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Who needs good neighbors?

Abstract: Due to the increasing spatial dispersion of social networks, the association between neighbor relationships and quality of life has become more uncertain. Our analysis used instrumental variable modelling to reduce bias associated with residual confounding and reverse causation, in order to provide a more reliable examination of the effect of interaction with neighbors on subjective well-being than previous work. While the frames of reference for individuals' socializing may have shifted outside the neighborhood, our analysis provides robust evidence that interaction with neighbors still matters a great deal for subjective well-being. A further important question to ask is if neighboring does affect well-being, then are there certain groups in society for whom contact with neighbors matters more? Our analysis suggests that there are, namely for those in a relationship, unemployed or retired. This means that while fostering contact with neighbors has the potential to significantly improve individual well-being, such policy efforts are likely to matter a good deal more in neighborhoods with relatively large numbers of geographically constrained social groups, such as the elderly and the unemployed.

Key words: subjective well-being, neighborly interaction, social capital

1 Introduction

Social scientists are united in a concern to understand what factors affect people's satisfaction with their lives. As Helliwell and Putnam (2004) note "A *prima facie* case can be made that the ultimate 'dependent variable' in social science should be human well-being, and in particular, well-being as defined by the individual herself, or 'subjective well-being'". Emerging interdisciplinary research has begun to show how subjective well-being can be measured with reliability and validity using simple self-rated questions about life satisfaction (Diener et al., 1999; Helliwell, 2001). In this article, we investigate whether interaction with neighbors can have a positive effect on an individual's satisfaction with their life, and tease out the implications of these spatial relationships. This focus reflects a widespread interest in questions of neighborhood and social cohesion that have a long history in social and housing policies which have sometimes been designed to promote these capacities in order to generate wider social well-being (Atkinson and Kintrea, 2001). These policy applications

stem from the interests of social scientists in the first half of the twentieth century as rampant urbanisation was seen to be producing a social order in which the traditional binds of kinship and ties of community and neighborhood were being replaced by individualism and increased anonymity. A second wave of community change and fracturing has been predicted by many social scientists due to socio-technical and informational changes that have created the possibility of local ties and connections being supplanted or replaced by networks facilitated by electronic systems (Wellman, 2001; Wellman and Haythornthwaite, 2008; Forrest and Kearns, 2001). Notwithstanding the increased possibilities for developing 'virtual' social networks there is some research to suggest, however, that on-line interaction may in fact supplement their face-to-face and telephone communication (Wellman et al., 2001; Valentine and Holloway, 2002).

An important consideration for any study of the effect of neighborly interaction on well-being is to control for potential bias due to endogeneity. It is possible that unobserved personality traits such as optimism and extraversion affect the extent to which people interact with neighbors as well as their reported well-being. A further potential endogeneity issue arises from bi-directional causality. Since it is reasonable to assume that when people feel happy they are more sociable, it could be the case that interacting with neighbors is not a determinant but an effect of high subjective well-being; in other words – general happiness, satisfaction and well-being may lead to stronger patterns of neighboring. Policy recommendations drawn from studies showing strong associations between measures of social capital and self-reported well-being may therefore be misleading if the possibility of reverse causality is not accounted for. While much recent research has found

that neighborly interaction is correlated with subjective well-being, such endogeneity issues are often overlooked.

The contribution of the work presented here is to specifically address the issue of endogeneity bias through the use of what is known as an instrumental variable (IV) approach. An IV approach can be used if adequate instruments (variables which correlate with neighborly interaction but not directly with well-being) can be found. Terza et al., (2008,b) show via simulation studies that applying the conventional IV method in nonlinear models can lead to bias in the estimation of the causal effect of the relevant endogenous variable(s) on the dependent variable, owing to the inherent non-linearity of the model. Given that the dependent variable in most well-being studies is ordinal in nature (i.e. ordered categories), applying the conventional linear IV method when the true data generating process is nonlinear, may lead to substantial estimation bias. As such, the two most relevant instrumental variable approaches to dealing with endogeneity in non-linear models are the two-stage predictor substitution (2SPS) and the two-stage-residual inclusion (2SRI) methods. While 2SPS extends the standard linear two-stage least squares estimator to non-linear models, by replacing the endogenous variables with predicted values from a first-stage regression, the 2SRI estimator instead includes the residuals from the first stage regression as additional regressors to control for the endogeneity. As demonstrated by Terza et al. (2008,a), in a non-linear context 2SRI is consistent whereas 2SPS may not be. Hence, we adopt the 2SRI method to take account of potential endogeneity bias when examining the effect of contact with neighbors on life satisfaction.

We use variables representing the extent to which individuals think their neighbors “look out” for each other and how many people the respondents report knowing in their neighborhood as instrumental variables for neighborly interaction. One could argue that our instruments while related to neighborly interaction will also affect life satisfaction indirectly through their association with other omitted variables. We address this concern by accounting for the effects of a wide range of control variables including subjective perceptions of safety and social trust when examining the effect of neighborly interaction on subjective well-being. Given the inclusion of these control variables, the exogeneity of instruments, which is a key requirement of the approach, is believed to hold. The use of an IV approach allows us to provide a more reliable assessment of the effect of neighborly interaction on subjective well-being than previous work. A further question that we explore in our analysis is whether there are certain groups for which contact with neighbors is likely to matter relatively more. This is done through interacting frequency of contact with neighbors with various dummy variables representing respondents’ personal characteristics.

Given the correlation between people’s health and various indicators of social capital (see Engstrom, 2008; Ronconi et al., 2010), we include subjective health status as a covariate in our models of life satisfaction. Including subjective health status as an explanatory variable helps to remove any potential confounding effect due to the association of health with both social capital and life satisfaction. For instance, in the case of neighborly interaction, people with a poorer health status may be less able to interact with neighbors as a result of restricted mobility or anxiety/depression. While subjective health status has frequently been found to be a strong correlate of well-being, the magnitude of this effect also remains

controversial due to endogeneity concerns (Helliwell and Putnam, 2004; Shields and Wheatley Price, 2005). Similar to our analysis of the effect of contact with neighbors, we directly address endogeneity when examining the effect of health on life satisfaction by instrumenting subjective health status with variables representing healthy eating (amount of fruits and vegetables consumed), physical exercise and alcohol consumption.

2 Subjective well-being

2.1 The determinants of subjective well-being

There has been much recent interest in examining the determinants of subjective well-being. The results from this work generally suggest that there is a positive relationship between income and subjective well-being (Blanchflower and Oswald, 2004 Ferrer-i-Carbonell, 2005). Studies that have included relative income suggest that well-being is strongly affected by relativities. Ferrer-i-Carbonell (2005), for instance, examined the importance of 'comparison income' and found that the income of others, namely the reference group (individuals of a similar age, education and who live in the same region) was as important for individual happiness as their own income. In relation to personal characteristics, higher levels of well-being have generally been observed at the younger and older age points with the lowest life satisfaction occurring in middle age. Being alone appears to be worse for subjective well-being than being in a relationship (Dolan et al., 2008). In the US, whites have been found to have higher subjective well-being than African Americans (Thoits and Hewitt, 2001).

