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The Effect of Migration on Trust in Communities of Origin

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Abstract

This paper investigates a largely neglected social cost of migration in communities of origin: reduced trust among the remaining population. For the purpose, I combine household-level trust data with aggregate migration rates at the municipality level in Mexico. To overcome endogeneity, variation in the revenue from the outsourcing industry Maquiladora and extreme weather conditions have been used to instrument for migration flows at the municipality level. I provide robust findings that residents in areas with high out-migration were more likely to adjust trust in their neighbors downward, pointing to a detrimental impact of migration on trust in origin areas.

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1 Introduction

The literature on the consequences of migration in communities of origin has grown substantially in recent years. Migration has been shown to affect a number of key economic outcomes such as human capital accumulation (Yang, 2008), intra-household resource allocation (Antman, 2011), long-run educational attainment (Dinkelman and Mariotti, 2016), and labor supply (Gibson, McKenzie and Stillman, 2011). However, existing literature has paid relatively little attention to the social aspects of migration in communities of origin. In this paper, I investigate this largely underexplored dimension of migration and provide evidence that there exists a *social* cost associated with migration: reduced trust among the remaining population.

Migration may affect trust shared among neighbors since it reduces the pool of residents whom one trusts. Or, it is also likely that in-migration may lead to lower levels of trust through increased population density and urbanisation, which is associated with greater anonymity (Miguel, Gertler and Levine, 2005). However, a rational-choice account of trust developed by Hardin (2002) that requires two essential elements, knowledge to allow the truster to trust and incentives of the trusted to fulfil the trust, suggests a more nuanced channel for the potential impact of migration on trust among neighbors, namely, the incentives to invest in social capital.

Migration can play a crucial role in this regard. To explain, high migration rates in a neighborhood lowers the incentive to get to know each other (which is a basic form of social capital investment), which will allow residents to learn the trustworthiness of their neighbors, due to the short expected time period over which they would interact. Further, the expected short-term nature of the relationship may also reduce the incentives to be trustworthy when trusted by weakening the threat of punishment because such threats are based on the expectation of on-going relationships. This incentive problem is critically described by Hardin (2002), "The biggest and most pervasive problem for us in trusting others is not the malign problem of dealing with cheaters but the relatively neutral problem of often having to deal with people with whom I cannot expect to have ongoing relationships in which to ground incentives for trustworthiness."

The paper is structured as follows. In section 2, I discuss the conceptual framework. Section 3 provides data description and section 4 explains identification strategies. In section 5, I report the findings and section 6 concludes.

2 Conceptual Framework

The notion of trust on which I focus in this paper is taken from Hardin (2002)'s rational-choice account of trust, which is the result of cognitive assessments of the trustworthiness of the (potential) trusted and of the returns to being trustworthy when trusted. With trust defined as above, the hypothesis I test is whether migration adversely affects

the assessment of trustworthiness of individuals (who could be potentially trusted) in one's community and lowers the incentive to fulfil the trust once trusted.

Migration could negatively affect trust between individuals through lower investment incentives in social capital. For example, if we plan to migrate or we anticipate that our neighbors will move out of our neighborhood in the near future, we might not invest too much time getting to know them, which will not allow us to assess their trustworthiness. Relatedly, DiPasquale and Glaeser (1999) find that renters, compared to homeowners, tend not to invest in social capital since they will not stay long enough to gather the returns from the investment. Renters are associated with fewer local organizations, less likely to be involved in local politics and less likely to put effort in gardening, which is a local public good. They find evidence that a sizeable share of the estimated effect of homeownership comes from their lower mobility rates.

It is also plausible that high out-migration rates in a neighborhood lowers the incentive to be trustworthy when trusted by weakening the threat of punishment or of developing bad reputations because such threats are based on the expectation of ongoing relationships. This conjecture is consistent with the insight from the repeated games literature that asserts a cooperative equilibrium is sustainable in an uncooperative game when the game is infinitely repeated and players discount the future sufficiently little (Fudenberg and Maskin, 1986). Dal Bó (2005) specifically provides experimental evidence that the prospect of future interactions significantly reduces opportunistic behavior and supports cooperation. The fear of retaliation is arguably low in an environment characterised by high migration rates.

