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HOW MUCH IS SOCIAL CAPITAL WORTH?

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ABSTRACT

This paper uses data from global and Canadian surveys data to estimate the powerful linkages between social connections, their related social identities, and subjective well-being. Our explanatory variables include several measures of the extent and frequency of use of social networks, combined with a number of measures of general and domain-specific trust, which are often used to gauge effective social capital. Using these measures we find that trust and social network size and use are all strong predictors of subjective well-being. We demonstrate the size and impact of these effects by calculating compensating differentials, measured as the changes in household income that would produce equivalent levels of life satisfaction.

We introduce three key measures of social identity – the respondents' sense of belonging to their communities, province and country – and find that they add significantly to the explanation of life satisfaction among Canadian respondents, and provide important mediating channels whereby social capital is linked to subjective well-being.

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An online appendix is available at:
http://www.nber.org/data-appendix/w16025

Introduction

In this paper we use large-sample global and Canadian survey data to reveal the powerful effects that social connections and related social identities have on subjective well-being. Our evidence is based on several measures of the extent and frequency of use of social networks, combined with a number of measures of general and domain-specific trust, which are often used to gauge effective social capital. Using these measures we find that trust and social network size and use are all strong predictors of subjective well-being and we demonstrate the size and impact of these effects, by calculating their value in terms of income changes that would produce equivalent levels of life satisfaction.

We introduce three key measures of social identity – the respondents' sense of belonging to their communities, province and country – and find that they add significantly to the explanation of life satisfaction among Canadian respondents, and provide important mediating channels whereby social capital is linked to subjective well-being.

How can the social context be valued?

Our conceptualisation of 'social capital', consistent with that of Putnam (2000), is based on the OECD's definition (2001, p.41) as "networks together with shared norms, values and understandings that facilitate co-operation within or among groups". Can the importance of social capital be assessed comparably with income support, housing quality, prescription drugs and other means used by individuals, families and policy-makers to improve the well-being of themselves and others? In epidemiology, the currency of choice has been human lives, with the benefits of medical and social interventions measured in terms of lives saved. Mortality estimates are now frequently supplemented by measures of morbidity, sometimes weighting different sorts of frailty to construct measures of healthy life expectancy. Classic applications of the health-based method to value the social context (e.g. Berkman & Syme 1979) measured the value of more extensive and happier social relations in terms of longer and healthier lives. An even earlier example is provided by Durkheim's (1897, 1952) magisterial analysis, in

which suicide was seen as the consequence of hopelessness felt in the face of perceived failures of social relations (Williams, 2001). In the same vein, Helliwell (2007) found that international differences in average social trust had large and significant effects in explaining international differences in both suicides and traffic fatalities.

Linking the social context to mortality and morbidity in these ways remains central to policy evaluation, and deservedly so. Even if the broader objective of the caring professions, and of public policy in general, is to improve the quality of human lives along many dimensions, it will probably always be the case that primary importance is placed on saving lives and restoring health. A life that has been lost cannot be made better, and all of the subjective life evaluations that provide the main evidence reported in this paper show strong linkages to subjective and objective measures of health status. Thus, the traditional measures of better health are not only important in their own right but are important predictors of self-assessed well-being.

However, to assess the overall consequences of the social context requires a broader framework in which good health and other aspects of a good life can be brought together, and their values compared. Many have adopted an a priori approach to such an evaluation. For example, Maslow (1943) argued for a hierarchy of human needs. His pyramidal structure focussed first on basic needs and then on 'higher order' needs, including those for social companionship. But even if one can measure how well needs and desires at different levels are being met, how are we to compare changes in the degree to which different needs are being met, whether they be at the same or different levels?

Alternatively, Sen (1999) treats capabilities as the fundamental bedrock of human development, represented by some basic set of freedoms from hunger, illness and fear, and supported by enough education to enable personal and social progress. Yet this also leaves the valuation issue unsolved, as policy-makers still need guidance as to the relative values of improving capabilities at different times, and in different contexts.

Utilitarians over several centuries, inspired by Bentham and Mill, among many others, have tackled the valuation issue by presuming some underlying if not-directly-measurable concept of *utility*. Bentham proposed operationalizing utility in terms of a form of hedonic calculus. By this means a balance of pleasure and pain, measured continually and then aggregated through time, would be used to assess each person's experienced utility. In the intervening centuries, many social scientists, and especially economists, have taken a different tack. Assuming that utility could not be directly measured, they instead studied human decisions — believing that these could be used to reveal some features of the underlying utility functions. For example, economists since Adam Smith have used the wages for different jobs (after adjusting as well as possible for differences in skills) to estimate the dis-utility of unpleasant or dangerous jobs, in the process estimating what have been often called 'compensating differentials'. In the literature, compensating differentials are the wage differences required to offset good or bad characteristics of a job. As will be seen shortly, the same term is now used in the well-being literature to place an income-related value on various features of the social context.

Beyond the indirect revealed preference approach long favoured by economists, Kahneman and colleagues (Kahneman 1999; Kahneman, Wakker & Sarin, 1997) have argued for a more direct application of Bentham's hedonic calculus. More precisely, they take the sum of the experienced balance of pain and pleasure to be the underlying measure of utility. Because of the invasiveness and costs of continual monitoring, they have recommended periodic sampling involving relatively short-term memories of moods and emotions[1]. The distinction between experienced and remembered utility has been given especial importance by Kahneman's research. For example, this research shows that the average of moment-by-moment assessments of the painfulness of a colonoscopy is not the same as the remembered pain of the procedure, with the latter best modelled as the average of the peak and final moments of pain (Redelmeier, Katz, & Kahneman 2003). Similarly, Wirtz, Kruger, Scollon and Diener (2003) found that moment-by-

[1] Kahneman and Krueger (2006) compare experience sampling and their proposed Daily Reconstruction Method, and discuss their proposed Benthamite U-index, a measure of the preponderance of unpleasant emotions over the previous day.

moment assessments of mid-term break holidays did not closely match the overall memories of the holiday experience. Kahneman has tended to follow Bentham explicitly, and argued that moment-by-moment measures are direct measures of utility and that remembered measures embody cognitive errors (Kahneman & Riis 2005). Others (including us) argue that the differences between experiences and the memories of them are not errors, but are instead of basic importance. Consistent with this claim, remembered experiences have been found to govern subsequent decisions about holidays and medical procedures, and to represent the long-lasting residual effect underpinning life evaluations. In any event, reports of moods can be used as additional direct measures of utility, and provide an alternative basis for valuing the social context. Our evidence suggests, however, that life circumstances, including income and key elements of social capital, have much more precisely estimated effects on life evaluations than on either current or average moods.