Religious beliefs have been found to be positively associated with life satisfaction and also that it makes little difference which religion one belongs to (Helliwell and Putnam, 2003, 2006; Rehdanz and Maddison 2005). Negative perceptions in relation to safety are associated with lower levels of well-being (Ferrer-i-Carbonell and Gowdy, 2007). The evidence that is available would also suggest that life satisfaction appears to be more strongly affected by subjective perceptions of safety as opposed to any objective measures of crime rates. Positive correlations between indicators of social support such as contact with friends and family with well-being have also been frequently observed in the literature (Demir et al., 2007; Lyubomirsky et al., 2006). As noted by Dolan et al. (2008) research is needed to better understand the direction of causality underpinning these relationships.

2.2 Geographical context

There is some evidence, across a range of geographical locations, to suggest that living in less urbanized areas is beneficial for life satisfaction (Morrison, 2007; 2011; Brereton et al., 2008). For example, Berry and Okulicz-Kozaryn (2011) explored subjective well-being in American cities and found that people living in rural areas are more likely to report a higher level of subjective well-being than people living in more urbanized locations. This they suggest could be the result of a greater prevalence of natural amenities in rural areas such as more space, clean air and green areas. The work by Morrison (2007) who used survey data for 12 locations in New Zealand also suggests that living in dense environments lowers subjective well-being. In an Irish study, Brereton et al. (2008) found that those living in Dublin had lower levels of life satisfaction than those living in the countryside. In this study we also examine if we can observe any significant differentials in the well-being of urban

and rural residents, after controlling for the effect of a wide range of explanatory variables. Morrison (2011) suggests that the geography of happiness may not mirror the geography of growth because raising population density in order to realize agglomeration economies can lower subjective well-being

There is an emerging literature documenting the effect of neighborhood context on indicators of well-being. Cutrona et al. (2005) describes how even after controlling for income and other perceived risk factors, depression may be linked to characteristics of the neighborhoods in which people live. Neighborhood characteristics may influence the level of stress imposed upon residents or their vulnerability to depression following negative events in their lives. They may also interfere with the formation of bonds among people. A variety of studies show that the effect of life circumstances on well-being are relational and depend on the wider distribution of socioeconomic advantage in an individuals' residential environment (Ballas 2013; Schwanen and Wang, 2014). For example, Clark (2003) using data from the British Household Panel Survey found that as expected unemployment affects well-being, but the pain of this situation is ameliorated when there are more unemployed people around. Luttmer (2005) found that higher earnings of neighbors were associated with lower levels of self-reported happiness. In other words, individuals feel worse when their neighbors earn more.

2.3 Neighborly interaction and subjective well-being

Neighborly interaction has long been associated with a number of positive outcomes at the neighborhood level and has been central to policy efforts aimed at building social cohesion

in the belief that a secondary impact of such interventions will be increased well-being (Kennett and Forrest, 2006). In traditional society, neighborly interaction was an important source of social support as people lived in small communities and had few ties outside their own localities. Yet as urban society has shifted alongside changes in transportation systems and information technology advances, many individuals have come to rely less and less on those who live in their locality (Wellman, 2001). We now live in a world where our social identities are being increasingly shaped by the virtual and remote as opposed to the real and proximate and the dominant image of social life is of fleeting superficiality and borderless communities (Forrest, 2008). This leads us to the question of what relevance is of local social networks in neighborhoods for individual well-being.

A number of recent studies have found a positive association between frequent interaction with neighbors and subjective well-being (Putnam 2000; Helliwell and Putnam, 2004; Li et al., 2005; Shields et al., 2007). For instance, the decline of neighborly interaction figures as an important indicator of Putnam's analysis of the decline in social capital in the USA which he links to a decline in general happiness (Putnam, 2000). Helliwell and Putnam (2004) using US and Canadian data from the World Values Survey also find that frequent interaction with friends and neighbors is associated with systematically higher assessments of subjective well-being. Similarly Shields et al. (2007) using data from the Household, Income and Labour Dynamics survey in Australia (HILDA) find that neighborhood measures of social support and interaction are positively correlated with individual life satisfaction. Within the UK, analysis of the British Household Panel Survey by Li et al. (2005) shows that talking with neighbors is associated with both increased life satisfaction and health. We add

to this research by using instrumental variable modeling to test and subsequently control for any bias associated with residual confounding and reverse causation, when examining the effect of interaction with neighbors on subjective well-being. A further important question that this study seeks to address is whether contact with neighbors will be more important for certain social groupings and what inferences we can take from such findings for social policies seeking to address contemporary concerns about a deficit in the social fabric of neighborhoods.

3 Dataset

In order to test the importance of neighborly interaction and other variables reflective of social capital on life satisfaction we used data from a survey designed specifically for the evaluation of various aspects of subjective well-being. The survey was distributed to 614 members of the general public in Ireland in 2012. Seventy seven sampling points were randomly selected across the country to ensure a wide geographical spread of survey respondents. A quota controlled sampling procedure was followed to ensure that the survey was nationally representative of the population aged 15 years and above. The quotas used were taken from the national census and were based on age, gender, social class and geographic location (i.e. a mix of urban and rural areas). A survey company (RED C) was hired to conduct the face to face interviews. Interviews were conducted at different times of the day as well as different days during the week to ensure that everyone in the population had an equal chance of being interviewed. The well-being indicator used in this paper is based on the answers to the following question: 'Thinking about the good and bad things in your life, which of these answers best describes your life as a whole?' Respondents

could choose a category on a scale of one to seven ('As bad as can be'; 'very bad'; 'bad'; 'alright'; 'good'; 'very good'; 'exceptional'). In the literature to date, the answer to this question has been referred to as subjective well-being (SWB), (Blanchflower and Oswald, 2004; Ferrer-i-Carbonell, 2005) self-reported life satisfaction (Luttmer, 2005; Brereton et al., 2008) and quality of life (Bryla et. al., 2013). Here after it is referred to as SWB.

Neighborly interaction was captured by the following question: How often do you speak to neighbors? Individuals could answer this question on a 10 point scale ('Everyday', 'a few times a week', 'about once a week', 'a few times a month', 'about once a month', '3-11 times a year', 'about twice a year', 'about once a year', 'less often than once a year', 'never'). The extent to which respondent's feel neighbors 'look out' for each other and how many individuals the respondents know in the neighborhood were used as instruments for neighborly interaction. In relation to respondents perceptions of neighbors they were asked: Would you say that... and then given the following 4 options (Neighbors in this area always look out for each other, Neighbors in this area generally look for each other, Neighbors in this area generally do not look out for each other, Neighbors in this area never look out for each other). To ascertain whether respondents know many people in the neighborhood they were asked: Would you say that you know? and then given the following 4 options (Most of the people in your area, Many of the people in your area, A few of the people in your area, Do not know people in the area).