One important observation is that the two elements discussed above, knowledge of the truster and the incentive of the trusted to be trustworthy, are complements. Residents may not attempt get to know their neighbors and form opinions on their trustworthiness *in anticipation* of their neighbors' low incentives to be trustworthy given the expected short-term nature of their relationship. Or having no knowledge at all about neighbors and consequently very weak interpersonal relationships in the neighborhood do not allow the opportunity to assess whether it is profitable to be trustworthy since it is likely that there is no trust placed on them in the first place. A similar observation has been made by Sobel (2002) with regard to local organization memberships (which is often a proxy for individuals' social capital) who said, there needs to be clubs in order for an individual to join one.

My analysis aims to subject this socioeconomic view on trust as a rational choice to rigorous econometric investigation and to estimate the effects of migration on trust among neighbors.

3 Data description

I use the 2010 Mexican Population and Housing Census collected by the Mexican National Statistics Institute (INEGI) to construct 5-year migration flows at the municipality level in Mexico using the information on respondents' place of residence in 2005

and their current location in 2010. Given the prevalence of international migration in Mexico, I also incorporate international migrants in the out-migration measure.

For trust data I turn to the last two waves of the Mexican Family Life Survey (MXFLS) conducted in 2005 and 2009. The survey includes a set of questions, trust being the main variable of interest, that reflect various aspects of social capital at the community level. These questions are answered by household heads or someone older than 18. The MXFLS elicits trust by asking the respondent to answer how much they agree with the following statement "People from this locality/community are trustworthy", for which they can choose between "Completely Disagree", "Disagree", "Agree", or "Completely Agree". I construct the trust variable so that higher trust takes higher values (i.e., the possible answers above take 1, 2, 3, and 4, respectively). It has been shown that survey-based trust measures, such as what I use here, are indeed correlated with behavioral trust measures in experimental settings. In a standard trust game with player A as the truster and player B as the trustee, A's trust of B is measured by the amount of money sent by A to B (and B's trustworthiness is measured by the amount of money returned by B to A). A number of papers have confirmed that survey-based trust measures are a strong predictor of the truster A's trust in this setting (Fehr et al., 2003; Sapienza, Toldra-Simats and Zingales, 2013; Glaeser et al., 2000).

4 Empirical analysis

4.1 First-difference specification

To identify the effect of out-migration on how much residents trust each other, I start with a first-differences specification to account for unobservable household heterogeneity correlated with trust and to exploit the panel nature of the dataset. Let $\Delta Trust_{ijs}$ be the change in trust between 2005 and 2010 of family i in municipality j, state s. Then I posit that $\Delta Trust_{ijs}$ will be a function of the migration rates at the municipality j over the same time period along with a vector of the changes in household characteristics, ΔX_{ijs} and state-specific time trends K_s:

$$\Delta Trust_{ijs} = \alpha + \Gamma' \Delta X_{ijs} + \beta OM_{js,05-10} + \delta K_s + \epsilon_{ijs} \tag{1}$$

where $OM_{js,05-10}$ represents the out-migration rate from municipality j. The first-difference specification is particularly relevant when we consider that trust held by individuals at one point is an equilibrium level reached by past experience, thus should be interpreted as a stock variable. Thus, migration flows between 2005 and 2010 should affect the *change* in the residents' trust that took place over the same time period rather than an equilibrium outcome observed at one point in time. An important caveat is that this first-difference specification assumes cardinality of the trust variable, which is ordinal. However, given that there is no generally accepted method for panel analysis that respects the ordinal nature of an outcome variable, assuming cardinality and estimating a standard linear first difference or fixed effects model to deal with

unobserved heterogeneity is the most common approach in the literature (Riedl and Geishecker, 2014).[1]

The vector of households characteristics include the age and education of household head, household income (Alesina and La Ferrara, 2002), household size and homeownership (DiPasquale and Glaeser, 1999). Standard errors are clustered at the municipality level to correct for potential correlation in shocks faced by households in the same municipality.

4.2 IV approach

Two main threats to the above specification are time-varying omitted variable bias and reverse causality. There might be time-varying factors that simultaneously affect migration and trust held by residents such as improvements in infrastructure including road and telephone lines. This could render social interactions more convenient and migration less costly through information flows and network building (Munshi, 2003). Also, it might be the changes in trust that drove people out of their municipalities. To address this concern, I use an instrumental variable approach developed in Boustan, Fishback and Kantor (2010).

