

## Mood Change of English, French and Chinese Speaking Immigrants in Ottawa and Gatineau, Canada

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### ABSTRACT

This multicultural study aimed at examining mood change of English, French and Chinese speaking immigrants in Ottawa and Gatineau, Canada, and identifying demographic factors that impact the change. 810 immigrants of English, French and Chinese speaking sub-groups were recruited by purposive-sampling. Using self-reports, respondents answered questions regarding mood change (mood status change and mood belief change) and demography in Multicultural Lifestyle Change Questionnaire of English, French or Chinese version. Data were analyzed statistically for the different immigrant sub-groups. Immigrants of different gender, language and category sub-groups exhibited different Mood Change Rates, Mood Improving Rates, Mood Declining Rates and Mood Belief Change Rates. There was no statistical difference between the rates of immigrant sub-groups. Mood Change (Mood Status Change + Mood Belief Change) was correlated positively with Mother Tongue and negatively with Speaking Languages. Mood Status Change was negatively correlated with Marital Status and Highest Level of Education. Mother Tongue, Speaking Languages and Highest Level of Education significantly impacted Mood Change (Mood Status Change + Mood Belief Change). Marital Status and Highest Level of Education significantly influenced Mood Status Change. Immigrants of different sub-groups in Canada experienced different mood changes. Marital Status and Highest Level of Education were main factors impacting Mood Status Change. Mother Tongue and Speaking Languages were principal factors influencing Mood Belief Change. Culture was an important factor contributing to Mood Change. Acculturation could impact Mood Status Change and Mood Belief Change. Data of immigrant mood change can provide evidence for health policy-making and policy-revising in Canada.

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## 1. INTRODUCTION

Immigrants face greater mood change, higher levels of stress and anxiety associated with leaving their native country [1]. However, different immigrant groups or sub-groups can experience different mood change or have different levels of stress and anxiety [2]. For example, Asian immigrants in Canada had the lowest rates of stress and depression [2]. Amongst other groups or sub-groups, stress related to acculturation can be much higher. For instance, Pakistan immigrant women showed higher stress and anxiety levels after arrival in Canada due to inaccessibility of high expectations and goals (better quality of life and better futures) of immigration [3], while Canadian Chinese students experienced higher anxiety or greater mood

change compared to Canadian English students and Canadian French students [4]. Many studies in Canada show that elderly Chinese immigrants had higher level of stress and anxiety because of language and cultural barriers associated with the new social environment [5]-[7]. Nevertheless, there is no literature that directly compare Chinese, English and French speaking immigrants in terms of mood change. Little research has taken into account specifically cultural and acculturated expressions of depressed or anxious mood, but manifestation of cross-cultural differences in psychological distressing or anxious mood may be valuable for health research and assessment [8],[9].

English speaking immigrants represent one of the largest immigrant sub-groups in Canada [10], while French speaking immigrants are one of principal immigrant sub-groups in Québec and the second largest immigrant sub-group following English speaking immigrants in the Ottawa (Ontario) – Gatineau (Québec) region [10],[11],[12]. Chinese speaking immigrants have constituted the largest immigrant sub-group entering Canada, one of the fastest-growing ethnic or cultural sub-groups in Canada since 1987 and the fourth largest sub-group following Arabic speaking immigrants in the Ottawa-Gatineau region [12],[13],[14].

The main objectives of this study were to explore the differences in Mood Change among different sub-groups of immigrants as well as to explore the correlations and relationships between Mood Dependent Variables (Mood Status Change and Mood Belief Change) and Demographic Independent Variables (Mother Tongue, Speaking Languages, Gender, Marital Status, Category of Immigration, Highest Level of Education, Employment Status and Income). The explorations show far-reaching significance in multicultural health research, health care, health policy-making and health promoting program in Canada.