Further variables reflective of social capital included in our analysis were whether they were engaged in voluntary activity and both the number of friends as well as support from friends

(see table 1 in the online appendix for more details relating to the structure of these variables). In order to capture subjective health status, respondents were asked: How is your health in general. Would you say that it is... and were then given 5 options ranging from very bad to very good. Various health related behaviors such as fruit and vegetable consumption, physical exercise and alcohol consumption were used as instruments for health. The survey asked respondents how frequently they consume fruit and/or vegetables, how often they engaged in physical exercise of at least 20 minutes or more and how often they consume an alcoholic drink. Respondents were presented with the same 10 point scale for each of these activities ranging from everyday to never.

To capture individuals' residential environment, respondents were asked to indicate what type of area they consider themselves to live in. They were given 6 options: city, city outskirts, town, town outskirts, village and countryside. As such, this can be seen as respondents' own subjective perception as to the type of residential environment they currently live in. We grouped individuals living in the village or countryside into one group which we label as rural to assess if, after controlling for the wide range of other explanatory variables, we could still observe any differences in the self-reported well-being of residents living in rural as opposed to more urban locations. Sample size did not permit a more refined spatial disaggregation. A variety of other psycho-social characteristics were also ascertained including; importance of religion to the respondent, their church attendance, their perceptions of safety, generalized feelings of social trust and their perceptions regarding their financial status. Background personal characteristics such as age, education,

income¹ and ethnicity were also collected. These factors have been found to be important correlates of well-being in the literature to date and were included as control variables in our analysis (see table 1 for more details in relation to the structure of these variables).

4 Unobserved personality traits

It could be argued that any findings of a positive relationship between our variables of interest and SWB could arise because our independent variables correlate with individuals' unobserved personality traits, which in turn influence their SWB. One way to test the likely importance of personality caused bias in models of SWB is to test how robust the coefficients are to the inclusion of a variable designed to capture a measure of personality (Helliwell, 2006; Ferrer-i-Carbonnell and Gowdy, 2007). In this analysis we test the sensitivity of our results to the inclusion of two variables designed to measure one particularly important personality trait when it comes to examining SWB, namely optimism (Lucas et al., 1996; Segerstrom and Sephton, 2010). In the survey questionnaire, respondents were asked to indicate their expectations of how their life in general would change over the next 12 months. They were given 5 options ranging from 'get a lot worse' to 'get a lot better' (see table 1 for more details). We derived two dummy variables designed to compare respondents who feel that their life in general will get better or stay the same with respondents who feel that it will get worse. This will of course reflect anticipated changes in respondents' circumstances over the next 12 months but will also to

¹ Common to surveys such as this, a large number of respondents did not answer the income question (33%) and as such we utilised regression analysis to impute these missing observations. In short we developed a model of income based on factors we would expect to affect a respondent's income such as age, education, employment status, gender, location etc. and used this explanatory model to simulate values for the missing observations. An examination of the effect of income was not, however, the focus of this study and any bias in the estimation of income should not affect the interpretation of our variables of interest.

a significant degree reflect a measure of optimism. To provide a more robust control for any endogeneity bias arising from the specific examination of the effect of contact with neighbors and subjective health status on SWB we adopt an instrumental variables approach which we discuss below.

5 Two-stage residual inclusion model

As discussed above, well-being is elicited using a seven point scale. Since this measure may not be cardinal (i.e. a given interval between measures may not have a consistent meaning), an ordinal model such as ordered probit or ordered logit is preferable to a linear regression model. In this analysis we adopt the ordered logit. We assume that a latent variable, Y_i^* measures the individual's SWB. The latent variable can be specified as: $Y_i^* = X'\beta + \varepsilon_i$ where X represents the individual's characteristics, β is a vector of coefficients and ε_i is a logistically distributed error term. Neighborly interaction and subjective health status are both potentially endogenous regressors. One means by which to deal with endogeneity is to adopt an instrumental variables approach (IV). An IV approach can be used if adequate instruments (variables which correlate with neighborly interaction but not directly with well-being) can be found. Following the argument of Terza et al. (2008a), attempting to correct for endogeneity by applying the conventional linear instrumental variable estimator (e.g. 2SLS) will be susceptible to bias. Hence we use the two-stage residual inclusion (2SRI) method².

² As suggested by a reviewer, an alternative approach to IV modelling would have been to use structural equation models (SEMs). While there are many advantages to SEMs, an IV approach is less likely to spread the bias that occurs with structural misspecifications that can occur with system-wide estimators such as full information maximum likelihood (see Bollen et al (2007)).

Partitioning the variables X into exogenous variables, X_X and potentially endogenous variables X_E , we can write the latent variable model as $Y_i^* = X_X' \beta_X + X_E' \beta_E + \varepsilon_i$. These requirements can then be written as $E(X_E, Z) \neq 0$ and $E(\varepsilon_i Z) = 0$. The 2SRI method then proceeds by estimating a first stage regression for each potentially endogenous variable using the exogenous regressors and the instruments as explanatory variables:

$$X_E = X_X' \alpha + Z\gamma + v_i.$$

After running the first-stage regression we retrieve the residuals (\hat{v}_i). One can think of these as capturing the part of X_E that is potentially endogenous. We then include these residuals in the main model as a control variable³.

$$Y_i^* = X_X' \beta_X + X_E' \beta_E + \varphi \hat{v}_i + \varepsilon_i^*$$

After including the residual, the parameters can be consistently estimated using standard methods, the ordered logit in this case. The 2SRI approach yields a simple test for endogeneity – if the first stage residuals are statistically significant ($\varphi \neq 0$) then (provided the assumptions underlying the IV approach hold) endogeneity was biasing estimates from the original model. The 2SRI approach has been increasingly applied in empirical studies, particularly in the health economics domain (see Stuart et al., 2009; Ali, 2012 and Dunn et al., 2012) but as yet does not appear to have been utilized in studies of SWB. Stuart et al. (2009), for example, used the 2SRI method to correct for potential omitted variable bias to assess the impact of drug use on hospital care costs. Ali (2012) used the 2SRI method to measure the effectiveness of cigarette taxes as a mechanism to reduce smoking rates among adolescents.

³ The equations are estimated sequentially and then to take account of the fact that the residual is a derived variable in the second stage we bootstrap both equations to account for this in calculating the standard error. By bootstrapping we take account of the uncertainty introduced by modelling them sequentially rather than jointly.

In the first stage of our 2SRI analysis, we estimate a model for each of our endogenous variables, neighborly interaction and health, with all of the exogenous variables in the model as well as the full set of instruments included as explanatory variables. The extent to which the respondent feels neighbors “look out” for each other and whether they know many of the people in their area are used as instrumental variables for neighborly interaction. Respondents reported level of physical exercise, fruit and vegetable and alcohol consumption were used as instruments for health. To provide consistent estimates, IV analysis requires that our instruments are ‘relevant’ and ‘valid’. To be relevant our instrumental variables must be correlated with one of our endogenous explanatory variables (neighborly interaction and health). This relationship must also be strong enough to prevent any ‘weak instrument’ problem (see Murray, 2006). At a theoretical level we would expect a strong association between neighborly interaction and whether they feel neighbors “look out” for each other. If respondents feel their neighbors do look out for each other, then they are much more likely to feel comfortable talking with their neighbors. Likewise if respondents know many other people in their neighborhood, then it seems likely that they will interact with their neighbors more. The results from our first stage regression analysis offer preliminary support for this view as we found that both our instrumental variables were highly statistically significant predictors of neighbourly interaction ($p < 0.001$), although the R-squared is somewhat low at 0.32 (see table 2 in online appendix).

