Feeling depressed in a foreign country:
Mental Health status of Mexican Migrants in Durham, NC[1]

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Abstract:

Of all Hispanic immigrants in the US, Mexicans have accounted for almost all the advantages of the epidemiological paradox. However, their mental health outcomes have shown to be less advantageous. We explore the link between migration and depressive feelings using a binational random survey of Mexicans in Durham, NC and sending communities in Mexico. Explanations for the link between migration and depression, such as acculturative stress, social distance, and loss of cultural context, are analyzed by comparing results for protective vs. risk factors between residents of Mexico and Durham, and among immigrants themselves. Results show little support for selection as an important source of the higher depression registered among migrants, and instead provide strong evidence that migration itself, and the disruption of social networks that it entails, heightens depression among migrants in Durham. Family separation, in particular, is the strongest predictor of depressive feelings and accounts for a sizeable portion of the heightened depression among migrants. Understanding subjective experiences of migration is necessary to better integrate newcomers into host societies.

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Introduction

Latino, especially Mexican, immigrants in the United States present a paradox with respect to health. Based on their lower average incomes, disproportionate concentration in low-skill and physically demanding occupations, and restricted access to healthcare, one would expect their average health outcomes to be significantly worse than those of natives. And yet they average better global and physical health status than the populations of both sending and receiving areas (Akresh & Frank, 2008; Jasso, Massey, Rosenzweig, & Smith, 2001). Much of the research on this topic has centered on the degree to which positive selection into migration, or even negative selection into return migration, could explain this paradox. An additional puzzle, however, is that mental health outcomes tend to show the opposite pattern, with migrants faring less well than those in sending and receiving contexts(Deisenhammer et al., 2012). While the competing influences of selection and social context have been thoroughly examined for the physical health of immigrants, the same cannot be said of mental health, where the two have scarcely been tested together.

Mexicans are an interesting case to study. Within the health literature, they have accounted for almost all the positive health advantages of the Hispanic immigrant epidemiological paradox. Nevertheless, the picture with respect to mental health is less auspicious, with several studies suggesting negative effects of migration experience. Migration from Mexico to the United States has been found to increase the probability of subsequent onset of anxiety and mood disorders (Breslau et al., 2007), drug use and related disorders (Borges et al., 2011), and depressive disorders, including major depression and social phobia (Breslau et al., 2011). All these studies attempt to address migrant selectivity, specifically the higher propensity of migration among healthy individuals and those with better socioeconomic backgrounds, by comparing Mexicans on both sides of the border. However, the reference group chosen –non-migrant family members of households with at least one migrant – introduces potential biases as well, as non-migrant family members may opt out of migration for health reasons. In addition, a detailed analysis of the forces undermining immigrant health, such as acculturative stress, lack of social support, and powerlessness and isolation, are often missing in these studies.

Accordingly, the aim of this paper is to address the gaps in the literature by exploring the link between Mexican migration experiences, the stress of changing social and cultural environments, and mental disorders. We draw on a unique dataset –a binational random survey administrated to Mexicans in Durham, NC *and* migrant-sending communities in Mexico – to address these issues. By asking the same questions on both sides of the border we increase comparability of indicators with respect to other sources. This data also contains information on characteristics of migration that have rarely been explored together, such as legal status, English proficiency, time spent in the United States, and social support. We have four main objectives are pursued. First, we seek to disentangle the association between migration and other correlates of depression such as socioeconomic status, cultural perceptions, and pre-migration conditions (which include psychopathological and social contexts, and family background). A matched samples approach is used to measure differences in the probability of feeling depressed between people in Mexico and Durham. By comparing Mexican migrants to Mexicans residing in Mexico, we better address the impact of selection into migration on mental health outcomes. Second, we explore how changes in social environments transform

the association between socio-demographic and economic factors and depressive feelings. Models predicting the likelihood of feeling depressed are compared in terms of significance, magnitude and sign between Mexicans in Mexico and Durham. Third, we test hypotheses of acculturative stress, integration, and protective environments (such as co-ethnic communities) among those living in Durham. And finally, both migration and its impact on social context are highly gendered. We therefore pay particular attention to the ways in which the link between migration and mental health may differ between men and women.

Background and theoretical framework

Immigrant incorporation literature is expanding its frontiers, moving from studying economic and social integration to subjective aspects of migration experience, such as mental health. Migration is conceptualized as a test of the emotional resilience of individuals. To a certain degree, all migrants experience psychological distress associated with changes in social conditions that could precipitate personal crisis after migration (Portes & Rumbaut, 1996). Therefore, self-reported mental health outcomes offer a unique opportunity to advance our understanding of health responses to shocks, as well as the role of protective and risk factors when changing contexts.

Most of the frameworks of mental health outcomes follow pathogenic perspectives (focus on risk factors) developed in the physical health literature (Bécares, Nazroo, Jackson, & Heuvelman, 2012; Deisenhammer et al., 2012; Lindert, von Ehrenstein, Priebe, Mielck, & Brahler, 2009). However, sociological explanations have emphasized the importance of immigrant incorporation, sources of social support, experiences with discrimination, and alienation. Borrowed from the physical health literature, the healthy migrant hypothesis posits that more prepared and healthier individuals are more likely to migrate than those in worse conditions (Akresh & Frank, 2008; Jasso et al., 2001). Preparedness and hardiness are shown in migrant selectivity in both observable and unobservable characteristics with respect to their origin societies, meaning that migrants average better mental health status than those who remain at origin because, for example, their socioeconomic background does not resembles that of the population at origin. However, very few studies are actually able to test the selection hypothesis directly, mostly due to the lack of comparative data in contexts of origin and reception. In the case of Mexicans living in the U.S., however, mental health researchers have found more support for the acculturative stress hypothesis than for the importance of selection(Breslau et al., 2007; Breslau et al., 2011).