## 2. RESEARCH METHOD

### 2.1. Survey Method

English, French and Chinese speaking immigrants at Adult Educational Centres/Schools, Christian Community Churches and Residential Communities in two adjacent cities in Canada – Ottawa, Ontario and Gatineau, Québec, were identified as the target population of this multicultural cross-sectional study. Random sampling was deemed impracticable for the study and could bring greater bias because immigrant status of the three ethnic sub-groups could not be identified effectively according to the sampling criteria. Purposive-sampling method was therefore applied in the multicultural study to recruit qualified immigrant participants [15]. Participants must have been 18 years or older, have resided in Ottawa or Gatineau one year or more, and had been 16 years or older when they arrived in Canada. In total, 810 qualified English, French and Chinese speaking volunteering immigrant participants were recruited to the multicultural study. All participants answered questions of Mood Change and Demography in a trilingual (English, French and Chinese) Multicultural Lifestyle Change Questionnaire developed by the authors, with all responses self-reported. The Multicultural Lifestyle Change Questionnaire was demonstrated by a pilot-test in the three immigrant sub-groups to have high validity (Pearson correlation coefficient  $r = 0.435 > \text{satisfactory value } 0.40$ ) [16], and reliability (alpha coefficient  $\alpha = 0.754 > \text{satisfactory value } 0.70$ ) before the multicultural study [17].

Mood Change included Mood Status Change and Mood Belief Change (dependent variables). Mood Improvement Rate and Mood Decline Rate in Mood Status Change were computed respectively based on response choices of two mood questions in the Multicultural Lifestyle Change Questionnaire - “Before arrival in Canada, how would you describe your overall mood status?” (question one) and “Since arrival in Canada, how would you describe your overall mood status?” (question two). The same alternatives of two questions were “A. Very relaxed”, “B. Relaxed”, “C. Somewhat relaxed”, “D. Neutral (neither relaxed nor anxious)”, “E. Somewhat anxious”, “F. Anxious”, “G. Very anxious”, and “H. Do not know”. The respondent was identified experiencing Mood Change if there were different choices in the alternatives of two questions except alternative “H” (i.e. picking “A” in the alternatives of question one and choosing “B” in the alternatives of question two). Meanwhile, the respondent was identified experiencing Mood Improvement if picking “C” in the alternatives of question one and choosing “B” or “A” in the alternatives of question two. On the contrary, the respondent was identified experiencing Mood Decline if picking “C” in the alternatives of question one and choosing “D” or “E” in the alternatives of question two.

Mood Belief Change was identified according to response choices of two Mood Belief questions in the Questionnaire - “Before arrival in Canada, which of these statements best described your belief with regards to anxiety?” (question one) and “Since arrival in Canada, which of these statements best describes your belief with regards to anxiety?” (question two). The same alternatives of two questions were “A. Anxiety affects extremely negatively health”, “B. Anxiety affects very negatively health”, “C. Anxiety affects negatively health”, “D. Anxiety affects somewhat negatively health”, “E. Anxiety affects less than somewhat negatively health”, “F. Anxiety does not affect negatively health”, and “G. Do not know”. The respondent was identified experiencing Mood Belief Change if there were different choices in the alternatives

of two questions except alternative “G” (i.e. picking “A” in the alternatives of question one and choosing “B” in the alternatives of question two).

Immigrant status of English or French or Chinese speaking subjects was identified by response of “Original Country” question in the Questionnaire– “What is your country of origin?”.

Demographic characteristics (independent variables) of the study population were identified according to response choices of the demographic questions relating to “Mother Tongue”, “Speaking Language”, “Age”, “Gender”, “Marital Status”, “Category of Immigration”, “Duration of Residence”, “Education”, “Employed Status”, “Employed status”, “Occupation”, “Religion” and “Income” in the Questionnaire.

Data relating to mood change and demography were analyzed statistically for the different immigrant sub-groups.

## 2.2. Data Analysis Method

Percentages of Mood Change Rate, Mood Improving Rate, Mood Declining Rate and Mood Belief Change Rate were calculated respectively for the total sample and the sub-groups including gender (Male and Female), language (English, French and Chinese speaker) and category (Principal Applicant Immigrant, Spouse and Dependant Immigrant, Family Class Immigrant and Other / Refugee Immigrant). Chi-square tests were performed to test if there were significant differences between the rates of immigrant gender sub-groups, language sub-groups and category sub-groups in Mood Change. Following the descriptive analysis, correlation analysis was performed to test if there were correlation between demographic (independent) variables - Mother Tongue, Speaking Languages, Gender, Marital Status, Category of Immigration, Highest Level of Education, Employment Status and Income, and mood (dependent) variables – Mood Change (Mood Status Change + Mood Belief Change) and Mood Status Change. The objectives were to measure a relationship between the independent variables and dependent variables. Finally, multiple / multivariable linear regression analysis was used to determine if the independent variables had significantly impacted the dependent variables.