Prospective migrants from a source area k compare the expected benefits of moving to new locations j with the costs of migration (Sjaastad, 1962). While negative economic shocks driving migrants out of source area k are endogenous with respect to the level of trust in that area, positive economic conditions pulling migrants to destination area j are arguably exogenous to trust shared among residents in k. Therefore, local economic conditions in areas that pull migrants out of source area are natural instruments for out-migration out of that city.

For local economic conditions, I use revenue from the maquiladora sector in Mexico. The demand for low-skilled labor in maquiladora operations has been a notable pull factor for migration in Mexico in the past decades (Villarreal and Hamilton, 2012; Portes and Roberts, 2005). This variable also provides a potentially more exogenous variation for migration flows than other measures used in the literature (e.g., GDP or employment growth rates) because the fluctuations in this industry are determined outside of Mexico by foreign markets (Bergin, Feenstra and Hanson, 2009). I rely on the Economic Census 2004 and 2009 for municipality-level revenue data from the maquiladora sector.

[1]Regarding the difficulty of choosing either to respect ordinality or to include fixed effects, Ferrer-i Carbonell and Frijters (2004) show that the cardinality assumption makes little difference, while including individual fixed effects has significant impacts on estimates. More recently, Riedl and Geishecker (2014) provide support for this common approach by comparing various ordered response estimators in terms of consistency and efficiency measures in Monte Carlo simulations. They find that a linear fixed effects model provides as least biased and efficient parameter estimates as more elaborate estimators that involve computationally expensive binary recoding schemes for estimating conditional logit models, especially when the researcher is mainly interested in relative effects, as in my case, than the absolute size of the parameter estimates.

Along with economic conditions, I also use extreme weather conditions and an indicator for rural areas to further predict migrant flows as in Boustan, Fishback and Kantor (2010). The weather data come from the National Climatological Database of Mexico (Cohen and Dechezleprêtre, 2015). Extreme weather conditions are defined as the deviation (measured in days) from the average number of days with temperature over 32 or below 10 degrees. The rural dummy captures the idea of differential patterns of migration between urban and rural areas.

The predicted migrant inflows for each destination area are then distributed over possible source areas using settlement patterns between 1995 and 2000 constructed based on the 2000 Mexican Population and Housing Census. By using settlement patterns observed 10 years ago I assume that they are a reasonable predictor of future settlement patterns (Theoharides, 2017; Munshi, 2003). The instrument for out-migration from municipality k is then the sum over all areas j ($j \neq k$) of the predicted migrations who are assumed to originate from municipality k ($k \neq j$). To minimize the possibility of spatial correlation, I follow Boustan, Fishback and Kantor (2010) by constructing my instrument using predicted migrant inflows from source areas outside of the destination area's own state only. In Appendix, I explain in detail the procedure to construct the instrument and present the results from the regressions that predict in- and out-migration rates based on the variables discussed above. The results are consistent with the existing literature, which provides support for the instrument.

5 Trust and migration

5.1 The impact of migration on trust

Table 1 presents key results from the analysis. Column 1 reports the coefficient from the first-difference specification, which indicates out-migration is negatively correlated with the changes in trust. This finding supports the hypothesis that migration reduces the incentives for social capital investment that leads to trust since out-migration of their neighbors (both actual and anticipated based on the municipality-level migration rate) effectively lowers the expected returns from mutual trust over future time periods.

Column 2 reports IV estimates controlling for household level variables along with state fixed effects. The first-stage result is presented in column 3. The predicted migration rate is a strong predictor of the actual migration rate. The IV specification yields qualitatively same results, highlighting the detrimental impact of migration on trust held by remaining residents. I also find a strong and negative relationship between the instrument and the change in trust in the reduced-form regression (column 4).