Similarly we would expect that our measures of various lifestyle related behaviours, namely consumption of fruits and vegetables, physical exercise and alcohol consumption would also be strongly associated with subjective health status. Again the results from our first stage

regression analysis would support this view as both fruit and vegetable consumption and physical exercise were statistically significant predictors of subjective health status at the 1% level ($p < 0.001$) whereas alcohol consumption was statistically significant at the 10% level ($p = 0.086$) (see table 3 in online appendix). Much previous research has also reported a significant association between these lifestyle related behaviors and self-reported health (Denton and Waters, 1999; Lantz et al., 2001; Blanchard et al., 2008).

For our instruments to be valid, they must have no direct effect on our outcome variable (SWB) save for its association with the endogenous variable after controlling for the effects of the exogenous variables. One could argue that the extent to which respondents feel neighbors “look out” for each other could serve as a proxy for social trust and in turn this variable could be correlated with well-being. We control for this issue by including a measure of respondents’ generalized level of social trust in our 2SRI model. A further threat to the validity of our instruments for neighborly interaction is that the extent to which neighbors know people in the area could serve as a proxy for feelings of safety, and this in turn could be related to well-being. To take account of this potential problem, we include a variable representing respondents’ subjective perceptions as to the level of safety in their neighborhood in our 2SRI model. While we would expect our various lifestyle related behaviors to be significantly associated with subjective health status, we would not expect them to have a direct effect on SWB. We provide a more formal examination of the suitability of our instruments below.

5.1 Specification tests

The simplest method to test for weak instruments is to examine the pairwise correlations between our endogenous regressors and our instrumental variables. Our correlation coefficients of 0.48 and 0.38 for our instruments for neighborly interaction are both quite high so as to not immediately flag a problem of weak instruments. While lower, the correlation between our instruments (fruit and vegetable consumption, physical exercise and alcohol consumption) with self-reported health status are also not so low as to flag a problem with weak instruments (0.16, 0.34 and 0.10). However, even though our instruments appear to be significantly correlated with our endogenous regressors, they could still be considered to be weak if they add little extra to explaining the endogenous variable after controlling for our other explanatory variables.

One commonly used diagnostic is, therefore, the F statistic for joint significance of instruments in the first stage regression. Stock and Watson (2003) suggest a simple rule of thumb for testing whether instruments are weak when there is one endogenous variable. If the F-statistic from testing the joint hypothesis that all instruments do not explain the endogenous variables is less than 10 then instruments are considered to be weak. The F-statistic for all of the instruments is 35 in the first stage regression for neighborly interaction, while in the first stage regression for health the F-statistic is 12. However, when there are multiple endogenous variables, there will be more than one first stage regression and more than one F-statistic. Then the test statistic used is the minimum eigenvalue of a matrix analog of the F-statistic that is defined in Stock and Yogo (2005, 84). A low minimum eigenvalue is interpreted to mean that the instruments are weak.

Stock and Yogo (2005), present the F-statistic required to restrict the bias of the IV estimator to a given % of the OLS bias. In the current context the calculated F-statistic of 12.16 is sufficient to ensure that the 2SLS bias is no more than 6% of the bias present in the OLS estimates which we deem to be an acceptable threshold. We also estimated our model using standard OLS and two-stage least squares (2SLS). The main advantage of using 2SLS is that we can implement the standard overidentification test to test whether our identifying exclusion restrictions are valid. To test the validity of our instruments, we calculated Sargan's test statistic to test the null hypothesis that all our instruments are valid. We find that we cannot reject the null hypothesis and conclude that the overidentifying restriction is valid (p value = 0.31). Another important way to test the validity of our instrumental variables is to conduct various sensitivity analyses. Within our 2SRI model, we used various combinations of our instrumental variables to examine the degree to which the results were sensitive to the selection of different instruments. We found that our results were robust to the choice of instruments⁴.

6 Results and discussion

Table 4 presents the results of our baseline model of life satisfaction. One advantage of the survey design used in this study is that it allowed the inclusion of a wide range of covariates in our regression models. Before examining the effect of neighborly interaction, we first discuss the effect of these other explanatory variables on reported levels of SWB. In line

⁴ We examined the effect of using a just-identified model, i.e. the same number of instruments as exogenous regressors. The respective values in this case were 58 (neighborly interaction) and 267 (health) percent increase in the odds of having higher levels of SWB for a standard deviation increase in the relevant explanatory variable. This compares to a figure of 54 and 199 per cent respectively in our overidentified model.

with previous literature, we find a negative relationship between age and SWB, but a positive relationship between age squared and SWB. This would be in keeping with previous work which suggests a U shaped relationship with higher levels of well-being for the relatively younger and older groups, with lowest levels of satisfaction in middle age⁵ (Blanchflower and Oswald, 2004; Ferreri-Carbonnell and Gowdy, 2007). In our baseline model we also find a positive effect of income on SWB in keeping with previous studies (Blanchflower and Oswald, 2004; Ferrer-i-Carbonell, 2005).

In addition to income having a significant effect on SWB, we find that subjective evaluations of a household's economic situation are highly relevant for life satisfaction. The importance of perceptions of financial status may arise either if perceptions are a more accurate measure of purchasing power (accounting for differences in cost of living across regions and debt levels) or if perceptions and attitudes towards circumstances are as important, if not more so, than the reality of those circumstances. Respondent's actual income levels could be relatively high but individuals could perceive themselves as being relatively less well-off and vice-versa.

Friendships have been found to be an important source of happiness with many prior studies documenting that number of friends and especially quality of friendships is positively related to overall well-being (Demir et al., 2007; Lyubomirsky et al., 2006; Demir et al., 2007). As can be seen in Table 4, our variables measuring both quantity of friends and support from friends were significantly related with SWB. As noted by Meier and Stutzer

⁵ In the baseline model we calculated that SWB reached its minimum point at 46 years of age.

(2006) volunteering can affect individuals' welfare because they enjoy helping others per se (intrinsic motivation) or in order to receive a by-product of volunteer work (extrinsic reasons). The findings of the current analysis support findings by Meier and Stutzer (2006) with respondents who participate in some form of voluntary activity stating a higher level of SWB. In line with previous research, we also found a positive association between having a strong religious identity and SWB (Helliwell and Putnam, 2003, 2006; Rehdanz and Maddison 2005).