A long time before the utilitarians, however, Aristole and others made a case for remembered life evaluations, arguing that ethics "gets its grip on the individual at this point of reflection: am I satisfied with my life as a whole, and the way it has developed and promises to develop?" (Annas 1993, p.28). Aristotle himself argued that the good life followed a middle course between the Stoics, who put their whole emphasis on the virtuous life, and the Epicureans, who emphasized the importance of pleasures, including the avoidance of pain (Annas 1993, p.336). But he was also an early advocate for empirical work on just these issues, and for taking his view of a good life "to the test of the facts of life, and if it harmonizes with the facts we must accept it, but if it clashes with them we must suppose it to be mere theory" (Nicomachean Ethics, Book 10, 1179, pp.20-23.)

How should we choose between using the Benthamite U-index (Kahneman & Krueger, 2006) or an Aristotelian life evaluation to provide the raw materials for valuing social capital? There are three main distinctions between the U-index and measures of life satisfaction. First, the U-index is based on moods, which are inherently more changeable during the course of a day and are less tightly linked to changes in life

circumstances. Second, the U-index measures the fraction of a day during which bad emotions predominated over good ones, with no further account taken of the strength of the positive or negative feelings. Third, even though both are based on memory rather than current experience, the Daily Reconstruction Method (DRM) underlying the U-index directs and frames recollections in the context of a time-use survey. It therefore provides more information about how specific daily activities (e.g., commuting alone or in company) affect moods during the day.

Life satisfaction questions, by contrast, ask about 'life as a whole these days'. It is clear, however, that even these broader assessments are responsive to changes in current circumstances and other mood-affecting patterns of daily life. Thus the U-index and measures of life satisfaction are both found to be correlated with many of the same variables. The two types of data are both useful, but for different purposes, with the former being most appropriate for unravelling the fabric of daily life and the latter for the evaluation of broader and more enduring life circumstances. Thus, as their respective proponents argue, the former can more easily be seen as an application of Bentham's hedonic calculus, and the latter as being truer to Aristotle's advice for evaluating the quality of life as a whole.

It is also worth noting that life satisfaction evaluations provide evidence supporting Sen's emphasis on capabilities, and Maslow's hierarchy of needs. For example, good health, freedom from hunger, and freedom to make one's own life choices all rank very high as determinants of life satisfaction, and education appears to play a strong mediating role by facilitating better jobs and incomes, better health, and greater trust and social engagement.

Two other practical reasons argue for using life satisfaction, or some similar form of life evaluation (rather than some measure of affect, such as the U-index) as a guide to measuring the value of social capital. The first is that measures of life satisfaction are easier to collect, and have been monitored much more widely, more comparably, and over longer time periods. The second and more fundamental reason is that because

measures of life satisfaction are more clearly responsive to basic life circumstances (including both income and the quality of social capital) they provide the basis for much more reliable estimates of the value of social capital.

Using Life Satisfaction Data to Value International Differences in Social Capital

In the studies that follow, the basic method used to value social capital involves using large samples of individual measures of life satisfaction (usually ordered responses on a 1 to10 or 0 to 10 scale) as dependent variables in an estimated utility function for an average individual. In the most general form, we use two-level analysis in which individual utility depends on a set of individual-level circumstances and assessments, plus the same and/or other variables measured to reflect the characteristics of the community or country in which the individual lives. The basic estimation form for two-level analysis of the ordered life satisfaction responses is:

$$(1)\ LS_{ij} = \alpha + \delta \ln\left(y_{ij}\right) + \mu X_{ij} + \gamma Z_j + \varepsilon_{ij},$$

where LS_{ij} is some measure of life satisfaction, for respondent i in community or country j, y_{ij} is the level of household income of the respondent, the X_{ij} are other individual or household-level variables, and the Z_j are community, state, or national-level variables, with the same value being used for all individual observations in geographic area j. We use the log form for both household and national average income since most recent evidence suggests, to a first approximation, that life satisfaction rises linearly with the logarithm, and not the level, of household income (e.g., Deaton 2008; Helliwell & Huang, 2010; Helliwell, Barrington-Leigh, Harris & Huang, 2010). In some surveys (Helliwell & Putnam, 2004), there is also evidence of an additional tailing off of marginal life satisfaction effects of income at high-income levels, although this is not evident in all surveys. Perhaps this finding reflects the fact that many surveys do not divide income categories finely enough, or do not have large enough samples at the top end of the income distribution. Where there are both individual and societal-level observations on the same social capital variable, the γ coefficients on the societal variables represent

contextual effects, or, in other words, the extent of externalities. These contextual effects could be either positive or negative. In the case of income, the effects of higher neighbourhood average income are usually negative, and often significantly so (Luttmer 2005; Helliwell & Huang 2010; Barrington-Leigh & Helliwell, 2008). In the case of social capital variables, the external effects are more generally positive (Helliwell & Putnam, 2004).