One might worry that the instrument based on economic situations in a domestic industry might not provide meaningful variation for international migration which is included of the migration rate in the analysis. Thus, I construct an alternative instrument, namely, historical migration rates at the municipality level between 1995 and 2000 that can also predict international migration flows as in several previous

studies (e.g. McKenzie and Rapoport, 2011; Woodruff and Zenteno, 2007).[2] The results remain qualitatively similar (column 5).[3]

Not only are the negative coefficient estimates of Table 1 statistically significant, but they are also economically meaningful. I assess the magnitude of the out-migration rate coefficient by comparing its explanatory power against other variables in the regression. To do this, I compare the out-migration rate variable with all other explanatory variables in the estimating equation (Nunn and Wantchekon, 2011). Using the estimates from column 1, and performing a standard decomposition of goodness of fit exercise, I find that out-migration accounts for around 8.9 % of the variation explained by the set of included covariate.[4]

5.2 Heterogeneity

Another possible interpretation, other than investment in social capital, is that the negative impact of migration on trust is driven by the loss of direct contact. This effect is supposed to be stronger in rural areas as people have denser social networks than in urban areas (Angelucci et al., 2009). Thus, it is of interest whether the effects of migration were larger in rural areas since the difference would be indicative of the extent to which the negative impact is driven by the loss of contact.

When I restrict my sample to households in urban areas I still find a statistically significant impact of migration on trust in both the first-difference (column 1) and IV specification (column 2). On the other hand, the effect disappears once the sample is restricted to households in rural areas (column 3). When instrumented, the estimate becomes more negative, but is noisy with large standard errors (column 4). One potential reason is that there might not be enough variation in migration rates across rural areas, given substantially lower migration from rural Mexico (3.6% in rural as opposed to 6.2% in urban areas). Further, the weak first stage questions the validity of my instrument for rural areas. Alternatively, I try the historical migration rate instru-

[2]I do not rely on this instrument as my preferred instrument because the 10-year gap between the historical and current migration rates here is much shorter than 70- and 90-year gap imposed in other papers (McKenzie and Rapoport, 2011; Woodruff and Zenteno, 2007) and thus likely to be more vulnerable to the concern of time-varying factors affecting migration patterns in 2000 and trust in 2009 simultaneously. Unfortunately, 2000 was the first year in which the Mexican Population and Housing Census asked residents of their origin municipalities, so it is not possible to construct municipality-level migration rates before 2000.

[3]The preferred instrument excludes within-states migrants to minimize the possibility of spatial correlation. As sensitivity checks, I also try to exclude migrants who moved out of one's own state but moved to municipalities within 100km or 200km from the borders and find similar results (reported in Table A2).

[4]Alternatively, for more straightforward interpretation, I constructed a binary variable that indicates whether the respondent chose a lower degree of trust compared to the previous period. Using this as the outcome variable rather than the change in the categorical variable as in the main analysis (which yields a coefficient of 3.5295 with standard deviation 1.707) indicates that 1 percent increase in the migration rate is associated with 0.3 percentage point increase in the probability that they adjust their trust in neighbors downward.

Table 1: The effect of out-migration on trust: Mexico, 2005-2010

	(1)	(2)	(3)	(4)	(5)
Out-migration rate	-0.951*	-2.692*			-2.511**
	(0.519)	(1.431)			(1.042)
Predicted out-migration rate			0.817***	-2.200**	
			(0.197)	(0.912)	
Exogenous controls	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Number of municipalities	152	152	152	152	148
First-stage F-statistics		17.25			42.04
Observations	6,158	6,158	6,158	6,158	6,075
R-squared	0.010	0.008	0.345	0.011	0.010

NOTE: Each regression includes state fixed effects. Regression in (1) is run in first-difference specification shown in equation (1) while regression (2) is in the corresponding IV specification. The dependent variable *Trust* is the answer to the following statement: "People from this locality/community are trustworthy." Column (3) reports the first stage of the IV estimation shown in (2). Column (4) reports the corresponding reduced-form. Column (5) uses the historical migration rate an alternative instrument. Standard errors are in parentheses and clustered at the municipality level. *** p<0.01, ** p<0.05, * p<0.1