The acculturative stress hypothesis is a social-environmental explanation that links the tensions arising from living in a foreign culture to mental disorders. Migration is “liberating but contradictory social location” where individuals go “from amusement to despair, from stimulation to depression” (Portes & Rumbaut, 1996, p. 147). Upon arrival immigrants could experience inner turmoil, instability and restlessness due to the change in their social environment. The conflict of cultures and the distance between the social context of origin and reception marginalize immigrants' previous experiences and causes status loss, which in turn undermines mental health.

Mental health research highlights four socio-demographic risk factors for depression: 1) low socioeconomic status (Portes & Rumbaut, 1996); 2) female gender 3) being unmarried (Rafful, Medina-Mora, Borges, Benjet, & Orozco, 2012); and 4) undesired life events (Ai, Pappas,

& Simonsen, 2015; Alegria et al., 2007). These findings are rooted in the sociological concepts of powerlessness and alienation: the inability to reach personal goals and the lack of agency contribute to worse outcomes. Therefore, being married, male, and relatively high income are protective factors against depressive disorders. However, migration could exacerbate the effects of powerlessness and alienation, and alter the mechanisms by which protective factors influence health. When applied to the realm of mental health, reversals could be even more common among those in better social positions before migrating –i.e. compared to migrants with no education, better educated migrants may have higher levels of demoralization.

An additional group of factors associated with depression among migrants emerge from the social integration processes in receiving societies. In the United States higher stress has been found among those unable to speak English(Ding & Hargraves, 2009; Schachter, Kimbro, & Gorman, 2012), women, the young, and the unemployed(Ornelas & Perreira, 2011; Portes & Rumbaut, 1996; Walker, Ruiz, Chinn, Marti, & Ricks, 2012). The impact of social support is less clear. On the one hand, co-ethnic communities could be positively associated with depressed feelings, as ethnic concentration might indicate segregated, deprived neighborhoods and greater discrimination (M.-A. Lee, 2009). On the other hand, concentration can also be a source of enhanced social cohesion, mutual support, and a stronger sense of community and belongingness, which are factors that protect and buffer individuals from the direct or indirect consequences of discrimination and racial harassment in the wider social environment(Bécares et al., 2012; M. J. Lee & Liechty, 2015; Portes & Rumbaut, 1996). Finally, migrants' legal status is central to the acculturation process as well as a reflection of social background (Letiecq, Grzywacz, Gray, & Eudave, 2014; Portes & Rumbaut, 1996). Being undocumented is associated with higher distress, as illegality intersects every aspect of immigrants' lives. It forces them to live in the shadows and engenders feelings of fear and uncertainty (Menjivar, 2006). It also directly hinders migrants' opportunities of social mobility (Gonzales, 2011) and heightens their exposure to unprotected, low-wage jobs and non-standard work arrangements (Donato, Wakabayashi, Hakimzadeh, & Armenta, 2008; Flippen, 2012).

Both migration and incorporation into receiving societies are also highly gendered processes. Men and women face different opportunities and motivations for migrating (Hondagneu-Sotelo, 1994). Compared to men, women are less likely to migrate without documents (Donato et al., 2008). In addition, migration could enhance gender equality as women's greater labor force participation in the United States could confer them greater leverage in household decision making (Parrado & Flippen, 2005). Thus, while Mexican women are, in general, more likely to be depressed than men, particularly during childrearing ages (Rafful et al., 2012), how migration may potentially shape the gendered pattern of depression is unclear.

Reverse associations could also be expected based on the extensive evidence on women's migration experiences. For example, in terms of earnings and employment, upon migration women encounter stronger push to informal jobs and earn lower wages than men (Donato et al., 2008) and dependence on their partners increases if they do not participate in the labor market (Hondagneu-Sotelo, 1994). Studies have also found that the rise in labor force participation of Mexican migrant women did not translate into a more egalitarian household division of labor or more liberal gender attitudes (Parrado & Flippen, 2005). Job opportunities for immigrant women show other forms of perpetuation of traditional gender roles outside of

the domestic sphere (Parreñas, 2005); for example, in Durham, NC, 38.8% of women were employed in cleaning and childcare activities compared to less than 1% of men (Flippen 2015). Intersections of immigrant women's precarious jobs and traditional gender roles change the ways in which protective and risk factors are associated to depression in comparison to men.

As mentioned above, we explore the hypotheses of selectivity, contributions and changes in associations of socio-demographic factors due to socially distanced contexts, and social integration stress on Mexicans living in the U.S. Besides using a unique sample –Hispanics in Durham, NC –we apply a three-step methodological approach that combines different statistical techniques to test all hypothesis in the same population.

Data

Data for the analysis are drawn from a mixed-methods study among Hispanics in Durham, NC. The study is a three-pronged approach including community collaboration and targeted random parallel sampling in sending and receiving areas. It includes detailed information on demographic characteristics, migration and employment histories, social support, family structure, and health-related attitudes and behaviors. Data collection occurred in two phases, from April 2002 to July 2003 and then from May 2006 to December 2007 among Latin American immigrant men and women aged 18 to 50 years of age in Durham, NC.[2] The same questions were also asked in eight sending communities in the Mexican states of Veracruz, Puebla, Michoacan, Hidalgo, Guerrero and Guanajuato during the same time periods (100 men and 100 women in each community). To maintain comparability, we restricted our Durham sample to people born in Mexico (for a total of 1,793 men and 1,217 women).