## 3. ETHICAL APPROVAL

The immigrant mood change study was part of a multicultural lifestyle change research project that was approved by Social and Behavioural Research Ethics Committee, Flinders University in Australia in 2010 and by Office of Research Ethics and Integrity, University of Ottawa in Canada in 2014.

## 4. RESULTS

### 4.1. Percentages in Mood Change

Table 1. Percentage in Mood Change

Item		Mood Change			
		Mood Status Change			Mood Belief Change
		*Mood Change Rate %	Mood Improving Rate %	Mood Declining Rate %	Change Rate %
Total Sampled Immigrants (810)		76.05	41.98	34.07	37.90
Gender	Male Immigrants (411)	74.21	41.36	32.85	36.74
	Female Immigrants (399)	77.94	42.61	35.34	39.10
Language	English Speaking Immigrants (278)	79.50	42.09	37.41	18.71
	French Speaking Immigrants (268)	68.28	28.36	39.93	48.88
	Chinese Speaking Immigrants (264)	80.30	55.68	24.62	46.97
Category Sub-groups	Principal Applicant Immigrants (193)	74.61	41.45	33.16	41.45
	Spouse and Dependent Immigrants (193)	77.20	43.52	33.68	37.31
	Family Class Immigrants (354)	79.38	44.92	34.46	36.16
	Refugee Immigrants (70)	60.00	28.57	24.29	38.57

Notes: \*Mood Change Rate = mood change subjects / sample subjects x 100%

#### 4.2. Significance Level

Table 2. Significance Level of Rates in Mood Change

Item	Chi-square	p-value	Significant Difference
Rates of Male and Female Immigrant Sub-groups in Mood Change	8.000	0.333	No
Rates of English, French and Chinese Immigrant Sub-groups in Mood Change	24.000	0.347	No
Rates of Principal Applicant, Spouse and Dependent, Family Class, Other/Refugee Immigrant Sub-groups in Mood Change	48.000	0.243	No

Notes: Significance Level:  $P < 0.05$

#### 4.3. Multivariate analysis (correlation and regression analysis)

Table 3. Multivariate Analysis Results in MoodChange

Correlation Analysis				Multiple Linear Regression Analysis				
Dependent Variable	Independent Variable	Pearson's r	p-value	Correlation between Independent Variable and Dependent Variable	Dependent Variable	Independent Variable	p-value	Impact of Independent Variable on Dependent Variable
MoodChange (MoodStatusChange + MoodBeliefChange)	Mother Tongue	0.137	0.000	Positive Correlation	MoodChange (MoodStatusChange + MoodBeliefChange)	Mother Tongue	0.000	Significant Impact
	Speaking Languages	-0.188	0.000	Negative Correlation		Speaking Languages	0.000	Significant Impact
MoodStatusChange	MaritalStatus	-0.125	0.000	Negative Correlation	MoodStatusChange	Highest Level of Education	0.024	Significant Impact
	Highest Level of Education	-0.097	0.006	Negative Correlation		Marital Status	0.001	Significant Impact
						Highest Level of Education	0.007	Significant Impact

Notes: Significance Level:  $P < 0.05$

### 5. ANALYSIS AND DISCUSSION

#### 5.1. Percentages in MoodChange

##### 5.1.1. Total Sampled Immigrants

The results of percentages in MoodChange show that over two thirds of immigrants (76.05%) exhibited moodchange. However, less than half of them exposed mood improve mentor mood decline, with the proportion reporting that their mood improved (41.98%) greater than the proportion indicating decline in their mood (34.07%), suggesting that immigrants were more likely to experience a positive mood change after arrival. A meta-analysis discloses that there was no conclusive evidence for a large increase in the risk of mood disorders among immigrants and only mild increase in risk of mood disorders associated with immigration [18]. It is interesting to note that Mood Change Rate (76.05%) of the immigrants was higher over one time than their Mood Belief Change Rate (37.90%), which indicates that while many immigrants changed their moodstatus, they did not change their moodbelief. MoodStatusChange did not coordinate or synchronize with Mood Belief Change. A study in Europe discloses that mood status of immigrants did not coordinate completely with their mood belief [19].

It seems that mood change could be associated with acculturation. Acculturation has been defined as “the process by which immigrants adopt the attitudes, values, customs, beliefs, and behaviors of a new culture” [20]. For individuals with a separate distinct culture, acculturation can be a source of stress or anxiety in a society that is strongly influenced by a mainstream culture [9],[21]. A study of South Asian immigrants in America reveals that acculturation and racial identity accounted for variance in depressed or anxious mood [22]. Similarly, a study of immigrants from the former Soviet Union in the US shows that higher acculturation levels were associated with lower personal stress and anxiety [23], and a research finding of Turkish immigrants in the Netherlands discloses that participation in Dutch culture was associated with a decrease of depressive and anxious mood [24].