Table 2: Heterogeneity: the effect of migration on trust

	(1)	(2)	(3)	(4)	(5)
	Urban areas			Rural areas	
Out-migration rate	-1.245*	-2.802*	-0.134	-5.099	-0.644
	(0.695)	(1.471)	(0.946)	(12.793)	(4.863)
Exogenous controls	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Number of municipalities	101	101	73	73	70
First-stage F-statistics	.	29.69	.	0.416	3.557
Observations	3,265	3,265	2,893	2,893	2,811
R-squared	0.013	0.011	0.026	0.010	0.027

NOTE: Each regression includes state fixed effects. The dependent variable *Trust* is the answer to the following statement: "People from this locality/community are trustworthy." Column 2 and 4 use the predicted out-migration rate as an instrument. Column 5 uses the historical migration rate between 1995 and 2000 as an alternative instrument. Standard errors are in parentheses and clustered at the municipality level. *** p<0.01, ** p<0.05, * p<0.1

ment used in column 5 in Table 1 and find a qualitatively similar result. This exercise indicates that the effect of migration on trust is not stronger for rural households and provides evidence against the alternative hypothesis that the estimated effects hinge on losing direct contact.

It is noteworthy that the estimated effect of migration on trust appears to be missing in rural areas suggesting that the investment channel is also weaker. One explanation is that the threat of social sanctions for not fulfilling the trust is stronger when social networks are dense (Miguel and Gugerty, 2005; Zak and Knack, 2001; Granovetter, 1985). Consequently, the likelihood of opportunism (of not returning the trust of someone when given it) in anticipation of a short-term relationship is likely to be lower in rural areas, due to the strong threat of punishment from the common social network that remains even in the event of the truster's migration (Lyon, 2000; Granovetter, 1985). Additional information on social relations and interactions in the MXFLS indeed reveals that households in rural areas tend to do each other favors more often, provide support/advice more often, and spend more time socializing with their neighbors, which suggests a deeper level of social embeddedness in those areas than in urban areas (Table A3).

6 Concluding remarks

This paper explored a largely understudied dimension of migration and provided evidence that migration has a detrimental impact on trust in origin areas. Given the findings, future research on specific mechanisms behind the relationship will deepen our understanding of the dynamic consequences of migration.

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Appendix

Constructing the instruments

The procedure to create the instruments for out-migration rates is as follows. For the instrument for out-migration rates, I predict in-migration rates to destination municipalities indexed by j, using local economic conditions along with weather shocks and a rural indicator. These rates are used to calculate a predicted inflow into each destination area j, out of source area k's state. Then I use internal migration patterns observed between 1995 and 2000 to estimate the probability that migrants arriving in destination area j come from source area k. The total predicted migrant outflow from each source municipality k is then the sum of these pair-wise predictions across all possible destination areas. This predicted migrant flow becomes my instrument for the actual out-migration rate.

To explain in detail, the in-migration rate $IM_{j,05-10}$ to destination area j is a function of a vector of the changes in local economic and weather conditions (ΔZ_j):

$$IM_{j,05-10} = \alpha + \Phi' \Delta Z_j + \mu_j \tag{2}$$

where Z_j includes the change in revenues from the maquiladora industry between 2005 and 2010 and the number of days between 2005 and 2010 with extreme temperatures (over 32 and below 10 degrees Celsius) and a rural indicator. I estimate the parameters of equation (2) from a single equation where each observation is a destination municipality. The predicted flow of migrants coming to municipality j is the product of the predicted in-migration rate for j and the population of the area in 2005:

$$IM_j = \hat{IM}_{j,05-10} \times Population_{j,05} \tag{3}$$

Then I use the settlement pattern observed between 1995 and 2000 to distribute the predicted migrant inflows over possible source areas k, where P_{jk} is the probability that migrants coming to j have come from source municipality k. The instrument for out-migration from municipality k is then the sum over all areas ($j \neq k$) of the predicted number of migrants who are assumed to originate from municipality k ($\neq j$). Migrants who are expected to come from municipalities in the destination j's own state are excluded in order to minimise the concern for spatial correlation.

$$M_k = \sum\nolimits_{j \neq k} IM_j \times P_{jk} \tag{4}$$

Finally, the instrument for out-migration rate in municipality k divides the predicted outflow by the population of that area in 2005.

