/mean (SD)	Primary migrants Proportion/mean (SD)	Secondary migrants Proportion/mean (SD)	Primary migrants Proportion/mean (SD)	Secondary migrants Proportion/mean (SD)
	$N = 1496$	$N = 102$	$N = 35$	$N = 171$	$N = 79$
Variables					
Psychological distress	11.51 (8.40)	11.74 (12.29)	8.19 (7.32)	9.34 (12.18)*·**	12.39 (13.44)
Mastery	27.84 (3.70)	26.12 (5.28)*	27.13 (3.80)	26.14 (5.93)*	25.73 (6.66)*
Female (vs. male)	0.50	0.62*	0.68	0.57*·**	0.32*
Age	42.81 (8.59)	46.65 (13.03)*	50.25 (10.37)*	44.77 (12.49)*	46.44 (12.42)*
Number of traumatic life events	2.70 (1.70)	2.49 (2.68)	2.35 (1.69)	2.14 (2.33)*	2.54 (2.18)
Marital status (vs. other):					
Married or common-law	0.56	0.63	0.70	0.73*	0.87*
Number of children in household:					
Under the age of 18 years	0.64 (0.76)	0.76 (1.29)	0.58 (0.92)	1.10 (1.48)*	0.92 (1.55)*
Ethnic/cultural identification:					
Arab or West Asian	0.06	0.10	0.11	0.02*·**	0.14*
African	0.00	0.03*	0.00	0.07*	0.17*
Caribbean	0.01	0.02	0.02	0.17*·**	0.03*
East Asian	0.01	0.09*	0.11*	0.37*	0.23*
European	0.17	0.30*	0.36*	0.09	0.18
Latin American	0.01	0.08*	0.03*	0.07*	0.05*
South Asian	0.03	0.16*	0.04	0.14*	0.16*
North American/Canadian (ref)	0.71	0.22*	0.33*	0.07*	0.03*
Length of residence in Canada	–	19.98 (15.63)	18.96 (14.15)	15.75 (13.23)**	11.62 (11.65)
Number of intermediary countries of residence pre-migration	–	–	1.28 (0.61)	–	1.38 (0.87)
Length of residence in intermediary country/countries	–	–	4.05 (3.63)	–	4.26 (4.89)
Household income (in 1000s)	104.45 (75.24)	74.79 (65.65)*·**	142.35 (121.40)*	60.96 (61.05)*	62.40 (75.74)*
Total years of education:					
Pre-migration (foreign-born only)	–	13.89 (4.73)	15.74 (2.86)	13.89 (4.73)**	16.53 (4.22)
Post-migration (foreign- and native-born)	16.57 (2.88)	1.87 (3.28)*	0.73 (1.36)*	1.60 (2.96)*·**	0.78 (2.34)*
Employed (vs. unemployed)	0.70	0.67	0.55	0.63	0.73
Limited English-speaking ability (vs. proficient)	0.01	0.07*	0.02	0.12*·**	0.04*
Pre-migration employment tenure	–	6.36 (6.85)	8.78 (6.22)	7.91 (9.22)**	10.86 (9.90)
Immigrant entrance class (vs. all others)					
Landed immigrant	–	0.55	0.63	0.75	0.70
Work visa	–	0.19	0.16	0.07	0.05

Significant mean/proportional differences between GNP/mode of migration subgroups are based on ANOVA (Bonferroni post hoc) and chi-square tests, respectively. Proportions presented for categorical variables and means (SD) presented for continuous variables

*Significantly different from the Canadian-born $p < 0.05$ (two-tailed test); **significantly different from secondary immigrants of the same origin country GNP $p < 0.05$ (two-tailed test)

model 1 (Table 2) regresses distress on foreign-born from upper-GNP and foreign-born from lower-GNP countries vs. the Canadian-born. Model 2 disentangles the effect of GNP by MOM. The next three models (models 3–5) adjust for covariates. While model 3 adjusts for socio-demographic variables and negative life events, model 4 adjusts for immigration-related confounders, and model 5 adjusts for socio-economic factors. Models 2 to 5 test H2: secondary