Durham, NC, is an interesting setting to examine immigrants' adaptation and health outcomes. Latino migration to Durham is part of the new and larger trend of increasing diversity in migrant destinations in recent decades throughout the U.S. Southeast. The early stage formation of Latino communities in this area offers the opportunity to better understand the effects of social context, particularly the relatively nascent co-ethnic community that is far less consolidated than in more "traditional" receiving areas.

While not nationally representative, these data offer other unique advantages for studying the link between Mexican migration and depression. Very few data sources are specifically designed to study immigrants, including both legal and undocumented populations and recently arrived newcomers (Flippen & Parrado, 2012). Also, the project drew on extensive qualitative research and used a questionnaire that was specifically tailored to the immigrant experience; it collected several characteristics of context of origin and reception (Flippen, 2012), including legal status, English proficiency, and a major depression scale, which allow testing some of the hypotheses of the mental health literature.

Model specification

The dependent variable in the analysis is derived from the ten-item scale version of the screening for depression proposed by the Center for Epidemiologic Studies Depression. This scale has been validated in numerous populations, including Latinos(Grzywacz et al., 2010), and has proven to be especially useful among populations with low levels of education(Irwin, Artin,

[2] A detail description of the sample design can be found in Parrado, McQuiston, and Flippen (2005)

& Oxman, 1999), as is the case for our sample. For each individual, the answers to questions about feeling depressed are coded as dummy indicators (1 if the answer indicates a depressed feeling, 0 otherwise) and then summed to form an index that ranges from 0 (not depressed at all) to 10 (extremely depressed). The question wording and proportions of positive answers by sex and country of residence are reported in Appendix 1. Finally, a dummy indicator of feeling depressed is established according to the optimal cutoff proposed by Irwin et al. (1999). For the purpose of this paper, individuals whose summary index adds up to 4 or above are considered as feeling depressed.[3]

Independent variables in the analysis include socio-demographic, economic, and migration-specific characteristics theorized to shape depression. First, sampled subjects were classified into two groups according their place of residence, and a dichotomous variable indicated whether the individual was living in Mexico or Durham. In addition, we control for sociodemographic characteristics, including age (discrete variable), education (dichotomous variable indicating if respondents completed primary education) and marital status (divided into two categories: unmarried and married or in consensual union). We also control for earnings. The large wage gap between Mexico and the United States complicates a comparison of the impact of earnings on depression across contexts. As such, we devise a relative measure of earnings that also takes into account employment status. Specifically, using year and place official minimum wage levels (2003 and 2007 mandatory wages in North Carolina[4] and in Region C in Mexico[5]), we standardize labor income reported by individuals and categorized them in three levels: zero or those unemployed, those who earn up to twice the minimum wage, and those who earn more than twice the minimum wage. For people living in Mexico, labor income was converted to the U.S. dollar equivalent using the Purchasing Power Parity over GDP (PPP) from the Penn World Table v.7.1 for 2003 and 2007.[6] Finally, family background is measured with respondents' reports of each of their parent's educational attainment.

The model restricted to the Durham sample also controls for several additional factors central to the immigrant experience. The most important of which is a set of mutually exclusive dummy variables to capture family structure *and* living arrangements. Because family migration patterns are highly gendered, these variables are defined differently for men and women. For men we distinguish between "traditional" family arrangements, which includes married men who are residing with their wife and children in Durham (i.e., no nuclear family members remain in Mexico); unmarried men (regardless of whether or not they have children); unaccompanied married men (whose wives continue to reside in Mexico); and split families, which consist of married men with some nuclear family members on both sides of the border (overwhelmingly married men living with their wives in Durham who nevertheless have at least one minor child in Mexico). Because only a small handful of married women in Durham migrated without their spouses (2.2%), the main distinction is the presence and location of children. We thus distinguish between married women living with all of their minor children in Durham; unmarried women with no children; married women with no children; unmarried

[3] Other specifications of this variable were also considered and yielded to substantively the same results.
[4] http://www.dol.gov/whd/state/stateminwagehis.htm
[5] http://www.conasami.gob.mx/pdf/salario_minimo/sal_min_gral_area_geo.pdf
[6] Data is publicly available online at https://pwt.sas.upenn.edu/php_site/pwt71/pwt71_form.php

mothers co-residing with their children; unmarried mothers whose children reside in Mexico; and married women who live with their husbands though their children remain in Mexico.

We also consider other migration-related characteristics, including social support, which is measured by an index that ranging from 0 to 5 and indicates whether the individual has at least one person for following situations: 1) to talk and be listened to, 2) to trust, 3) to help them to understand and solve problems in the U.S., 4) to help with procedures and paperwork, and 5) to drive them when needed. The remittance indicator measures whether the individual reports sending money to Mexico. We use two indicators to measure the time spent in the United States: a dichotomous variable that shows if the individual has traveled at least once to Mexico since they came to the United States, and the cumulative number of years lived in the United States net of the time spent abroad. Legal status is dichotomous variable indicating whether or not the individual is authorized to reside in the United States. Finally, English proficiency indicates that migrants report speaking English well or very well.

Methods and analytic strategy

Our analytic strategy follows our specific objectives. First, to assess the link between depressed feelings and migration net of the confounding influence of selection into migration, we use propensity score matching techniques to simulate a natural experimental design based on a treatment group (migrants living in Durham) and a control group (individuals living in Mexico). Three matching schemes were tested (N nearest neighbors, one -to-one, and kernel) to obtain a balanced sample on covariates for both groups. Our results correspond to a 5-nearest neighbors scheme with replacement, which means that more than one individual can be used to construct the counterfactual group (Caliendo & Kopeinig, 2008). The selection of our final match strategy was based on obtaining the best balance for each covariate and a mean bias lower than 5% (Rosenbaum, 2002). On the matched sample, a logistic regression was estimated to obtain the mean effect of migration on the odds of feeling depressed, net of socio-demographic controls.