### 5.1.2. Gender Sub-groups – Male and Female Immigrant Sub-groups

The results reveal that different male and female immigrants had different rates in Mood Change. However, all rates (Mood Change Rate, Mood Improving Rate, Mood Declining Rate and Mood Belief Change Rate) amongst female immigrants were higher than those of male immigrants. It appears that female immigrants could be more influenced by new social environmental factors and have higher mood acculturation than male immigrants. The difference of mood acculturation levels amongst male and female immigrants could also lead to differences in Mood Change.

### 5.1.3. Language Sub-groups – English, French and Chinese Immigrant Sub-groups

The results uncover that different immigrant language sub-groups had different rates in Mood Change. Amongst the three sub-groups, Chinese immigrants had the highest Mood Change Rate (80.30%) and Mood Improving Rate (55.68%), while English immigrants had lower Mood Change Rate (79.50%) and Mood Improving Rate (42.09%), and French immigrants had the lowermost Mood Change Rate (68.28%) and Mood Improving Rate (28.36%). On the contrary, French immigrants had the highest Mood Declining Rate (39.93%), while English immigrants had lower Mood Declining Rate (37.41%), and Chinese immigrants had the lowermost Mood Declining Rate (24.62%). In other words, the greatest Mood Change was amongst Chinese immigrants, with the second greatest change observed amongst English immigrants. Mood Improving Rate of Chinese and English immigrants were higher than their Mood Declining Rate, which shows that most Chinese and English immigrants improved their mood. However, Mood Improving Rate of French immigrants were lower than their Mood Declining Rate, indicating that French immigrants experienced a decline in their mood. Most likely, the greater mood change amongst Chinese immigrants could be because of the greater cultural and environmental difference between their native and host country.

Furthermore, French immigrants exhibited the highest Mood Belief Change Rate (48.88%), while Chinese immigrants had higher Mood Belief Change Rate (46.97%), and English immigrants exposed the lowermost Mood Belief Change Rate (18.71%). That is, the greatest Mood Belief Change was amongst French immigrants, with Chinese immigrants having the second greatest Mood Belief Change. It is unclear why French immigrants had the greatest Mood Belief Change.

It is inferred that difference of acculturation level of English, French and Chinese immigrants could contribute to differences in their mood change.

### 5.1.4. Category Sub-groups-Principal Applicant Immigrant, Spouse and Dependent Immigrant, Family Class Immigrant and Other (Refugee) Immigrant Sub-groups

The results display that different immigrant category sub-groups had different rates in Mood Change. Amongst the four sub-groups, Family Class Immigrants had the highest Mood Change Rate (79.38%), Mood Improving Rate (44.92%), and Mood Declining Rate (34.46%), while Other (Refugee) Immigrants had the lower most Mood Change Rate (60.00%), Mood Improving Rate (28.57%) and Mood Declining Rate (24.29%). It is known that Mood Change Rate (74.61%), Mood Improving Rate (41.45%), and Mood Declining Rate (33.16%) of Principal Applicant Immigrants were lower than those of Family Class Immigrants and Spouse and Dependent Immigrants, but higher than those of Other (Refugee) Immigrants. However, Mood Change Rate (77.20%), Mood Improving Rate (43.52%), and Mood Declining Rate (33.68%) of Spouse and Dependent Immigrants were lower than those of Family Class Immigrants. Therefore, the sub-group of the greatest mood change was Family Class Immigrants, the second one was Spouse and Dependent Immigrants, the third one was Principal Applicant Immigrants, and the fourth one was Other (Refugee) Immigrants.

On the other hand, Principal Applicant Immigrants had the greatest Mood Belief Change Rate (41.45%), while Other (Refugee) Immigrants and Spouse and Dependent Immigrants had lower Mood Belief Change Rates (38.57% and 37.31%), and Family Class Immigrants had the lowermost Mood Belief Change Rate (36.16%). For this reason, immigrant category sub-group of the greatest mood belief change was Principal Applicant Immigrants, the second one was Other (Refugee) Immigrants, and the third one and the least one were respectively Spouse and Dependent Immigrants and Family Class Immigrants. It may be that Principal Applicants could accept more easily Canadian culture and have higher level of acculturation, with a concomitant greater mood belief change. In contrast, there were lower level of acculturation and less belief change amongst Family Class Immigrants and Spouse and Dependent Immigrants.