Table 2 The effects of primary/secondary immigration by GNP on psychological distress (N = 1883)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Exp(b) (95% CI)	Exp(b) (95% CI)	Exp(b) (95% CI)	Exp(b) (95% CI)	Exp(b) (95% CI)	Exp(b) (95% CI)
Foreign-born by level of economic development (GNP) of origin country						
Upper-GNP[a]	1.00 (0.86, 1.18)					
Lower-GNP[a]	0.88 (0.79, 0.99)*					
GNP by migration type						
Upper-GNP[a]						
Primary		1.04 (0.88, 1.23)		1.02 (0.81, 1.27)	1.24 (0.86, 1.79)	1.20 (0.87, 1.65)
Secondary		0.78 (0.58, 1.06)		1.12 (0.74, 1.69)	1.44 (0.84, 2.45)	1.18 (0.74, 1.88)
Lower-GNP[a]						
Primary		0.76 (0.67, 0.86)**	0.81 (0.68, 0.96)**	0.78 (0.62, 0.97)*	0.97 (0.66, 1.41)	0.91 (0.65, 1.26)
Secondary		1.17 (0.99, 0.38)[b]	1.23 (1.02, 1.48)*[b]	1.63 (1.16, 2.30)***[b]	2.05 (1.26, 3.32)**[b]	1.41 (0.93, 2.15)[b]
Length of residence in Canada	0.99 (0.99, 1.00)	1.00 (0.99, 1.00)	1.00 (0.99, 1.00)	0.99 (0.99, 1.00)	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)
Ethnic/cultural identification[c]						
Arab or West Asian			1.27 (1.05, 1.53)**	1.26 (1.05, 1.52)**	1.31 (1.09, 1.58)**	1.15 (0.98, 1.36)
African			1.09 (0.84, 1.42)	1.18 (0.89, 1.55)	1.11 (0.84, 1.47)	1.34 (1.05, 1.71)*
Caribbean			1.04 (0.83, 1.32)	1.06 (0.84, 1.33)	0.99 (0.78, 1.25)	1.05 (0.85, 1.29)
East Asian			1.13 (0.93, 1.37)	1.13 (0.93, 1.37)	1.10 (0.91, 1.33)	1.06 (0.90, 1.26)
European			1.17 (1.03, 1.32)**	1.17 (1.03, 1.32)**	1.16 (1.03, 1.32)*	1.08 (0.97, 1.21)
Latin American			1.17 (0.90, 1.53)	1.17 (0.90, 1.52)	1.13 (0.87, 1.47)	1.01 (0.80, 1.27)
South Asian			1.29 (1.07, 1.56)**	1.31 (1.09, 1.58)**	1.32 (1.10, 1.59)**	1.17 (0.99, 1.38)
Female (vs. male)			1.11 (1.02, 1.21)**	1.12 (1.03, 1.22)**	1.11 (1.02, 1.20)*	1.10 (1.02, 1.18)
Age			0.99 (0.99, 1.00)***	0.99 (0.99, 1.00)***	0.99 (0.98, 0.99)***	0.99 (0.98, 0.99)***
Married or common, law (vs. other)			0.79 (0.72, 0.87)***	0.79 (0.72, 0.87)***	0.82 (0.75, 0.91)***	0.89 (0.82, 0.98)**
Number of children under the age of 18			0.97 (0.93, 1.02)	0.97 (0.93, 1.02)	0.98 (0.94, 1.02)	1.01 (0.97, 1.05)
Negative life events			1.12 (1.09, 1.14)***	1.12 (1.09, 1.14)***	1.11 (1.08, 1.13)***	1.09 (1.07, 1.11)***
Immigrant entrance class (vs. other)						
Work visa				0.88 (0.68, 1.15)	0.88 (0.68, 1.14)	0.83 (0.66, 1.05)
Landed immigrant				1.01 (0.86, 1.19)	0.98 (0.83, 1.16)	0.97 (0.84, 1.12)
Number of intermediary countries of residence pre-migration				0.79 (0.63, 0.98)*	0.76 (0.61, 0.95)*	0.92 (0.76, 1.11)
Length of residence in intermediary country/countries				1.00 (0.96, 1.04)	1.01 (0.97, 1.04)	1.01 (0.97, 1.04)
Limited English-speaking ability (vs. proficient)				1.05 (0.85, 1.31)	1.02 (0.82, 1.26)	0.91 (0.75, 1.10)
Pre-migration employment tenure					1.02 (1.00, 1.04)*	1.01 (1.00, 1.02)*
Total years of education						

Table 2 (continued)

	Model 1 Exp(b) (95% CI)	Model 2 Exp(b) (95% CI)	Model 3 Exp(b) (95% CI)	Model 4 Exp(b) (95% CI)	Model 5 Exp(b) (95% CI)	Model 6 Exp(b) (95% CI)
Pre-migration					0.97 (0.95, 0.99)**	0.99 (0.97, 1.01)
Post-migration and native-born					1.00 (0.99, 1.02)	1.02 (1.00, 1.03)**
Household income					0.99 (1.00, 1.00)**	0.99 (1.00, 1.00)
Employed (vs. unemployed)					0.87 (0.79, 0.95)**	0.96 (0.89, 1.04)
Mastery						0.90 (0.90, 0.91)***

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (two-tailed test)

[a] Canadian-born is the reference group

[b] Significantly different from primary migrants of the same origin country GNP (based on post hoc tests)