Second, to further examine how change in social environment is associated with depressed feelings, we estimate logistic regression models separately by place of residence (Durham and Mexico).[7] The models include age, education, marital status and father's years of schooling. The remaining covariates (English speaking proficiency, living arrangements, time spent in the United States, remittance behavior, social support, and legal status) were excluded from this analysis because their values could have changed as consequence of migration. By comparing coefficients from models on the Durham and Mexican sample, we gain important insight into how context shapes depressive symptoms. The comparison helps to understand whether a higher educational level or being married, for example, have the same protective associations against feeling depressed in different social environments.

Finally, restrict the analysis to the Durham sample in order to explore how migration-specific characteristics shape depressive feelings. In addition to socio-demographic covariates, these models include a set of variables, sex specific defined, related to characteristics of the migration experience like English speaking proficiency, living arrangements, time spent in the

[7] We also estimated pooled models (Mexican and Durham samples) with interactions between migration and all covariates. Substantive results were similar across specifications.

United States, remittance behavior, social support, and legal status. These models test hypotheses of social incorporation stress (first five indicators), isolation (social support) and marginality (legal status).

All models are sex-specific, and include a fixed effect for survey wave and robust corrections to the standard errors. In addition to logistic models, ordinal logistic and OLS regression specifications for ordinal and discrete definitions of the depression scale were tested. Results were not sensitive to changes in the dependent variable definition, which suggests that the cutoff of the depression scale works for our sample.

Results

Figure 1 shows the distribution of the depressive feelings scale by sex for Mexicans living in Durham and Mexico. Broadly speaking, respondents express more depressive feelings in Durham than in Mexico, and among women than among men. However, there are important interactions between migration, gender, and depression, with the link more keenly felt among men than among women. For instance, among men 27.8% of those living in Mexico report no depressed feelings, compared to 10.5% of those living in Durham (2.7 times higher). Likewise, the decline in the number of positive answers for depressed feelings is not as steep for men in Durham as it is for men in Mexico. Slightly more than one in four men in Mexico feel depressed using our dichotomous cut-off for depression, compared to one in two migrants in Durham. Women, however, exhibit a different pattern. While they average higher depressive feelings than men in both contexts, the dramatically higher depressive feelings among migrants so clearly evident among men is more muted among women. Thus, while only 15.3% of women in Mexico report no depressed feelings (compared to 27.8% for men), the corresponding figure for women in Durham is 9.8% (compared to 10.5% for men in Durham). While Mexican women in Durham feel significantly more depressed than their counterparts in Mexico, with 20 percentage points more respondents falling above our dichotomous cut-off for depression, the disadvantage women face vis a vis their male peers all but disappears in the Durham context.

Differences in depressed feelings between those in the U.S. and in Mexico could be partially explained by migrants' selectivity in sociodemographic and background characteristics. Table 1 presents descriptive statistics for the Durham and Mexican sample and indeed shows important differences in socio-demographic characteristics across contexts. Men in Durham average significantly lower educational levels and lower status family backgrounds than their counterparts residing in Mexico; 60.9% have completed primary education compared to 76.3% of those in Mexican communities, and their parents' average schooling is roughly one year lower. In terms of age and marital status no significant differences are observed. Among women educational attainment is also lower in the Durham than Mexican sample, though differences in family background are more modest. Unlike men, the distribution of marital status among women also varies sharply across contexts: 81.6% of women in Durham are married compared to 64.3% of those in Mexico. Women in Durham are also slightly younger than those in our Mexican sample. Overall, these figures suggest that compositional differences could contribute to the higher proportions of migrants with depressed feelings in Durham.

To assess whether migrant selectivity in fact contributes to higher depressive feelings in Durham, propensity score matching (*psm*) procedures were applied to generate balanced samples by place of residence in terms of age, education, marital status, and parents' years of

schooling. With this procedure, variation in variables associated with depressed feelings between people in Mexico (control) and Durham (treated) are reduced to non-significant levels. In the matched samples, differences in depressed feelings are exclusively attributable to three terms: the place of residence, error, and unobservable pre-migration characteristics linked to the outcome that vary between those in Durham and Mexico.

The propensity score matching was based on a logistic model that controls for the variables mentioned above, which are either associated with migration or depressed feelings. After obtaining the propensity scores, several matching options were tested to obtain a balanced and unbiased sample for both dichotomous and discrete specifications of the depression scale. Results of the matching procedure for the dichotomous indicator are shown in Table 2 and are based on five neighbors with replacement and no common support matching.[8] Balance was reached for all characteristics included ($p>0.05$, Table 2) with the exception of mothers' education for the male sample, which still presents a significant difference of 0. 40 years of schooling. The variable was kept in the analysis because its inclusion shifted the distribution bias of covariates to lower levels. Table 2 shows that mean and median bias for both men and women were not higher than 5% and distribution maximums did not exceed 8%, which ensures that the matching largely removed the differences in the explanatory variable distributions. Finally, using the balanced samples, the association between place of residence and depressed feelings was estimated with a logistic regression weighted with the factors provided by the *psm* procedure. On average, the odds of feeling depressed for men in Durham are 2.2 times higher than those for men in Mexico, and women in Durham had 2.3 higher odds than their counterparts in Mexico. These figures before balancing the samples were 2.7 and 2.3, respectively (results not shown). Thus accounting for selection into migration has a sizeable impact on the migration-depression link for men (0.5 points) but not for women (-.06), essentially eliminating the interaction between gender, migration, and depression evident in Figure 1. However, it is still important to emphasize that even after accounting for selective migration, depression is markedly higher among migrants in Durham than their statistically equivalent peers in Mexico.