In our baseline model we find that feeling very safe in comparison to unsafe is positively related to SWB which supports previous research in this area (Ferrer-i-Carbonell and Gowdy, 2007). In our analysis, we find no statistically significant difference between feeling fairly safe compared to unsafe suggesting that it might only be the highest levels of perceived safety that affect SWB. Some previous research has examined the geographical distribution of life satisfaction, finding that people living in rural areas are more likely to report a higher level of subjective well-being (Brereton et al., 2008; Berry and Okulicz-Kozaryn, 2011). Our results support these findings of an urban – rural differential in SWB, as we find that individuals living in rural areas, all things being equal, have a higher level of SWB than those living in urban areas. Given that we control for a large number of socio-demographic variables, as well as health and social capital, a reasonable hypothesis is that this difference is the result of location-specific environmental amenities.

6.1 The effect of neighborly interaction and self-reported health

The results in table 4 suggest that self-reported health status is significantly associated with SWB. While health has frequently been found to be a strong correlate of SWB, the magnitude of this effect remains controversial, since it is difficult to disentangle the direction of causality between health and life satisfaction (Helliwell and Putnam 2004). Additionally, unobserved variables may influence both health and SWB leading to biased estimates of the relationship between them. We explore the role of health after accounting for these issues in section 6.2 and 6.3.

In terms of neighborly interaction, we can see that those who speak with their neighbors more often tend to have a higher SWB. It has also been argued that the importance of the neighborhood as a source of social interaction is being progressively eroded with the emergence of more dispersed and electronic social networks. However, while such changes have been observed for some groups, the results presented in table 4 also provide *prima facie* evidence that interacting with neighbors does still matter to people and can have a positive effect on overall SWB. As noted earlier, endogeneity could be biasing these estimates as increasing contact with one's neighbors may not be a determinant but rather an effect of respondents feeling satisfied with their lives, or the positive result could be due to confounding with omitted variables. In an effort to reduce the influence of omitted variables on our model results, we control for the effect of differences in personality by including variables measuring optimism on the part of the respondent (see section 6.2 below) and in a further effort to overcome potential endogeneity when specifically

examining the effect of neighborly interaction and self-reported health status we use the 2SRI approach (see section 6.3 below).

Insert table 4 here

6.2 Personality traits

To help measure the effect of personality traits, we included two dummy variables in our model of SWB indicating whether respondents felt that their lives would get better over the next 12 months or stay the same, with the reference group being respondents who felt that their lives would get worse. Unsurprisingly, we find that individuals who expect their lives to get better or stay the same in the short term (over the next 12 months) tend to report greater well-being than individuals who feel their lives will get worse. While these variables capture individuals' subjective perceptions regarding likely future changes in their lives (e.g. moving to a better neighborhood, new job) they also to some extent reflect whether respondents have a relatively optimistic nature and, in turn, it is this optimism that may be positively related to SWB.

While adding these personality variables increases the overall explanatory power of our model of SWB, their inclusion did not change our conclusions regarding the effect of our other explanatory variables. This suggests that while measurable characteristics of personality such as optimism do affect SWB, this influence is above and beyond the explanatory power of our baseline model. Hence we do not believe that the statistical significance of our explanatory variables in table 4 is due to unobserved personality traits, removing one source of potential endogeneity. Next we employ the 2SRI approach to

further allay concerns regarding endogeneity when it comes to specifically examining the effect of neighborly interaction as well as self-reported health status.

6.3 Instrumental variable model results

Table 5 presents the results from our 2SRI model where residuals from the first stage models for neighborly interaction and health are included to overcome any potential bias due to endogeneity. A small number of variables (Income, perceived safety and rural) which were weakly significant in the baseline model are no longer significant in the 2SRI model. This loss of efficiency is a common drawback of instrumental variable approaches (Murray, 2006). The residual from the first stage regression of neighborly interaction is not statistically significant ($p = 0.464$), which suggests that endogeneity bias is not present to a significant degree when examining the effect of neighborly interaction. This we attribute to the wide range of control variables in our analysis, thus making endogeneity less likely. However, the residual from the first stage regression of subjective health status is statistically significant suggesting that endogeneity was biasing our estimate of the effect of health in our baseline model.

Ordered logit models imply a non-linear relationship between the explanatory variables and the ordinal dependent variable. Under this specification, the coefficients cannot be directly interpreted with any substantive meaning. In order to evaluate the magnitude of the effect of these variables with heterogeneous scales, we can calculate standardized coefficients that represent the impact of a standard deviation change in our explanatory variable in terms of a percentage change in the odds of having higher as opposed to lower levels of SWB. For

ease of interpretation, instead of the multiplicative or factor change, we describe the percentage change in the odds of having higher levels of SWB. As can be seen in table 5, health status has the most substantive impact on SWB. A standard deviation increase in health leads to a 199 percent increase in the probability of reporting higher SWB. A standard deviation increase in neighborly interaction leads to a 54 percent increase in the probability of reporting higher levels of well-being. Further variables reflective of social capital found to be significantly associated with SWB in our 2SRI model were voluntary activity and the number of friends and support from friends. A standard deviation increase in these variables was associated with a 17, 15 and 24 percent increase in the probability of reporting a higher level of SWB respectively.

Insert table 5 here

6.4 The social composition of neighboring: Who is helped by neighboring practices?

Having provided robust evidence that frequency of contact with neighbors significantly affects SWB, we now examine whether neighborly interaction matters more for certain groups of people over others. This is done through interacting neighborly interaction with various personal background variables. In relation to analysing interaction effects in non-linear models, Ai and Norton (2003) in a widely discussed contribution to econometric practice describe how statistical tests of partial effects for interaction terms are not necessarily informative and reliable. In order to provide a more reliable determination of any potential interaction effects, following Greene (2010) the predicted probabilities of reporting either a good, very good or exceptional quality of life for our interaction variables were graphed and visually examined.

We found no obvious interaction effect between neighbourly interaction with gender, education or rural location). We did find, however, that the effect of neighborly interaction on SWB appears to be significantly greater for those that are unemployed. An illustration of this interaction effect can be seen by examining figures 1a, 1b and 1c (see online appendix). These figures illustrate the predicted probabilities of both individuals who are unemployed or in full time employment of reporting a good, very good or exceptional well-being. For both groups, there is a general upward trend indicating that speaking with neighbors is positively correlated with SWB. There is, however, a much bigger increase in the slope of the lines representing the predicted probabilities for those who are unemployed as neighborly interaction increases. This signifies that frequency of contact with neighbors appears to matter a good deal more for those who are unemployed as opposed to in full time employment when it comes to individual well-being. One possible explanation is that unemployed individuals have less opportunity for socializing (through work and so on) outside of their neighborhood and thus neighborly interaction could take on greater importance. There may also be other unobserved differences between those that are unemployed and employed that could explain this finding. For instance, it seems likely that those that are unemployed may be less able to engage in more indirect forms of socializing (e.g. online social networks) due to differences in technology skills or accessibility to the relevant technology.

A similar argument could be used to explain why neighborly interaction appears to contribute more to SWB for those that are retired (see figure 2a, 2b and 2c in the online appendix). Older individuals are more constrained geographically than other groups and as

such locally based social networks could also take on greater importance. It also seems likely that online networks and other forms of 'indirect' socializing are used less by retirees than other groups in society. Finally we also find that contact with neighbors is more important for those who are in a relationship as compared to those that are single (see figures 3a, 3b and 3c in the online appendix). Similarly to those who are unemployed and retired, a possible explanation is that individuals in a relationship have less opportunity or perhaps less time for socializing outside the neighborhood than other groups.