It appears that immigrants of different category sub-groups could have different level of mood acculturation, which contributed differences of their Mood Status Change and Mood Belief Change.

### 5.2. Significance Level

Though significance analysis results show that there was no statistical significance difference between rates in Mood Change in different immigrant sub-groups, there were greater or very great percentage differences between some of the rates in Mood Change.

### 5.3. Multivariate Analysis

The results of correlation analysis show that Mood Change (Mood Status Change + Mood Belief Change) was correlated positively with Mother Tongue and negatively with Speaking Languages, and Mood Status Change was negatively correlated with Marital Status and Highest Level of Education. Marital Status and Highest Level of Education were mainly correlated with Mood Status Change of the immigrants. However, Mother Tongue and Speaking Languages were principally correlated with Mood Belief Change, because they were not correlated with Mood Status Change. So, culture could be correlated with mood and mood change of immigrants.

Furthermore, the results of regression analysis indicate that Mother Tongue, Speaking Languages and Highest Level of Education significantly impacted Mood Change, and Marital Status and Highest Level of Education significantly impacted Mood Status Change. Highest Level of Education significantly influenced both Mood Status Change and Mood Belief Change, and was their determinant factor. Marital Status only significantly affected Mood Status Change rather than Mood Belief Change. Mother Tongue and Speaking Languages principally and significantly impacted Mood Belief Change and was its determinant factors, because they did not significantly impact Mood Status Change. Therefore, cultural factors could impact mood and mood change of the immigrants, in particular, their mood belief and mood belief change.

Mood Belief Change could influence Mood Status Change. Immigrants of different ethnic or linguistic sub-groups could have different mood status changes because of difference of acceptability of new mood belief. However, Mood Belief Change of immigrants could not undergo change accordingly with Mood Status Change. Some of immigrants could experience Mood Status Change because of other factors instead of Mood Belief Change. Acculturation is a possible impacting factor, because acculturation can greatly affect psychological functioning as it entails adjustments in person-environment fit for responding to new sociocultural conditions [9]. A study in the US shows that the immigrants from Mexico, Eastern Europe, Africa and Caribbean regions were different with the immigrants from Western countries in risk for mood or anxiety disorders [25]. A survey in Canada discloses that Age at immigration was correlated to mood or anxiety disorders and younger age at immigration was associated with increased risk of having a current mood disorder or anxiety disorder [26]. The results of this multicultural mood change study exhibit that Mother Tongue and Speaking Languages were correlated with Mood Change instead of Mood Status Change. Consequently, Mother Tongue and Speaking Languages could be correlated with Mood Belief Change. The immigrants with different linguistic or cultural or social background had different Mood Belief Change. Original culture and/or acculturation of immigrants were relating impacting factors on their mood belief change.

Believably, the results of this mood change study provide evidence for making and/or revising policies relating to immigrant psychological and mental health in Canada, which is able to regulate or adjust mental health care and service for immigrants, and to make more effectively mental health promotion program to lessen immigrant stressing and anxious mood and risk of psychological or mental diseases and to reduce mental health inequality and inequity for immigrants. The data may help Health Canada policy makers to source and consider evidence of mood change for the vulnerable and marginalized population in decision-making and policy-revising process, and to adapt appropriately evidence, prior to and during formulating new mental health policy or revising previous mental health policy. Therefore, Canadian immigrants can improve their mood and experience healthier mood status to contribute Canadian economic and social development.

## 6. CONCLUSION

Immigrants in Canada experienced changes in their mood. However, changes in mood were moderated by gender, language, and immigrant categories, with different factors contributing to the changes. Mother Tongue, Speaking Languages and Highest Level of Education significantly impacted Mood Change. Marital Status and Highest Level of Education significantly impacted Mood Status Change. Mother Tongue and Speaking Languages significantly impacted Mood Belief Change. Culture was an important factor to contribute Mood Change. Acculturation was a considerable factor to impact Mood Status Change and Mood Belief Change. Data of immigrant mood change may provide evidence for mental health policy-making and policy-revising in Canada.

## COMPETING INTERESTS

The authors declare that they have no conflict of interest.

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