Figure 1: Compensating differentials at individual and national levels

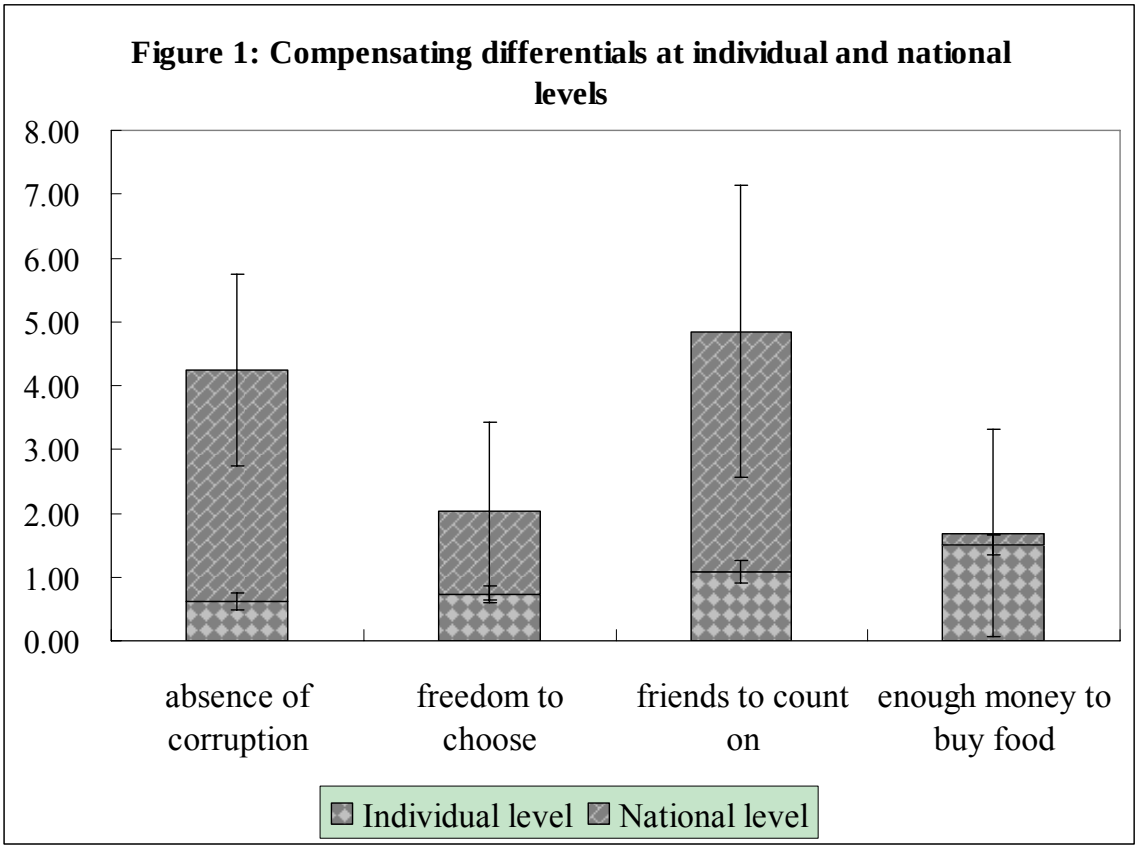


Figure 1 shows some example estimates of the value of social capital, based on two-level analysis of a global sample of life evaluation data from three waves (between 2006 and 2008) of the Gallup World Poll. The coefficients underlying the compensating differentials of Figure 1 are drawn from column 1 of Table 1 of Helliwell, Barrington-Leigh, Harris and Huang (2010). That paper includes comparable estimates for equations using three different life evaluations, each on a scale of zero to ten: satisfaction with life, the Cantril self-anchoring striving scale, also known as the ladder of life, and a simple average of each individual's answers to both questions. The Cantril form of life

evaluation asks respondents to "Please imagine a ladder with steps numbered zero at the bottom to ten at the top. Suppose we say that the top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?" The satisfaction with life question (SWL) was: "All things considered, how satisfied are you with life as a whole these days?" (using the same 0 to 10 score; for more details of these measures see the appendix to Helliwell and Barrington-Leigh (2010)).

Earlier analysis comparing the first wave of Gallup ladder data with earlier World Values Survey data for life satisfaction showed quite differently shaped distributions, with the ladder data having lower means, smaller right-hand shoulders, and more mass at the mid-points than was the case for the World Values Survey data for life satisfaction (Helliwell, 2008). There was also some evidence that the effects of income were greater on the ladder measure. These differences led to the addition of the life satisfaction question to the Gallup World Poll, and to experimental studies designed to see if the framing of the life satisfaction question could lead to differences in the patterns of responses (Gleibs, Haslam, Morton, Rabinovich, & Helliwell, 2010). These experiments showed that increasing the salience of material aspects of life tended to produce subsequent subjective life evaluations that in turn revealed higher correlations with the respondents' actual incomes.

This demonstrated potential sensitivity of coefficients to priming effects made it especially valuable to have matched data for both life satisfaction and the Cantril scale. Fortunately for our attempts to value the social context in terms of income, we found very similar coefficients using all three dependent variables, thus giving almost identical estimates of compensating differentials (Helliwell et al., 2010). This is quite remarkable, because the distributions of the Cantril scale and the SWL continue to show significant differences of the sort noted earlier: the national means of the Cantril scale average about 0.5 points lower than those for life satisfaction, with the difference taking the form of a fuller right-hand shoulder in the life satisfaction distribution. It is encouraging to note that these differences do not lead to conflicting stories from well-being equations estimated

from the two different distributions. Indeed, we found that by averaging the two measures we increased the signal-to-noise ratio, as revealed by a significantly higher explained share of total variance. The resulting R^2 of 0.44 is very high for any cross-sectional equation for individual-level measures of subjective well-being, especially an equation that has relatively few structural parameters and no country or region fixed effects. Adding region or country fixed effects raises the explained variance even further, but does not alter the coefficients. Taken together, these results suggest that international differences in average values of subjective well-being reflect common responses to international differences in the economic and social life circumstances, rather than to differences in the way people evaluate their lives (as argued by Diener, Helliwell, & Kahneman, 2010). This, coupled with the statistical strength of the key coefficients, helps to provide greater confidence in our estimates of the value of social capital.

We estimate the value of social capital as the ratio of the social capital coefficient to that of income. Following the notation of equation (1), the value of some social capital variable X is $\Delta = \mu/ \delta$, where Δ represents the log change in income that would have for the average respondent the same life satisfaction effect as a change in some measure of non-financial life characteristic, X. These ratios or coefficients are referred to as compensating differentials, since they show how much income could fall and still leave life satisfaction unchanged if there were some improvement in the social context, or vice versa.

To calculate reliable estimates using this method obviously requires secure and reasonably independent estimates of the life satisfaction effects of an individual's social circumstances and also of income, since the compensating differential is based on the ratio of the sizes of the two effects. If individual- and societal-level effects are estimated simultaneously, then the error ranges of the two effects can be separately computed. The individual-level effects of social capital are often estimated much more precisely than are the contextual or the societal, in large part because the number of independent observations is invariably much smaller for the contextual effects.

Another important robustness check is to relax the assumption that coefficients are the same in all countries, and to estimate separate well-being equations for each country. Since the sample sizes are now much smaller, and since the social and political contexts shaping well-being differ among nations in many more ways than can be captured by the limited set of explanatory variables, the distributions of national coefficients are quite spread out, as observed by Helliwell et al. (2010). That study shows that the means of the country distributions are almost exactly equal to the global coefficients, once more providing support for the use of the global coefficients for the individual-level effects.