Given the continued salience of migration for depression even after controlling for pre-migration characteristics, we next turn to theoretical explanations that focus on the migration experience itself. The change in social environments could alter the associations between depressed feelings and socio-demographic and socioeconomic characteristics. For this hypothesis, separate logistic regression models by place of residence, for women and men, are presented in Table 3. Among men, significant differences across contexts in associations with feeling depressed are observed for earnings, age, and marital status. With respect to earnings, those who earn more than twice the minimum wage are significantly less likely than lower earning men to be depressed in both Mexico and Durham (.441 and .526, respectively), but the protective effect is significantly weaker for those residing in Durham; the odds for people in Mexico are reduced 8.5% more than those of people in Durham. Somewhat paradoxically, men

[8] Hereafter, we will only refer to the dichotomous indicator of feeling depressed, but all estimations were also obtained for the summary index of the depressive scale to test for sensitivity to the cutoff point. These estimations were obtained using both linear and ordinal regression and are available upon request. Substantive results were similar across specifications. We preferred logistic models over other specifications for simplicity in interpretation.

who were not working at interview also exhibited significantly lower depression than those who earned low wages, though the effect was only significant in Mexico. A detailed analysis of the unemployed revealed that in Mexico, the vast majority (70%) was under 22 years of age. In Durham, in contrast, only 20% were as young. Separate logistic models that subdivide the unemployed between young (<22 years) and older adults show that the protective association of unemployment for depression among those in Mexico is exclusive to the young (results not shown). In the Mexican context, where state-provided unemployment protection is slight, only those with relatively advantaged social support (i.e., the ability to live in the parental home, supportive family ties, etc.) can afford to be without work in their youth. Thus this variable is likely capturing unmeasured aspects of family background that are protective for depression among young men in Mexico.

The effects of age and marital status also exhibit differential associations with depression across contexts among men. Specifically, each additional year of age is associated with a 4.6% increase in the odds of depression for men in Mexico, but does not significantly change the odds for those living in Durham. The most interesting result is for marital status. In the wider literature on depression, married people have consistently been found to average lower depression than the unmarried. However, Table 3 shows that while marriage is also associated with lower likelihood of feeling depressed in Mexico (0.375) and Durham (0.733), this protective association is 57.2% (1-(1-.37)/(1-.73)) lower for men in Durham. Finally, neither education nor family social background protect men from feeling depressed; although the latter is marginally protective for men in Mexico, the effect does not significantly differ across contexts.

Among women, too, there are important differences across contexts in the relationship between socio-demographic characteristics and depression, although the pattern is distinct from those among men. Among women in Mexico, the effect of employment and earnings are very similar to those evinced by men; compared to those earning lower wages, both unemployment and earning twice the minimum wage decrease the odds of feeling depressed by 45 and 37%, respectively. Unlike in the case of men, the share of young unemployed women in Mexico and the U.S. is almost the same (18% and 13%), and separating this category by age does not change the association between unemployment and depressed feelings in Mexico. This relationship suggests that pre-migration resources and networks are available to women regardless of their stage in life –young adulthood or childbearing –and likely related to their traditional gender roles. Unlike men, earnings have no effect on depressive feelings among women in the Durham context.

Education is hypothesized to lessen feelings of depression. Among women in Mexico better educated women are indeed 40% less likely to be depressed than their peers who did not complete a primary education. However, in Durham the protective effect of educational attainment is absent. In contrast, marriage lowers the odds of depression by 40.2% among women in Durham, but has no significant effect on women in Mexico. One possible explanation for the suppressed association between marriage and depression among women living in Mexico is the correlation between marriage and education, and marriage and age (polychoric correlations significant at $p<0.05$). Finally, age and father's years of schooling do not predict depression in either Durham or Mexico.

In general, men and women's results show support for the hypothesis of changes in protective associations due to changes in social contexts. For men, after migration, marital status no longer ensures social stability to individuals, probably due to isolation and family separation. For women, after moving to the U.S., education acquired in Mexico and earnings lose power and, to some extent, its relationship to class status weakens. We explore in-detail these changed associations among migrants in Durham with models that include characteristics that derive from migrating.

Finally, to examine the relationship between migration-specific factors and depression Tables 4a and 4b present results from logistic regression models of feeling depressed among Durham residents. For men, age, education, remittances, legal status and good English were not significantly associated with feeling depressed (Table 4a). There were also no differences between earning low and being unemployed, but those that make more than two minimum wages have significantly lower odds of feeling depressed (OR=.70). Associations between feeling depressed and unmarried men implied a 68.9% of increase in the odds compared to married with children in the U.S. or childless. No significant differences are found among those with split arrangements –either with the wife or children are away. Yet, for unaccompanied men the odds of depressed feelings multiplied by 2.6 (Table 4a), which suggest that family separation and loneliness play an important role to onset depression. Results from the social support variable strength this last argument. Having support from family members, coworkers, friends, and other sources is associated with a discount of 15.4% in the odds of depressed feelings. Previous studies on mental health among Latino immigrants have already documented that loneliness and social isolation increase chances for depression (Kiang, Grzywacz, Marin, Arcury, & Quandt, 2010; Letiecq et al., 2014). Returning back to Mexico is significantly associated with increases in chances for depressed feelings (1.520, table 4.a). Yet, as previously found by other studies (Portes & Rumbaut, 1996), over time, mental health of immigrants improves. Our results suggest that the greater the amount of years spend in the US, the lower the odds for feeling depressed.