[c] North American/Canadian ethnic/cultural identification is the reference group

Table 3 The adjusted effect of primary/secondary immigration by GNP on mastery

	Mastery ($N = 1883$) Adjusted model	
	b (95% CI)	
GNP by migration type		
Upper-GNP[a]		
Primary	− 0.46	(− 2.23, 1.30)
Secondary	− 2.08	(− 4.65, 0.49)
Lower-GNP[a]		
Primary	− 0.77	(− 2.60, 1.05)
Secondary	− 3.84 ***,[b]	(− 6.17, − 1.49)

This model is adjusted for all study controls presented in Table 1

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (two-tailed test)

[a] Canadian-born is the reference group

[b] Significantly different than primary migrants of the same origin country GNP (based on post hoc tests)

immigrants from less-developed origin countries will have higher psychological distress than the native-born and primary immigrants from less-developed countries. Model 6 includes mastery to test H3b—lower mastery will partly explain the higher rate of distress among secondary immigrants from less-developed countries. Finally, adjusted results in Table 3 test the prediction that secondary immigrants from less-developed countries will have lower mastery than primary immigrants and the native-born (H3a).

Results

Table 1 provides summary statistics for all variables used in the analyses disaggregated by GNP and MOM. As can be seen, lower-GNP primary immigrants report significantly lower psychological distress than the native-born *and* lower-GNP secondary immigrants. Mastery is significantly lower among upper-GNP primary immigrants and lower-GNP primary and secondary immigrants as compared to the native-born.

Table 2 presents multivariate analyses with psychological distress as the dependent variable. Model 1 provides support for H1: at average LOR in Canada, only lower-GNP immigrants report lower distress than the native-born.

Results of model 2 show that, while, at average LOR, distress among lower-GNP primary immigrants is 24% lower than that of the native-born, lower-GNP secondary immigrants have significantly *higher* distress than lower-GNP primary immigrants. Auxiliary analyses indicate that the effect of migration on distress does not vary by LOR in Canada (results available upon request). The effects of controls (models 3–5) are as follows: female, ethnic/cultural identification of Arab or

west Asian, European, or South Asian (as compared to Canadian/North American), and negative life events all increase distress. However, age, married or common-law, household income, and employed all decrease distress. Results of models 3 and 4 provide support for H2: lower-GNP secondary immigrants have significantly higher distress than lower-GNP primary immigrants *and* the native-born. The coefficient for lower-GNP primary immigrants is no longer significant with the addition of socio-economic covariates in model five. In-depth analyses (available upon request) indicate that this is due to pre-migration years of education. The higher distress among lower-GNP secondary immigrants, as compared to the native-born, becomes non-significant with the addition of mastery in model 6, providing support for H3b. However, this group continues to report significantly higher distress than lower-GNP primary immigrant.

Table 3 presents adjusted multivariate results for the effect of GNP by MOM on mastery. As predicted, lower-GNP secondary immigrants are the only group who have significantly lower mastery than the Canadian-born and lower-GNP primary immigrants—a decrease of 3.84 points in average mastery. This finding provides support for hypothesis 3a.

Discussion

Limited research has examined the effect of MOM on psychological health of migrants. Using data on a sample of residents from Toronto, Ontario, the current study addressed this gap in mental health research. Contrary to research on the effect of MOM on birth outcomes that suggests secondary immigrants from less-developed countries are healthier than their primary-immigrant counterparts (Urquia et al. 2010), the results of the current study find the opposite: lower-GNP secondary immigrants are *less* healthy than lower-GNP primary immigrants and the Canadian-born. Similar to findings reported for birth outcomes, immigrants from upper-GNP countries did not experience a HIE, irrespective of MOM (Urquia et al. 2010). Immigrants from upper-GNP countries come from places that are generally more similar to Canada in opportunity structures, such as education and health care, and thus the health effects of migration, or re-migration, from developed countries are likely minimized for these immigrants (Urquia et al. 2010; Montazer and Wheaton 2017).

The HIE effect among lower-GNP primary immigrants was partly due to the higher pre-migration education level among this group. This finding provides some support for the argument that immigrants are a selected group and that immigration policies of destination countries indirectly select on health-ameliorating variables at the point of immigration, particularly among those from the poorest countries (Montazer and Wheaton 2017; Jasso et al. 2004). Although pre-migration education was also a protective factor among secondary

immigrants from lower-GNP origin countries, these immigrants did not benefit from a HIE. Instead, results for this group of immigrants to Canada pointed to an *un-healthy immigrant effect.*

Secondary immigrants are a special group. These migrants are exposed to at least three environments: their origin country, intermediary country(ies) and the final destination country (Urquia et al. 2010). However, they are not a homogenous group; reasons for residing in an intermediary country may differ for secondary migrants depending on the LED of their origin country. Movement for upper-GNP secondary migrants may be truly voluntary, whereas for lower-GNP secondary migrants, spatial mobility may be necessary to reach their desired destination country (Paul 2011; Urquia et al. 2010). Auxiliary analysis (available upon request) provides indirect support for this assumption: an increase in the number of intermediary countries was found to decrease distress *only* among upper-GNP secondary migrants.