7 Concluding remarks

While much previous research has found a positive association between neighborly interaction and SWB, the interpretation of these research results is challenged by a fundamental concern in that these findings are based on conventional regression estimates. These estimates, in turn, are prone to major sources of bias including residual confounding and reverse causation. Our advanced modeling approach adds to the existing literature in this area by directly addressing these endogeneity concerns by using an IV approach, namely the two stage residual inclusion (2SRI) method. While frequently employed in health policy analysis, the 2SRI method does not as yet appear to have been used in studies of the determinants of subjective well-being. Our findings support the messages of practitioners and policymakers keen to address forms of spatial disadvantage – that neighbouring is an important element of well-being and an expression of local social bonds that yield wider positive outcomes.

The significance of neighborly interaction has recently been questioned given the extensive social networks residents maintain beyond the neighborhood. With advances in technology, communication, transportation as well as changing lifestyles, neighborhoods may be losing some of the importance they once had. This movement away from community life and the shift towards more spatially diffused social networks raise fundamental questions for theoretical, empirical and policy analyses of neighborhood life in which the relationship between good neighbor relationships and quality of life has become more uncertain. Our analysis reveals that despite this context of ongoing social changes, we can still see that spatially bounded practices of neighboring interactions play an important role in determining subjective well-being.

Perhaps one of the most important implications of our work is that we have seen how neighborly interaction contributes more to the well-being of certain social groups over others, namely the unemployed, the retired or those in a relationship. This connects to long-standing evidence that such groups are more constrained geographically than other groups when it comes to social ties and networks, and therefore locally based social networks take on greater importance. Findings from previous research suggest that social characteristics (e.g. homogeneity, class) of a neighborhood can influence the degree to which residents interact with their neighbors, as residents are more likely to interact with others that share similar values and interests (Farrell et al., 2004). While social characteristics of a neighborhood itself can influence the degree to which residents interact with their neighbors, our analysis reveals that an underappreciated aspect of studies into the relationship between the neighborhood and well-being is that neighborly interaction is

likely to take on greater significance for particular socio-demographic groupings. As neighborly interaction seems to matter more for certain groups, an important question to ask is to what extent should efforts aimed at facilitating contact with neighbors be concentrated on neighborhoods with relatively larger number of geographically constrained social groups, such as the elderly and the unemployed.

Reduced community capacity, social cohesion and an increasing attention toward the embedded problems of loneliness and community determinants of health and well-being now form the basis of concerted research and practice. Our findings chime with rising efforts in the face of the emasculation of the local state as a provider of key social services to combat forms of social atomisation and improve cohesion. Notable among these has been the work of the Joseph Rowntree Foundation in its work on developing practice-based remedies to the problem of loneliness (Robbins and Allen, 2013). Such work is heavily reliant on the mediation of neighbouring by community workers and local activists to counter pockets of social isolation and help build local bridges within the community. This work often centres on organising activities and events that bring people together and in turn foster interaction and co-operation between neighbors. While findings are often mixed, partly because of the level of complexity involved (Sander 2002) there is also some research to suggest that characteristics of transportation and land-use systems within a metropolitan region can facilitate social interaction between neighbors (Dempsey, 2008; Farber et al., 2013). Much of this research emanates from the proponents of New Urbanism, who propose that dense, mixed land-use development coupled with civic design strategies can be used to induce contact between neighbors (Cattell, 2004). Our work supports these

proposals and others that offer the kinds of enhanced physical and social landscapes that help to build sustainable and embedded patterns of neighbouring.

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Table 4: Ordered Logit Model of Subjective Well-Being

	Coefficients	Std. Errors	z- statistic	%	%StdX	SDofX
Age***	-0.1	0.037	-2.68	-9.5	-80.1	16.2
Age squared***	0.01	0.01	2.68	0.1	430.2	1543.7
Female	0.233	0.186	1.25	26.3	12.4	0.5
Relationship (not in a relationship/divorced/widowed)	0.219	0.197	1.11	24.5	11.0	0.5
Income**	0.132	0.064	2.06	14.1	26.1	1.8
Third Level education (primary or secondary level)	0.327	0.255	1.28	38.7	17.0	0.5
Professional qualification (primary or secondary level)	-0.447	0.291	-1.54	-36.1	-15.9	0.4
Support from friends***	0.278	0.092	3.03	32.0	30.6	1.0
Friends*	0.258	0.151	1.72	29.5	14.9	0.5
Religion (less than very important)**	0.485	0.24	2.02	62.4	22.5	0.4
Church attendance (less than weekly or never)	-0.121	0.213	-0.57	-11.4	-5.7	0.5
Voluntary activity (never)**	0.375	0.172	2.18	45.5	20.4	0.5
Rural (living in a town or city)*	0.299	0.181	1.65	34.9	15.1	0.5
Very safe (unsafe)**	0.453	0.231	1.96	57.3	24.3	0.5
Fairly safe (unsafe)	0.075	0.218	0.34	7.8	3.7	0.5
Financial status of household***	0.283	0.097	2.91	32.8	32.0	1.0
Unemployed (employed)	-0.004	0.283	-0.01	-0.4	-0.1	0.4
Disability	0.542	0.692	0.78	72.0	6.9	0.1
Part time work	0.177	0.266	0.66	19.3	6.2	0.3
Domestic	0.29	0.298	0.97	33.6	9.7	0.3
Student	0.349	0.452	0.77	41.7	9.5	0.3
Retired	0.181	0.363	0.5	19.9	6.7	0.4
Other	1.496	0.723	2.07	346.3	17.6	0.1
Trust (you can't be too careful in dealing with people)	0.07	0.179	0.39	7.3	3.6	0.5
Expectations of life getting better (worse)***	0.852	0.251	3.4	134.3	45.0	0.4

Expectations of life staying the same (worse)***	0.622	0.208	2.99	86.3	36.5	0.5
Irish	0.346	0.321	1.08	41.4	9.5	0.3
Neighborhoodly interaction***	0.204	0.055	3.7	22.6	38.7	1.6
Health***	0.733	0.121	6.05	108.2	78.8	0.8
N = 589						

% is the percent change in the odds of having higher levels of SWB. % StdX is the percent change in odds of having higher SWB for a standard deviation change in our explanatory variable. SDofX is the standard deviation of the relevant explanatory variable

****indicates statistically significant at 1 percent level, ** indicates statistically significant at 5 percent level, * statistically significant at 10 percent level.*