Alike men, odds of feeling depressed for women were not significantly associated with age, education and remittances (Table 4b). Unemployed women were as likely as those earning low to be depressed, but those that make more than two minimum wages have significantly lower odds (OR=.26). The substantial reduction of three quarters of women's odds compared to the 30% decrease of men's might signal autonomy and independence that work brings to women's life. It is important to highlight that the relationship between earnings and depressed feelings observed among women is mediated by English proficiency, as shown in Model 2 (Table 4b), odds' reductions disappeared once speaking English is consider in the model. It is likely that the "good jobs", those paying good, are only available to women fluent in English.

In terms of living arrangements, being unmarried and any family separation could increase their odds of depression feeling (coefficients greater one, model 1, table 4b). Significant associations are observed for unmarried women with corresiding children and for unmarried with all their children living in Mexico. For the former, the odds of depression more than triple, and for the latter increase by 6.7 times compared to married women with at least a child living with them. Pressures of single motherhood in terms of income, care, emotional energy, among others, are factors of distress that increase depressive feelings, which exacerbate when children are separated from their mothers. Compared to those lacking social

support, women with support from their family and social networks decreases the odds of depression by 26.9%, slightly above men's odds ratio.

Unlike men, for women, returning back to Mexico was not significantly associated with increases in chances for depressed feelings (table 4b). Differences in these results might be related to engendered migration processes. Women have different motivations for migrating, family reunification reasons are more common among them (Hondagneu-Sotelo, 1994), and compared to men, women are less likely to migrate without documents (Donato et al., 2008). Thus, motivations to travel back to Mexico and the associated risks of crossing are different for men and women already residing in the U.S. As previously found by other studies (Portes & Rumbaut, 1996), over time, mental health of immigrants improves. Our results suggest that the greater the amount of years spend in the US, the lower the odds for feeling depressed. Decreases are faster for men than for women, for whom a quadratic function fitted better, and slowed the pace of the linear coefficient (table 4b).

English proficiency and legal status were significantly correlated for women (polychoric correlation of 0.578, $p<0.05$). Therefore, two model specifications are shown, each one including one of these two indicators (model 1 is used for interpretation proposes, except when stated the opposite). In contrast with men, for whom legal status and good English were not significant, both factors decreased the odds for depressed feelings for women. Holding legal status halves the odds of feeling depressed and speaking English well reduces them by close to two thirds (0.368, model 2, table 4b). Results support that documented status and English speaking are factors that ease acculturation processes (Letiecq et al., 2014; Portes & Rumbaut, 1996). On the one hand, holding legal status increases the possibilities of social mobility through better employment conditions (Donato et al., 2008; Flippen, 2012; Gonzales, 2011); it also provides more emotional stability and reduces fear and uncertainty of deportation and discriminative situations associated with undocumented status. Besides, in our sample, all women with legal status had at least a child living with them, therefore legal status might be preventing family separation. On the other hand, being able to communicate with others reduces migrants' isolation, it also increases their chances of getting better jobs and improving their living conditions. In the specific case of women, it could also be reducing their husbands' dependence through employment and their ability to function in the U.S. environment, like communicating in school with teachers.

Conclusions

In this paper three different theoretical hypotheses to explain feelings of depression among Mexican immigrants to the U.S. were analyzed (migrant selectivity, the impact of context on protective/risk factors for depression, and acculturative stress). While selection bias in observed characteristics accounted for a small portion of the differences in depression among Mexicans in Mexico and in Durham, acculturative stress and context were found to be far more important in explaining the higher levels of depression among migrants, especially for women.

The importance of context to depression is clearly demonstrated in the interaction between migration and socio-demographic characteristics. The protective effects of factors such as income, educational attainment, and marriage are significantly weaker among migrants in Durham than among non-migrants in Mexico. Moreover, context-related interactions show a different pattern for men and women. For both men and women, the protected effects of

earnings are diminished in Durham. However, among men the benefits of marriage are also lower in the U.S. context, while among women it is education that loses its power to enhance mental health in the United States. These findings signal that changing social environments does translate into status loss. And specifically for women, the fact that employment and earnings do not protect from feeling depressed supports previous findings suggesting that labor participation is not a panacea for low the challenges facing immigrant women (Parrado & Flippen, 2005).

Findings also demonstrate that the process of immigration itself is related to mental health. Results show that family separation accounts for a sizeable portion of the heightened depression among migrants. In general, marriage still protected immigrants from depression as hypothesized by previous studies (Portes & Rumbaut, 1996), but the different configurations in living arrangements mediate this relation. Unaccompanied men were far more likely to feel depressed than anyone else, which shows that for men having their partner with them provides stability and support. For women, the stresses associated with single motherhood boosts the odds of depressed feelings; economic hardship and the challenges of balancing motherhood and breadwinning roles likely contribute to this effect. Mothers separated from their children were the most vulnerable to feeling depressed. Many mothers in this situation face the competing hopes of returning to Mexico to rejoin their children or bringing their children to the United States. Both situations entail intense pressure to earn money to achieve their objectives, and are potential sources of stress and sadness. In fact, qualitative studies among Latino immigrants have shown that migrants feel "persistent sadness because they were separated from their families back in their home countries, whom they missed badly" (Winkelman, Chaney, & Bethel, 2013, p.1821). Indeed, other studies of depression among Mexican migrants have concluded that family separation is among the most important predictors of depression (Letiecq et al., 2014). Policies that impose barriers for family reunification have direct consequences for migrant mental health and hinder their incorporation process in host societies.