This paper argued that differences in distress between the different immigrant groups by MOM (and the native-born) would in part be due to differences in mastery. Mastery—a sense of having control over the forces that affect one's life—links the socio-economic, interpersonal, behavioural, and physiological systems (Mirowsky and Ross 2010). A firm sense of mastery averts the tendency to become helpless in stressful situations, such as job loss, economic hardship, and relationship problems. However, stressors and alienating situations can create a sense of detachment from one's own actions that people find distressing (Mirowsky and Ross 2010). Living in transit is alienating for immigrants from poorer origin countries because of higher stressors confronting these migrants. The current paper tested this central premise, argued, and found evidence that the associated stressors deplete secondary immigrants' sense of mastery, resulting in higher distress among this group.

Limitations

The current study has a number of limitations. First, although an important start in explaining the differential effect of MOM on the mental health of immigrants, the data here do not measure stressors and mastery in intermediary countries. While a lower level of mastery was an important explanatory variable for the higher distress among lower-GNP secondary immigrants, future research should examine whether these secondary immigrants *actually* experience a depletion in mastery *prior* to immigration to Canada. For example, secondary immigrants who take a longer path to migration may experience more unmet expectations, and stressors post-arrival than primary immigrants, which depletes their sense of mastery while in Canada. However, as is the nature of all cross-sectional data, it is not possible to establish temporal ordering and a test of causation in the current paper. Future research needs to
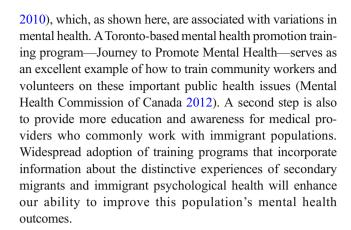
explore these possibilities and better identify the underlying mechanisms that explain variations in health outcomes across MOM/GNP groups using longitudinal panel data.

Second, while the analyses examine the effect of economic contextual factors at the time of emigration, they do not account for all the push and pull factors in the migration process that may determine the migratory forces unique to any year of departure—such as the political and legal conditions in origin countries (Jasso et al. 2004). Similarly, although only secondary migrants from wealthier intermediary countries were included in the analyses, there is unmeasured heterogeneity in policies in these countries that could affect stress exposure, mastery and mental health outcomes of secondary migrants. Further, it was not possible to decipher the underlying drivers of secondary migration in these data or the process of secondary migrants' admission to intermediary country(ies), which might have important consequences for experiences of stress, copying, and distress. Third, the effects of GNP/MOM on outcomes may be due to ethnicity or the region of origin of the immigrants in the analyses. In an attempt to capture these variations, analyses adjusted for ethnic/cultural identification of the respondent. Further, auxiliary analyses (available upon request) adjusted for region of origin. The findings remained significant, which confirms the robustness of the effect of origin-country LED. Future research should replicate these analyses with a larger sample of migrants to Canada. It may be, for example, that non-significant results observed among some migrant groups, or non-significant interaction between MOM/GNP and gender is due to small numbers in some groups. Finally, the results of this paper are not generalizable to immigrants migrating to other receiving countries, refugees, or secondary migrants who resided in poorer intermediary countries.

Conclusion

The findings from this study make a significant contribution to our understanding of (non-refugee) immigrant mental health in Canada: namely, that the mode of migration and macroeconomic contexts of exit have important consequences for the psychological health of this growing population. The results suggest that secondary migrants from the most economically disadvantaged origin countries are at increased risk for mental health problems when compared to primary migrants from these same origin countries and to the Canadian-born.

These findings have direct practice implications. As a first step, training programs for community workers and volunteers—who are often the first point of contact for immigrants in the settlement process (Mental Health Commission of Canada 2012)—should include information on the increasing diversity of immigrants (Kirmayer et al. 2011) and the complex and evolving global patterns of migration (Urquia et al.

2010), which, as shown here, are associated with variations in mental health. A Toronto-based mental health promotion training program—Journey to Promote Mental Health—serves as an excellent example of how to train community workers and volunteers on these important public health issues (Mental Health Commission of Canada 2012). A second step is also to provide more education and awareness for medical providers who commonly work with immigrant populations. Widespread adoption of training programs that incorporate information about the distinctive experiences of secondary migrants and immigrant psychological health will enhance our ability to improve this population's mental health outcomes.

Compliance with Ethical Standards

Conflict of Interest   The authors declare that they have no conflict of interest.

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