Table A1 presents the results from the regressions that predict in- migration rates based on local pull factors in column (1). Although not directly used in the construction of my instrument I also report the regression predicting out-migration rates for

Table A1: Determinants of in- and out migration at the municipality level, 2005-2010

Determinants	(1) In-migration rate	(2) Out-migration rate
Change in the revenue	0.0577**	0.0316**
from the maquiladora industry	(0.0239)	(0.0154)
Rural areas	-0.0109***	-0.00763***
	(0.00202)	(0.00132)
Days over 32 degrees	0.000006	0.00008*
	(0.000006)	(0.000004)
Days below 10 degrees	0.00003	0.00009**
	(0.000006)	(0.000004)
Observations	2,142	2,110

NOTE: In- and out-migration rates are migration inflows and outflows over the period 2005 and 2010 divided by the population in 2005, respectively and are based on the Mexican Population and Housing Census 2010. The data on the change in the revenue from the Maquila industry come from the Economic Census 2004 and 2009. Days over 32 degrees and below 10 degrees are deviation from the historical mean number of those days. Standard errors are in parentheses.

comparison and to interpret the results against the prior literature (column (2)). As expected, an increase in the revenue from the maquiladora sector appears to be a strong pull factor for migrants, increasing the in-migration rate by 0.06 percentage points for every one billion peso increase in the revenue. Rural areas experienced substantially lower in- and out-migration, which emphasizes the popular urban-urban migration pattern. Extreme weather conditions, both cold and hot days, do not have a significant impact on in-migrations, whereas they appear to be strong push factors that lead to higher out-migration flows. This finding is consistent with existing empirical evidence for the weather-induced migration (Feng, Oppenheimer and Schlenker, 2012; Gray and Mueller, 2012). One surprising finding is that an increase in the revenue from the maquiladora industry, a local pull factor, also induces more out-migration, although the magnitude is much smaller (0.03 percentage points for every one billion peso increase in the revenue). This could be the case if the boom in the maquiladora industry brings about overall economic liveliness, which often times accompanies inflation. This may lead to more out-migration of less well-to-do families in particular because of rising housing prices and other living costs. Alternatively, better economic conditions brought about by the maquiladora industry might have induced individuals to migrate by relaxing the liquidity constraints faced by households and consequently allowing them to finance the initial cost that migration often entails (Angelucci, 2015). Overall, I find that the revenue increase in the maquiladora industry and extreme weather conditions are strong pull and push factors, respectively, for internal migration.

Table A2: Alternative instruments: the effect of out-migration on trust: Mexico, 2005-2010

	(1)	(2)	(3)	(4)
Out-migration rate	-1.864*		-1.635	
	(1.125)		(1.033)	
Predicted out-migration rate		-1.913*		-1.906*
		(1.018)		(1.094)
Exogenous controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Number of municipalities	152	152	152	152
First-stage F-statistics	22.9		24.9	
Observations	6,158	6,158	6,158	6,158
R-squared	0.009	0.010	0.010	0.009

NOTE: Each regression includes state fixed effects. The instrument used in column (1) excludes migrants who are expected to relocate out of their own states but within 100 km from the state border. Column (2) reports the first stage of regression in column (1). Similarly, the instrument used in column (3) excludes migrants who are expected to relocate out of their own states but within 200 km from the state border. Column (4) reports the first stage of regression in column (3). *** p<0.01, ** p<0.05, * p<0.1

Table A3: Descriptive statistics: social relations and interactions

	Urban areas	Rural areas	
	Mean	Mean	Diff.
Favors	2.37	2.63	0.25***
Watch over house	2.49	2.64	0.14***
Advice on family matters	2.07	2.33	0.25***
Parties	2.12	2.38	0.25***
Gathering	2.12	2.43	0.31***

NOTE: Each variable is an answer to (1): "How often do people from your community do favors to each other?", (2): "When a neighbor is away, how often do you or your neighbors watch his/her house?", (3): "How often do you and other people from your community ask for advice to each other about things like raising your children or getting a new job?", (4): "How often do people from your community have parties in which you invite other people from the community?", and (5): "How often do you and other people from your community gather in each other's houses or on the street?" in 2009 wave of the MXFLS. Respondents answer the questions by choosing from "Never", "Rarely", "Frequently" or "Always". Higher values correspond to higher frequency. *** p<0.01, ** p<0.05, * p<0.1