While innovative, this paper has also some limitations. Physical health status has been shown to be a significant predictor of mental health. The lack of information on physical health in the sample used is a weakness of the study. Also, we do not have information on prior depression status, and it is possible that migrants were depressed before migrating. However, the groups more prone to depression, the unhealthiest and unhappiest, are the less likely to migrate as a good mental and physical health is needed to endure the difficulties of migration. Studies in the physical health literature have shown that on average migrants are healthier than populations at origin places (healthy migrant evidence (Akresh & Frank, 2008; Jasso et al., 2001)), and in-poor-health immigrants have higher probabilities of returning to Mexico (Arenas, Goldman, Pebley, & Teruel, 2015). Therefore, our migrants' sample might have overrepresentation of people with good physical and mental health status prior to migration, and continued good physical health after migration, which in turn could be decreasing changes of depressed feelings and making our estimates conservative in any case.

A broad and new research agenda in the area of mental health and migration is emerging. Several of the hypotheses and paradoxes analyzed within the physical health literature could be tested and the results could serve as feedback for both areas. Mental health

studies for migration urge to understand the subjective experiences of the process as well as to ease the integration process of newcomers in receiving societies.

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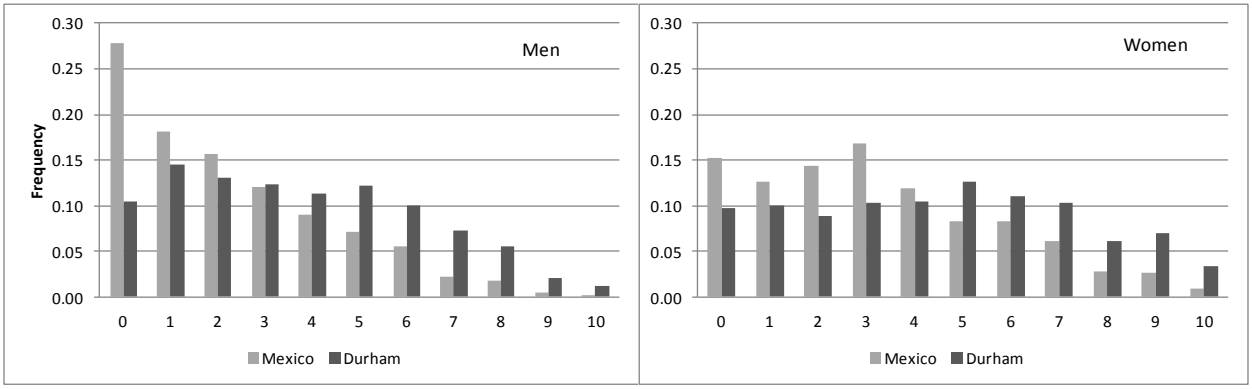
Tables and Figures

Figure 1. Distribution of symptoms in CESD screening for depression by migration status and sex



Source: Gender, migration and health among Hispanic study 2003, 2007

Table 1. Descriptive statistics by migration status and sex

	Men			Women		
Variables	*Mexico*	*Durham*		*Mexico*	*Durham*	
Depression Scale Score	2.3	3.7	***	3.3	4.5	***
	(2.2)	(2.6)		(2.5)	(2.9)	
Feeling depressed (score >3) %	26.5	49.6	***	40.9	60.9	
Sociodemographic chacracteristics						
Age	30.7	30.5		31.2	30.5	*
	(8.8)	(8.0)		(8.5)	(7.7)	
Completed primary education %	76.3	60.9	***	68.6	58.9	***
Marital status						
Unmarried	37.0	39.0		35.8	18.5	***
Married or in consensual union	63.0	61.0		64.3	81.5	***
Socioeconomic chacracteristics						
Weekly earnings						
Unemployed %	4.6	3.1	***	34.9	46.2	***
2 minimum wages or less %	11.0	77.2	***	12.3	52.6	***
More than 2 minimum wages %	84.4	19.6	***	52.9	1.3	***
Background characteristics						
Father's years of schooling	5.4	4.3	***	4.2	4.1	
	(3.8)	(2.9)		(3.5)	(3.2)	
Mother's years of schooling	4.9	4.1	***	3.8	3.6	
	(3.8)	(2.9)		(3.4)	(3.3)	
Migrants living arrangements						
Men living arrangements						
Married accompanied, all or no-children %		34.0				
Unmarried %		39.0				
Unaccompanied %		22.9				
Married, split (children or wife in Mx) %		4.1				
Women living arrangements						
Unmarried, no children %					8.9	
Unmarried, children corresiding %					8.0	
Unmarried, all children in Mx %					1.5	
Married, no children %					13.7	
Married, children corresiding %					63.1	
Married, all children in Mx %					4.7	
Migration associated characteristics						
Social support index		3.9			4.0	
		(1.4)			(1.3)	
Sends remittances %		79.2			54.3	
Ever visited Mexico %		18.3			7.9	
Cumulative years spent in the US		7.3			7.0	
		(5.7)			(4.9)	
Holds legal status %		5.1			5.7	
Good English %		8.2			6.7	
Year						
2003 '%	50.0	33.5		50.0	22.0	
2007 '%	50.0	66.5		50.0	78.0	
Sample size	800	993		800	717	

Notes: Standard deviations in parethesis. T and Chi-square tests for differences of discrete and categorical variables, respectively, between people in Mexico and Durham.