Figure 1 shows estimates of compensating differentials for several of the Gallup variables with some connection to social capital. These are based on common global coefficients estimated using two-level modelling of the global sample of individual data. The lower part of each bar shows the individual-level effects, and the vertical line shows the range covered by plus and minus one standard error. The individual-level effects are thus all highly significant. Consider, for example, the 'count on friends' variable. Each individual has been assigned the value 1.0 for this variable (and zero otherwise) if they answered 'yes' to the following question: 'If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them, or not?'. To be able to answer yes to that question has the same subjective well-being effect as a 1.08 change in the log of household income, which corresponds to almost a trebling of household income. The effects would probably be even larger, and would be more precisely estimated, if a more graduated range of answers had been available. This is especially the case for this variable, because of the very large number of 'yes' respondents, who thereby comprise a group too large to have supporting social networks of equivalent quality. For example, almost 82% of global respondents answered 'yes', and this percentage rises to 92% among respondents living in the industrial countries. Since other research has shown that the size and characteristics of one's social networks have important dose-response linkages to subjective well-being, there is obviously significant explanatory power lost by not taking into account the large differences that must exist among the 'yes' respondents,

all of whom are currently assumed to have equally supporting and engaging social networks.

The upper part of each bar shows the estimated size of the national-level effect, once again accompanied by a vertical line covering the 95% confidence region. As noted earlier, the national-level contextual effects for social capital are generally positive. The contextual effects are in some cases significantly positive, although they are always much less precisely estimated than the individual-level effects. Thus to live in a country where others have family and friends to count on has positive well-being effects above and beyond those that result from having one's own supporting network. These spill-over effects from social networks are large, even if not very precisely estimated. For example, to live in a country having an Irish level of having friends to count on (97.5%) compared to France (at 93.9%) would have an income-equivalent value of about .175 of log income, about equal to 20% of one's income, with one-fifth of this 20% due to the average individual effect, and the rest arising from the national-level effect.

Comparing countries much further apart in the international spectrum provides correspondingly larger estimates. If we order the countries in the first three waves of the Gallup Poll in terms of the average percentage of a population having family or friends to count on, the top ten average just over 96%, and the bottom ten just below 50%. The income-equivalent value of this difference is 2.23 (=.46*(1.08+3.77)), or more than a nine-fold increase in per capita incomes. Put another way, the lack of this type of social capital accounts for a difference of almost a full point (0.95) on the 10-point scale of the Cantril ladder. But this is by no means the whole story, as the total life evaluation gap between these two groups of countries is more than 2.7 points, of which about 1.5 points is explained by their almost 25-fold difference in average per capita incomes. Thus, even though the support of friends is of critical importance, and has huge income-equivalent values, if we look across countries the differences in average incomes are even greater than the differences in the strength of social networks. As we shall now show, this situation is reversed when we turn to consider differences in incomes, social capital, and well-being within countries.

Valuing social capital differences within countries

In this section we use data from the 17th cycle (2003) of the Canadian General Social Survey (GSS) to value social capital. This survey is especially appropriate for this valuation, since it was designed to measure the extent and quality of social capital. Even without this larger range of social variables, we find that social factors explain a larger proportion of the total variance when the sample is within an industrial nation, since basic wants are largely satisfied.

Table 1: *Weighted OLS regressions for satisfaction with life*

	(1)	(2)	(3)	(4)
Household income (ln)	0.13***	0.12***	0.13***	0.13***
	[9.3]	[8.8]	[9.7]	[9.3]
Social trust	0.028**	0.014	0.013	0.004
	[2.4]	[1.17]	[1.16]	[0.35]
Trust neighbour to return wallet	0.072***	0.059***	0.040***	0.034***
	[6.2]	[5.1]	[3.4]	[2.9]
Trust colleagues	0.25***	0.23***	0.22***	0.20***
	[13.3]	[11.9]	[11.8]	[10.8]
See family (ln)		0.054***		0.033*
		[2.9]		[1.78]
See friends (ln)		0.073***		0.050***
		[4.6]		[3.3]
Have close friends (ln)		0.045***		0.034***
		[3.4]		[2.6]
Have close family (ln)		0.099***		0.079***
		[8.2]		[6.7]
Have other friends (ln)		0.024*		0.012
		[1.87]		[0.97]
Belong in community			0.17***	0.15***
			[13.6]	[11.9]
Belong in Province			0.063***	0.059***
			[4.9]	[4.6]
Belong in Country			0.074***	0.071***
R^2	0.11	0.13	0.16	0.17

Note: * $p < .1$; ** $p < .05$; , *** $< .01$.

Standardized beta coefficients and, in square brackets, *t*-statistics, are shown.

Detailed results and definitions of variables are in the online appendix.

Table 1 shows the standardized betas from several equations explaining cross-sectional differences in life satisfaction among the sample of more than 11,000 respondents for whom the full set of variables is available. From this it can be seen that several different measures of the extent, quality and frequency of use of social capital are significantly correlated with life satisfaction, as are key measures of social identity, especially those relating to the respondent's sense of belonging to his or her local community, province and country. Four equations are modelled in the table, with the most basic (i.e., 1) on the left and the most complete (4) on the right. The first two equations do not include the social identity variables, while the third and fourth do. The first and third equations do not include variables measuring the size and intensity of use of social networks, while the second and fourth do. Thus it is possible to see the effects of adding social identity and social connections, separately and together.

All of the equations include three measures of trust; a general measure of social trust, assessments of the likelihood of a lost money-bearing wallet being returned intact if found by a neighbour, and a measure of the respondent's trust in his or her workplace colleagues. As analyzed in more detail in Helliwell and Wang (2010), all three trust measures are significantly correlated with life satisfaction, with trust in colleagues and in neighbours remaining robustly significant even when the mediating effect of social identity is taken into account, as in the third and fourth equations. The partial SWL correlation of the social trust measure tends to fall with the addition of direct measures of domain trust (as shown earlier in Helliwell & Putnam 2004), and with the addition of specific measures of social capital and social identity, as shown by the changes in the social trust coefficient when moving from the left to right across the table. Trust in colleagues has the largest explanatory role, with a standardized beta exceeding that for the other two measures combined, and equal to that for income.