Table 5: Ordered Logit Model of Subjective Well-Being using 2SRI Approach

	Coefficients	Bootstrapped Std. Errors	z- statistic	%	%StdX	SDofX
Age**	-0.09	0.04	-2.26	-8.30	-75.50	16.21
Age squared***	0.01	0.01	2.57	0.10	401.90	1543.73
Female	0.17	0.21	0.87	18.10	8.70	0.50
Relationship (not in a relationship/divorced/widowed)	0.24	0.23	1.21	27.10	12.00	0.47
Income	0.08	0.08	1.14	8.60	15.60	1.76
Third Level education (primary or secondary level)	0.36	0.30	1.40	43.20	18.80	0.48
Professional qualification (primary or secondary level)**	-0.56	0.35	-1.89	-42.90	-19.50	0.39
Support from friends**	0.23	0.12	2.36	25.20	24.20	0.96
Friends*	0.27	0.16	1.77	30.50	15.40	0.54
Religion (less than very important)**	0.53	0.28	2.18	70.10	24.90	0.42
Church attendance (less than weekly or never)	-0.23	0.26	-1.03	-20.50	-10.60	0.49
Voluntary activity (never)*	0.31	0.19	1.77	36.50	16.70	0.50
Rural (living in a town or city)	0.26	0.22	1.41	29.40	12.90	0.47
Very safe (unsafe)	0.34	0.27	1.41	39.90	17.50	0.48
Fairly safe (unsafe)	0.00	0.25	0.01	0.30	0.10	0.49
Financial status of household**	0.23	0.13	2.20	25.60	25.00	0.98
Unemployed (employed)	0.05	0.34	0.17	5.10	1.80	0.36
Disability	1.20	0.89	1.56	232.20	15.90	0.12
Part time work	0.19	0.27	0.71	20.80	6.70	0.34
Domestic	0.30	0.34	1.02	35.60	10.20	0.32
Student	0.33	0.57	0.72	38.70	8.90	0.26
Retired	0.30	0.44	0.80	34.70	11.30	0.36
Other**	1.61	0.73	2.22	400.80	19.10	0.11
Trust (you can't be too careful in dealing with people)	0.05	0.21	0.30	5.50	2.70	0.50
Expectations of life getting better (worse)***	0.76	0.31	2.96	113.40	39.20	0.44
Expectations of life staying the same (worse)***	0.62	0.25	2.97	86.30	36.50	0.50

Irish	0.47	0.37	1.40	60.20	13.20	0.26
Neighborly interaction**	0.27	0.13	2.46	30.90	54.10	1.60
Health***	1.38	0.42	3.73	299.10	199.30	0.79
Residual: Neighborly interaction	-0.09	0.15	-0.73	-8.80	-11.50	1.33
Residual: Health*	-0.72	0.44	-1.86	-51.50	-37.30	0.65
N = 589						

% is the percent change in the odds of having higher levels of SWB. % StdX is the percent change in odds of having higher SWB for a standard deviation change in our explanatory variable. SDofX is the standard deviation of the relevant explanatory variable.

****indicates statistically significant at 1 percent level, ** indicates statistically significant at 5 percent level, * statistically significant at 10 percent level.*

For online appendix

Table 1: Summary Statistics of Well-Being and Explanatory Variables

Variable	Description	Mean (N=614)	Std. Dev.	Min	Max
Well-being	Respondents were asked: Thinking about the good and bad things in your life, which of these best describes your life as a whole? (1= As bad as can be, 2= Very bad, 3= Bad, 4=Alright, 5=Good, 6=Very good, 7=Exceptional)	5	0.9	1	7
Age	Age	44.79	16.17	18	89
Female	Whether the respondent is female (1=Yes, 0=No)	0.51	0.5	0	1
Relationship	Whether the respondent is in a relationship (1=Yes, 0=No)	0.67	0.47	0	1
Income	Respondent's income per annum. in increments of €10,000	3.17	1.75	0	11
Third Level education	Whether the respondent has a 3rd level education (1=Yes, 0=No)	0.36	0.48	0	1
Professional qualification	Whether the respondent has a professional education (1=Yes, 0=No)	0.18	0.39	0	1
Support from friends	How easy the respondent reports discussing their feelings with friends (1=very difficult to 5=very easy)	3.79	0.98	1	5
Friends	Number of close friends: 0=none, 1= one or two and 2=several	1.41	0.54	0	2
Religion	Whether religion is important to the respondent (1=Yes, 0=No)	0.22	0.41	0	1
Church attendance	Whether the respondent attends church at least on a weekly basis (1=Yes, 0=No)	0.39	0.49	0	1
Voluntary activity	Whether the respondent engages in voluntary activities (1=Yes, 0=No)	0.43	0.5	0	1
Rural	Whether the respondent dwells in a rural location (1=Yes, 0=No)	0.32	0.47	0	1
Very safe	Whether the respondent feels very safe walking in their area at night (1=Yes, 0=No)	0.36	0.48	0	1
Fairly safe	Whether the respondent feels fairly safe walking in their area at night (1=Yes, 0=No)	0.39	0.49	0	1
Financial status of household	How the respondent rates the financial situation of their household feels fairly safe walking in their area at night (1=very bad to 5=very good)	3.36	0.98	1	5
Unemployed	Work status: unemployed (1=Yes, 0=No)	0.15	0.36	0	1

Disability	Work status: unable to work due to permanent illness/disability (1=Yes, 0=No)	0.01	0.12	0	1
Part time work	Work status: working part-time (1=Yes, 0=No)	0.13	0.34	0	1
Domestic	Work status: engaged in domestic duties (1=Yes, 0=No)	0.12	0.32	0	1
Student	Work status: student (1=Yes, 0=No)	0.07	0.26	0	1
Retired	Work status: retired (1=Yes, 0=No)	0.15	0.36	0	1
Other	Work status: another work status (1=Yes, 0=No)	0.01	0.11	0	1
Trust	Whether the respondent agrees that most people can be trusted (1=Yes, 0=No)	0.55	0.5	0	1
Expectations of life getting better	Whether the respondent believes their life in general will improve over the next 12 months	0.25	0.43	0	1
Expectations of life staying the same	Whether the respondent believes their life in general will remain the same over the next 12 months	0.51	0.5	0	1
Irish	Nationality (1= Irish, non-Irish)	0.93	0.26	0	1
Neighborly interaction	How often respondent speaks to their neighbors (10=every day, 9 = a few times week, 8= about once a week, 7= a few times a month, 6=about once a month, 5=3-11 times a year, 4=about twice a year, 3= about once a year, 2 = less than once a year and 1=never)	8.66	1.6	1	10
Health	How the respondent rates their health (1=very bad to 5=very good)	4.15	0.79	1	5
<i>Instrumental variables</i>					
Neighbors look out for each other	Respondents were asked: Would you say that? (1 = Neighbors in this area never look for each other, 3 = Neighbors in this area generally do not look out for each other, 3 = Neighbors in this area generally look out for each other, 4 = Neighbors in this area always look for each other)	1.68	0.76	1	4
Neighbors Known	Respondents were asked: Would you say that you know (1 = do not know people in the area, 2 = a few of the people in the area, 3= many of the people in your area, 4 = most of the people in your area.	1.83	0.81	1	4
Fruit and vegetable consumption	How often respondents consume fruits and/or vegetables (1=every day, 2 = a few times week, 3= about once a week, 4= a few times a month, 5=about once a month, 6=3-11 times a year, 7=about twice a year, 8= about once a year, 9 = less than once a year and 10=never)	1.39	0.87	1	10