* p<0.10, ** p<0.05, ***p<.001

Source: Gender, migration and health among Hispanic study 2003, 2007

Table 2. Differences in sociodemographic and background characteristics between people in Durham (treated) and Mexico (control) after propensity score matching procedure

	Men				Women			
Variables	*Treated*	*Control*	*T-test*	*p>|t|*	*Treated*	*Control*	*T-test*	*p>|t|*
Sociodemographic chacracteristics								
Age	30.45	30.09	0.94	0.348	30.47	30.34	0.32	0.752
Education (Less than primary, *ref. cat.*)								
Completed primary education	0.61	0.62	-0.49	0.625	0.59	0.59	-0.05	0.957
Marital status (Unmarried, *ref. cat.*)								
Married or consensual union	0.61	0.61	-0.14	0.890	0.81	0.81	0.27	0.787
Background characteristics								
Father's years of schooling	4.33	4.12	1.47	0.142	4.11	4.02	0.53	0.593
Mother's years of schooling	4.06	3.80	1.79	0.074	3.62	3.60	0.13	0.894
Year (2007, *ref. cat.)*								
2003	0.34	0.36	-1.3	0.194	0.22	0.22	0.09	0.929
Mean bias	4.5				1.2			
Median bias	5.0				1.0			

Source: Gender, migration and health among Hispanic study 2003, 2007

Table 3. Odds-ratios from logistic regression models of depressed feelings by migration status

	Men		Women	
Variables	Mexico	Durham	Mexico	Durham
	Odds ratio	*Odds ratio*	*Odds ratio*	*Odds ratio*
Socioeconomic charateristics				
Unemployed (*Ref: Less than twice the weekly minimum wage*)	**0.166 ****	**0.809**	**0.545 ****	**0.816**
More than twice the weekly minimum wages	**0.441 ****	**0.526 *****	**0.631 ***	**1.012**
Sociodemographic chacracteristics				
Age	**1.046 *****	**1.014**	1.015	1.012
Education (*Ref: Less than primary education*)				
Completed primary education	0.855	0.888	**0.596 ****	**1.006**
Marital status (*Ref: Unmarried*)				
Married or in consensual unions	**0.375 *****	**0.733 ****	**0.924**	**0.598 ****
Background characteristics				
Father's years of schooling	0.955 *	0.982	0.964	0.993

Bolded coefficients indicate statistically significant differences between migration status at p<0.05.
Fixed effects for survey year included.
* p<0.10, ** p<0.05, ***p<.001
Source: Gender, migration and health among Hispanic study 2003, 2007

Table 4a. Odds-ratios from logistic regression models of depressed feelings for Mexican immigrants in Durham, NC: Men

Variables	*Odds ratio*	
Socioeconomic charateristics		
Weekly earnings (Less than 2 minimum wages, *ref. cat.*)		
Unemployed	1.123	
More than 2 minimum wages	0.702	*
Sociodemographic chacracteristics		
Age	1.011	
Education (Less than primary, *ref. cat.*)		
Completed primary education	0.901	
Living arrangements (Married accompanied, *ref. cat.)*		
Unmarried	1.689	**
Unaccompanied	2.637	***
Married split	1.013	
Migration associated characteristics		
Social support index	0.846	**
Sends remittances	1.248	
Ever visited Mexico	1.520	**
Cumulative years spent in the US	0.934	***
Holds legal status	1.361	
Good English	0.832	

Notes: Fixed effects for survey year included

* p<0.10, ** p<0.05, ***p<.001

Source: Gender, migration and health among Hispanic study 2003, 2007

Table 4b. Odds-ratios from logistic regression models of depressed feelings for Mexican immigrants in Durham, NC: Women

	Model 1	Model 2
Variables	*Odds ratio*	*Odds ratio*
Socioeconomic charateristics		
Weekly earnings (Less than 2 minimum wages, *ref. cat.*)		
Unemployed	0.898	0.908
More than 2 minimum wages	0.256 **	0.318
Sociodemographic chacracteristics		
Age	1.014	1.007
Education (Less than primary, *ref. cat.*)		
Completed primary education	1.153	1.233
Living arrangements (Married, children coresiding, ref. cat.)		
Unmarried, no children	1.061	1.206
Married, no children	1.247	1.325
Unmarried, children coresiding	3.161 **	3.229 **
Unmarried, all children in Mx	6.591 *	6.838 *
Married, all children in Mx	1.259	1.326
Migration associated characteristics		
Social support index	0.731 ***	0.727 ***
Sends remittances	1.227	1.206
Ever visited Mexico	1.204	1.170
Cumulative years spent in the US	0.926	0.943
Cumulative years spent in the US Squared	1.004 *	1.004 *
Holds legal status	0.495 **	
Good English		0.368 **

Notes: Fixed effects for survey year included

* p<0.10, ** p<0.05, ***p<.001

Source: Gender, migration and health among Hispanic study 2003, 2007

Appendix 1. Depression screening questions from the Hispanics in Durham Study, percentage of Mexican participants answering Yes by migration status and sex.

	Men		Women	
In the past six months, have you:	*Mexico*	*Durham*	*Mexico*	*Durham*
felt depressed?	32.3	44.5	53.8	57.9
felt that everything you did was an effort?	27.3	53.8	37.4	51.0
felt that your sleep was restless?	34.4	38.8	41.1	52.7
been a happy person?	83.5	71.3	84.4	70.4
felt lonely?	25.9	51.6	50.1	51.2
felt that people were unfriendly?	14.3	28.7	21.0	48.0
enjoyed life?	84.6	73.8	83.0	73.5
felt sad?	41.5	61.0	65.1	64.3
felt that people disliked you?	13.0	19.1	15.0	31.4
felt that you could not get going?	7.4	17.6	12.6	35.3

Source: Gender, migration and health among Hispanic study 2003, 2007