The third and fourth equations of Table 1 present our first results attempting to measure some direct and indirect effects of social identity on life satisfaction. At this

correlational level, we find significant evidence that those who feel a strong sense of belonging are significantly more satisfied with their lives. The sense of belonging to one's local community is especially important, with a beta value slightly exceeding that for income. Thus, if we are seeking to explain the variance across individual respondents to the 2003 Canadian General Social Survey, even more is explained by differences in community-level social identity than by differences in income. Feelings of belonging to country and province are also significant supports for life satisfaction, with the former more important than the latter (except in Quebec); together they explain a slightly smaller share of the variance than does the community-level social identity.

Local social identity appears to mediate about half of the life satisfaction effects of the neighbourhood trust variable, as the beta coefficient on the latter variable drops in half when the community belonging variable is added. Hence, the life satisfaction effects of believing that your neighbours would make the effort to return your lost valuables flow substantially through their support for a greater sense of community belonging, as will be shown later in the three parts of Figure 2.

We can also use our results to check for parallels with the findings of Haslam, O'Brien, Jetten, Vormedal and Penna (2005) relating to interactions between social support and social identity. In their regressions, social support and social identity were both strongly predictive of life satisfaction, when entered on their own. The authors then hypothesized that the positive effects of social identity on life satisfaction would be mediated through social support, implying that the estimated effects of social identity on life satisfaction would be significantly less when social support was added to the equation, but not vice versa. Their results supported the hypothesis.

Our results, shown in Table 1, show less of this sort of mediation, and consequentially greater independent roles for both social identity and social support. The estimated coefficients on social support (as measured by the number and frequency of contacts with family and friends) fall when social identity (focussing on the key community belonging variable) is introduced, and vice versa. But the drop is greater for

social support (when social identity is introduced, comparing Equation 4 with Equation 2) than for social identity (when social support is introduced, comparing Equation 4 with Equation 3). To obtain a closer replication of their tests, we could construct aggregated measures to represent our social support and social identity variables, something lying beyond our current exploratory analysis. As they stand, though, our data seem to admit independent roles for both social identity (especially at the community level) and social support (as measured by the existence and use of larger support networks of family and friends) as simultaneously significant correlates of life satisfaction.

The life satisfaction results in Table 1 also illustrate the claim made earlier, that social variables are more important than economic differences when explaining life satisfaction differences among respondents living within Canada. For example, the combined social identity variables explain twice as much variance as does income; the trust variables explain more than income, and the social network variables are of roughly similar size. This calculation is based on Equation 4, in which all variables are entered simultaneously, so that it is appropriate to add up the standardized betas to a total that is several times as large as that for income. Also noteworthy is the lack of conflict among local, provincial and national identities. Each appears to add to life satisfaction without detracting from the positive effects of the other sorts of belonging. To test this, we defined a variable summing the belonging variables for each individual, and found a slight but nonetheless positive effect. Thus, the benefits of belonging to one's local community do not appear to depend on being less attached to the larger encompassing communities. For any given feeling of belonging at one level, life satisfaction is higher among those who also feel they belong to both more and less encompassing social identities.

Because we found fairly robust correlations between life satisfaction and three different social identities of different but overlapping ambits, we then became curious about what factors might underlie the ways in which individuals identify with their communities, their provinces, and with Canada as a whole. We have therefore done some exploratory analysis using individual and census-tract variables to explain differences

among individuals in their sense of belonging in their communities, their provinces, and in Canada as a whole. The main results are shown in Figures 2, 3 and 4, and the regression details shown in Table 2 of the online Appendix. All three figures compare the coefficients for each of the three types of social identity. Figure 2 shows the effects of different types of trust, Figure 3 shows the effects for different types of social connections, while Figure 4 contains variables showing that social identities take time to grow. These effects are drawn from equations that include all variables simultaneously, so that they are competing for explanatory power.

The factors explaining the three types of belonging are quite different, in ways that tend to support the validity of all three measures. In particular, community-level belonging, as shown in the first equation, is highly dependent on other local variables, especially neighbourhood trust, social connections with family and friends, and length of time spent in the neighbourhood. A sense of belonging to one's province is higher among francophones, while belonging to Canada is much lower. People who live in the province of their birth identify more with their province, and less with Canada as a whole, than do those who have lived in more than one part of Canada. Immigrants identify significantly more with their local community and province, and less with Canada as a whole, than do those born in Canada. However, all of the immigrant-related effects tend to disappear with increases in the number of years that the immigrant has lived in Canada.

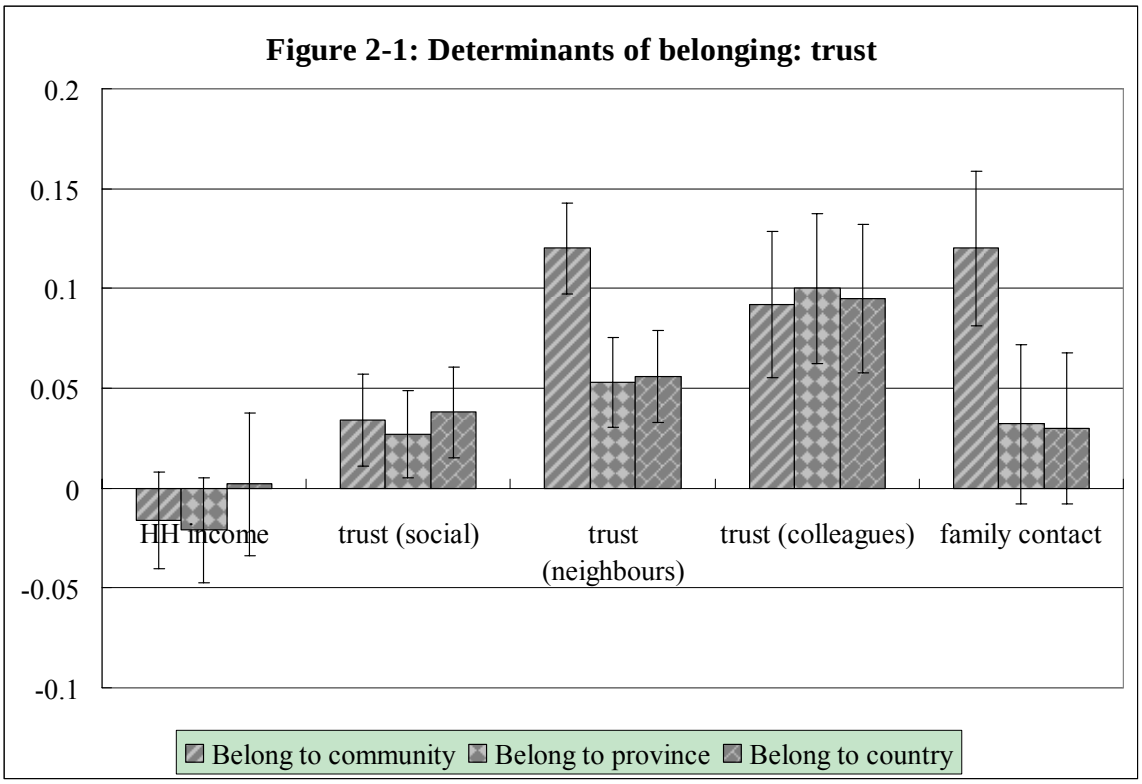


Figure 2-1: Determinants of belonging: trust
0.2
0.15
0.1
0.05
0
-0.05
-0.1
HH income
trust (social)
trust (neighbours)
trust (colleagues)
family contact
Belong to community
Belong to province
Belong to country

Figure 2-2: Determinants of belonging: social connections

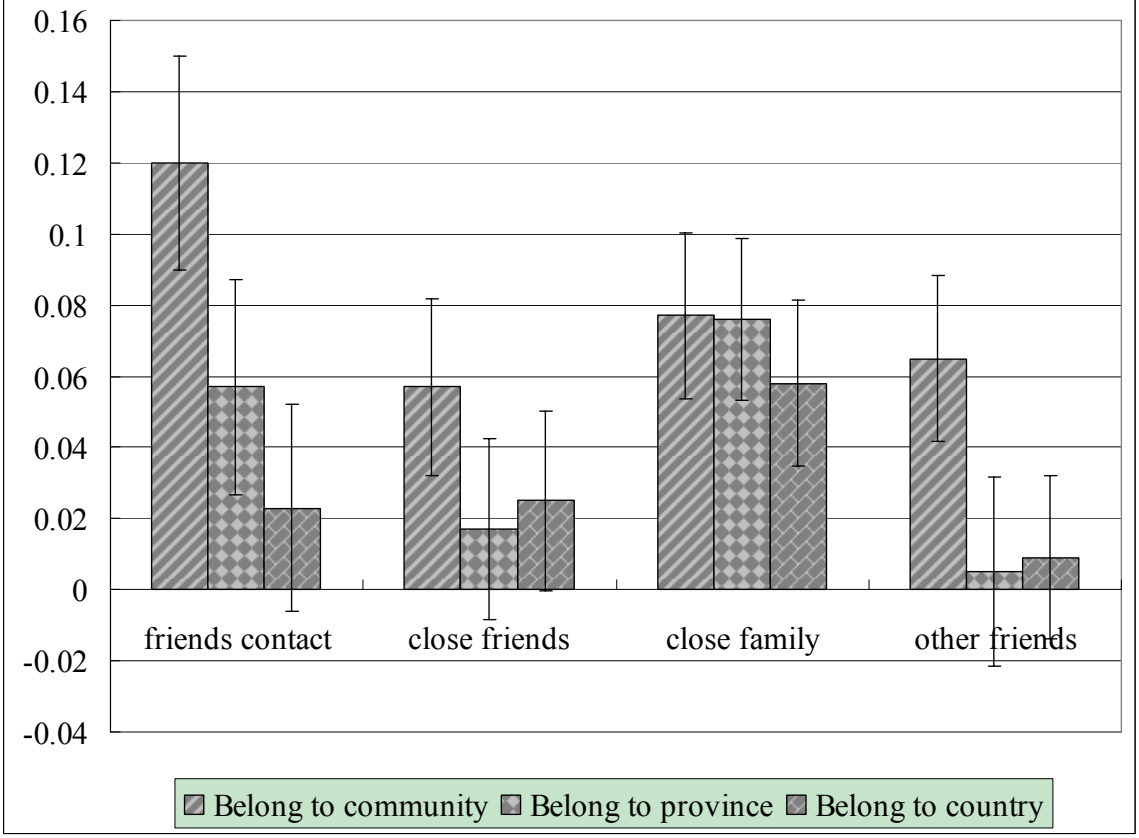
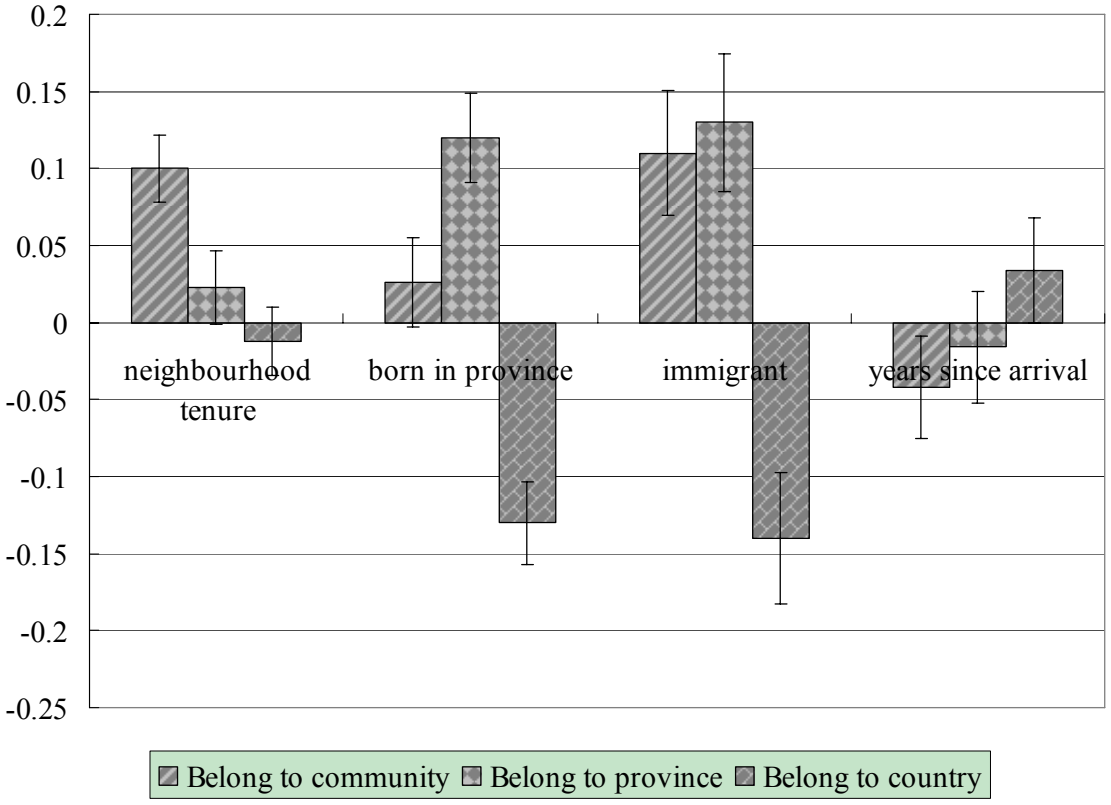


Figure 2-3: Belonging takes time to develop



Conclusion

Our global and national results both attach high values to several aspects of the social context. Our respondents report significantly higher life satisfaction when they have strong social networks, when they make more frequent use of these supportive networks, when they trust those among whom they live and work, and when they feel a sense of belonging in their communities. Our results are derived from individually-based cross-sectional survey data, making it difficult or impossible to derive strict causal interpretations. The economic and social circumstances we have alleged to increase life satisfaction may indeed do so. But there is also the very real possibility that those who are more satisfied with their lives will also reach out to others, form more robust social networks, and be more successful in their economic and social lives.

Because these positive two-way linkages are plausible for both economic and social variables, one can perhaps examine more reliably the relative sizes of economic and social influences. As we have shown, this can be done if both income and social factors are apparently important supports for life satisfaction. If they are, as we found for both the Gallup World Poll data and the data from the Canadian General Social Survey, it is possible to measure the importance of social capital in income-equivalent terms, as we did for the Gallup data, and to compare the overall explanatory power of income and social capital, as we have done using the Canadian data. In both cases we found large values for several different measures of the extent and nature of social engagement and social identity. Our results seem to us to support and encourage a variety of experimental interventions, since only in such an environment can causality and policy relevance be firmly established.

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Online appendix to:

How Much Is Social Capital Worth?

John F. Helliwell and Chris Barrington-Leigh

Appendix Table 1: Weighted OLS Regressions for Satisfaction with Life

	(1)	(2)	(3)	(4)
Household income (ln)	0.13***	0.12***	0.13***	0.13***
	[9.3]	[8.8]	[9.7]	[9.3]
Age/100	-1.02***	-0.89***	-0.99***	-0.90***
	[15.5]	[13.7]	[15.6]	[14.2]
(Age/100)^2	0.93***	0.83***	0.88***	0.81***
	[14.0]	[12.6]	[13.6]	[12.6]
Male	-0.051***	-0.048***	-0.048***	-0.045***
	[4.7]	[4.4]	[4.5]	[4.2]
Married	0.14***	0.14***	0.12***	0.13***
	[8.9]	[9.0]	[8.2]	[8.3]
Common law	0.037***	0.043***	0.037***	0.042***
	[3.2]	[3.8]	[3.3]	[3.8]
Separated/divorced/widowed	-0.033***	-0.035***	-0.036***	-0.037***
	[2.6]	[2.8]	[2.9]	[3.0]
High school	0.02	0.023	0.023	0.024
	[1.28]	[1.47]	[1.49]	[1.60]
Post-secondary	-0.0004	-0.0003	0.014	0.012
	[0.022]	[0.014]	[0.77]	[0.66]
University	-0.02	-0.025	-0.004	-0.01
	[1.17]	[1.43]	[0.23]	[0.57]
Social trust	0.028**	0.014	0.013	0.004
	[2.4]	[1.17]	[1.16]	[.35]
Trust neighbour to return wallet	0.072***	0.059***	0.040***	0.034***
	[6.2]	[5.1]	[3.4]	[2.9]
Trust colleagues	0.25***	0.23***	0.22***	0.20***
	[13.3]	[11.9]	[11.8]	[10.8]
No colleagues	0.14***	0.12***	0.11***	0.10***
	[6.1]	[5.3]	[5.0]	[4.5]
See family (ln)		0.054***		0.033*
		[2.9]		[1.78]
Any family contact		-0.026		-0.012
		[1.32]		[0.61]
See friends (ln)		0.073***		0.050***
		[4.6]		[3.3]
Any friends contact		-0.019		-0.013

		[1.17]		[.86]
Have close friends (ln)		0.045***		0.034***
		[3.4]		[2.6]
Have close family (ln)		0.099***		0.079***
		[8.2]		[6.7]
Have other friends (ln)		0.024*		0.012
		[1.87]		[0.97]
Neighbourhood tenure (ln)	0.020*	0.015	-0.0001	-0.0004
	[1.79]	[1.42]	[.009]	[.038]
Francophone	0.067***	0.095***	0.075***	0.095***
	[5.9]	[8.3]	[6.5]	[8.3]
Born in province	0.007	-0.001	0.003	-0.003
	[0.52]	[0.087]	[0.20]	[0.23]
Immigrant	-0.035	-0.016	-0.046**	-0.029
	[1.48]	[0.68]	[2.0]	[1.29]
Belong in community			0.17***	0.15***
			[13.6]	[11.9]
Belong in province			0.063***	0.059***
			[4.9]	[4.6]
Belong in country			0.074***	0.071***
			[6.1]	[5.9]
Years since arrival	-0.002	-0.012	0.0002	-0.008
	[0.10]	[0.59]	[0.012]	[0.40]
CT fraction immigrants	-0.01	-0.004	-0.011	-0.007
	[0.72]	[0.28]	[0.87]	[0.54]
CT fraction movers	0.005	0.003	-0.0007	-0.002
	[0.44]	[0.24]	[0.063]	[0.18]
constant	2e-16	2e-16	2e-16	2e-16
	[2e-14]	[2e-14]	[2e-14]	[2e-14]
Number of observations	11137	11137	11137	11137
R squared	0.11	0.13	0.16	0.17
Number of clusters	3931	3931	3931	3931

Notes: The asterisks *, **, and *** mark significance at 10%, 5% and 1%. Standardized beta coefficients and, in square brackets, t-statistics, are shown. Detailed definitions of variables and coefficients on other variables are in the appendix table 3. Highlighted rows are shown in figures in the main text of the paper.

Appendix Table 2: Weighted OLS Regressions for Expressions of Geographic Belonging

	Belong in community	Belong in province	Belong in country
Household income (ln)	-0.016	-0.021	0.002
	[1.30]	[1.56]	[.11]
Age/100	-0.075	0.17***	0.20***
	[1.21]	[2.6]	[3.3]
(Age/100)^2	0.15***	0.022	-0.057
	[2.6]	[0.36]	[0.98]
Male	-0.028***	0.021*	0.004
	[2.7]	[1.94]	[0.40]
Married	0.081***	0.021	0.026
	[4.9]	[1.27]	[1.64]
Common law	0.009	0.017	-0.006
	[0.72]	[1.33]	[0.45]
Separated/divorced/ widowed	0.005	0.014	0.014
	[.38]	[1.10]	[1.24]
High school	-0.014	-0.0002	0.004
	[1.00]	[0.013]	[0.25]
Post-secondary	-0.062***	-0.031*	-0.023
	[3.9]	[1.84]	[1.33]
University	-0.060***	-0.077***	-0.036**
	[3.7]	[4.4]	[2.1]
Social trust	0.034***	0.027**	0.038***
	[2.9]	[2.4]	[3.3]
Trust neighbour to return wallet	0.12***	0.053***	0.056***
	[10.4]	[4.6]	[4.8]
Trust colleagues	0.092***	0.10***	0.095***
	[4.9]	[5.2]	[5.0]
No colleagues	0.081***	0.075***	0.089***
	[4.0]	[3.5]	[4.3]
See family (ln)	0.12***	0.032	0.03
	[6.1]	[1.57]	[1.56]
Any family contact	-0.083***	-0.018	-0.035*
	[4.2]	[.86]	[1.78]

See friends (ln)	0.12***	0.057***	0.023
	[7.8]	[3.7]	[1.55]
Any friends contact	-0.023	-0.009	-0.012
	[1.58]	[0.61]	[0.86]
Have close friends (ln)	0.057***	0.017	0.025*
	[4.5]	[1.31]	[1.94]
Have close family (ln)	0.077***	0.076***	0.058***
	[6.5]	[6.5]	[4.9]
Have other friends (ln)	.065***	0.005	0.009
	[5.5]	[0.37]	[0.77]
Neighbourhood tenure (ln)	0.10***	0.023*	-0.012
	[9.1]	[1.90]	[1.06]
Francophone	0.062***	0.10***	-0.22***
	[5.1]	[8.3]	[16.4]
Born in province	0.026*	0.12***	-0.13***
	[1.76]	[8.1]	[9.5]
Immigrant	0.11***	0.13***	-0.14***
	[5.3]	[5.7]	[6.4]
Years since arrival	-0.042**	-0.016	0.034*
	[2.5]	[.87]	[1.95]
CT fraction immigrants	0.012	-0.009	0.028**
	[0.97]	[0.66]	[2.3]
CT fraction movers	0.007	0.037***	0.020*
	[.63]	[3.1]	[1.73]
constant	-3e-16	-1e-16	1e-15
	[3e-14]	[1e-14]	[1e-13]
Number of observations	11338	11338	11338
R squared	0.12	0.08	0.13
Number of clusters	3957	3957	3957

Notes: The asterisks *, **, and *** mark significance at 10%, 5% and 1%. Standardized beta coefficients and, in square brackets, t-statistics, are shown. Detailed definitions of variables and coefficients on other variables are in the appendix table 3.

Appendix Table 3: Variable Descriptions

Variable	Explanation
SWL	"How do you feel about your life as a whole right now?" (1-10 scale denotes "very dissatisfied" to "very satisfied")
Household income (ln)	Natural log of self-reported household income
Age, (Age/100)^2	age in years, scaled/squared
Male	1=Male
Married	1=Married
Common law	Living Common law
Separated/divorced/ widowed	separated, divorced, or widowed
High school	Educational attainment: High school diploma
Post-secondary	Educational attainment: some post-secondary
University	Educational attainment: completed university degree
Social trust	"Generally speaking, would you say that most people can be trusted or that you cannot be too careful in dealing with people?" 1="People can be trusted"; 0="Cannot be too careful in dealing with people"
Trust neighbour to return wallet	"If you lost a wallet or purse that contained two hundred dollars, how likely is it to be returned with the money in it if it was found: by someone who lives close by?" (Scaled to [0, 1])
Trust colleagues	Using a scale of 1 to 5 where 1 means "Cannot be trusted at all" and 5 means "Can be trusted a lot", how much do you trust each of the following groups of people: people you work with or go to school with? (rescaled to cover the range between 0 and1)
No colleagues	respondent not asked "Trust colleagues" question
See family (ln)	natural log of frequency at which the respondent saw relatives (outside of people s/he lived with) during previous month, or 0 if the answer was none
Any family contact	indicator to denote whether the frequency was greater than 0
See friends (ln)	natural log of frequency at which the respondent saw friends during previous month, or 0 if the answer was none
Any friends contact	indicator to denote whether the frequency was greater than 0
Have close friends (ln)	Natural log of number of close friends, that is, people who are not respondent's relatives, but who respondent feels at ease with, can talk to about what is on his/her mind, or call on for help (or 0 if none).
Have close family (ln)	Natural log of number of relatives to whom respondent feels close to, that is, at ease with, able to talk to about what is on his/her mind, or call on for help (or 0 if none).
Have other friends (ln)	Natural log of number of other friends the respondent has who are not relatives or close friends (or 0 if none)
Neighbourhood tenure (ln)	Natural log of time (years) the respondent has been resident in his/her current neighbourhood.
Francophone	Indicates whether respondent is Francophone.
Born in province	Indicates whether respondent was born in the province of residence.
Immigrant	Indicates whether respondent is an immigrant to Canada. (1=foreign born)
Years since arrival	Time (years) since the respondent arrived to live in Canada.
Belong in community	"How would you describe your sense of belonging to your local community?" (scaled to [0, 1] range)
Belong in province	"What about (your sense of belonging) to your province?"
Belong in country	"What about (your sense of belonging) to Canada?"

CT fraction immigrants	Fraction of residents in the respondent's census tract who are immigrants.
CT fraction movers	Fraction of residents in the respondent's census tract who lived elsewhere less than 5 years ago.