Physical exercise	On average, how many times a year would you engage in physical exercise of at least 20 minutes or more? This could include activities such as walking, swimming, gym work or any sport related activity (Everyday, 'a few times a week', 'about once a week', 'a few times a month', 'about once a month', '3-11 times a year', 'about twice a year', 'about once a year', 'less often than once a year', 'never')	7.9	2.76	1	10
Alcohol consumption	How often respondent have had an alcoholic drink of any kind during the last 12 months? (1=every day, 2 = a few times week, 3= about once a week, 4= a few times a month, 5=about once a month, 6=3-11 times a year, 7=about twice a year, 8= about once a year, 9 = less than once a year and 10=never)	4.8	2.8	1	10

Table 2: First stage regression results from IV analysis – Neighborly interaction

	Coef.	Std. Err.
Age	0.027	0.026
Age squared	0.000	0.000
Female	-0.071	0.132
Relationship (not in a relationship/divorced/widowed)	-0.081	0.139
Income **	-0.098	0.044
Third Level education (primary or secondary level)	0.075	0.180
Professional qualification (primary or secondary level)	-0.083	0.205
Support from friends	0.057	0.063
Friends	0.030	0.107
Religion (less than very important)	0.055	0.173
Church attendance (less than weekly or never)	0.338	0.151
Voluntary activity (never)	0.120	0.122
Rural (living in a town or city)	-0.049	0.128
Very safe (unsafe)	0.018	0.165
Fairly safe (unsafe)	0.177	0.156
Financial status of household	-0.065	0.066
Unemployed (employed)	-0.128	0.197
Disability	0.183	0.490
Part time work	-0.098	0.193
Domestic	0.094	0.213
Student	-0.271	0.311
Retired	0.126	0.258
Other	-0.173	0.543
Trust (you can't be too careful in dealing with people)	-0.044	0.128
Expectations of life getting better (worse)	0.353	0.173
Expectations of life staying the same (worse)	-0.119	0.147
Irish	0.252	0.233
Neighbors look out for each other ***	-0.814	0.084
Neighbors known ***	-0.401	0.083
Fruit and vegetable consumption	-0.109	0.067
Physical exercise	0.013	0.022
Alcohol consumption	0.003	0.022
R ²	0.32	

Table 3: First stage regression results from IV analysis – Health

	Coef.	Std. Err.
Age**	-0.029	0.013
Age squared	0.000	0.000
Female	0.102	0.064
Relationship (not in a relationship/divorced/widowed)	-0.063	0.067
Income***	0.095	0.021
Third Level education (primary or secondary level)	-0.086	0.088
Professional qualification (primary or secondary level)	0.188	0.100
Support from friends	0.046	0.031
Friends	-0.020	0.052
Religion (less than very important)	-0.031	0.084
Church attendance (less than weekly or never)	0.061	0.073
Voluntary activity (never)	0.040	0.060
Rural (living in a town or city)	0.031	0.062
Very safe (unsafe)*	0.135	0.080
Fairly safe (unsafe)	0.085	0.076
Financial status of household ***	0.089	0.032
Unemployed (employed)	-0.051	0.096
Disability***	-0.826	0.239
Part time work	0.054	0.094
Domestic	-0.028	0.104
Student	0.048	0.151
Retired	-0.113	0.125
Other	0.173	0.264
Trust (you can't be too careful in dealing with people)	0.058	0.062
Expectations of life getting better (worse)	0.087	0.084
Expectations of life staying the same (worse)	0.013	0.071
Irish**	-0.253	0.113
Neighbors look out for each other	-0.004	0.041
Neighbors Known	0.000	0.040
Fruit and vegetable consumption***	0.119	0.033
Physical exercise***	0.067	0.011
Alcohol consumption*	0.018	0.011
R ²	0.366	

Figure 1a: Relationship between neighborly interaction, unemployment and SWB

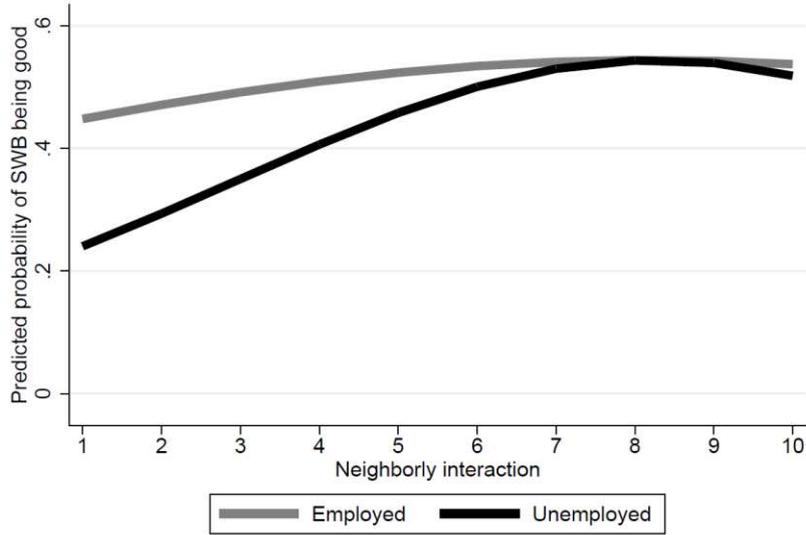


Figure 1b: Relationship between neighborly interaction, unemployment and SWB

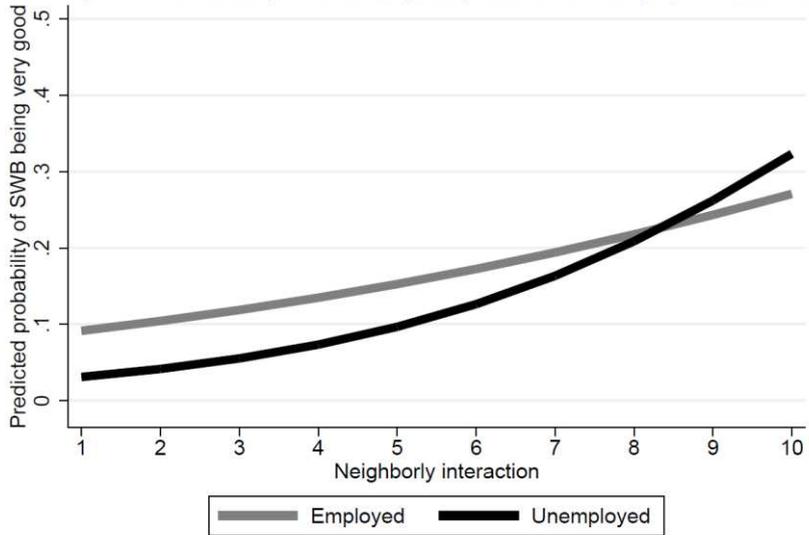


Figure 1c: Relationship between neighborly interaction, unemployment and SWB

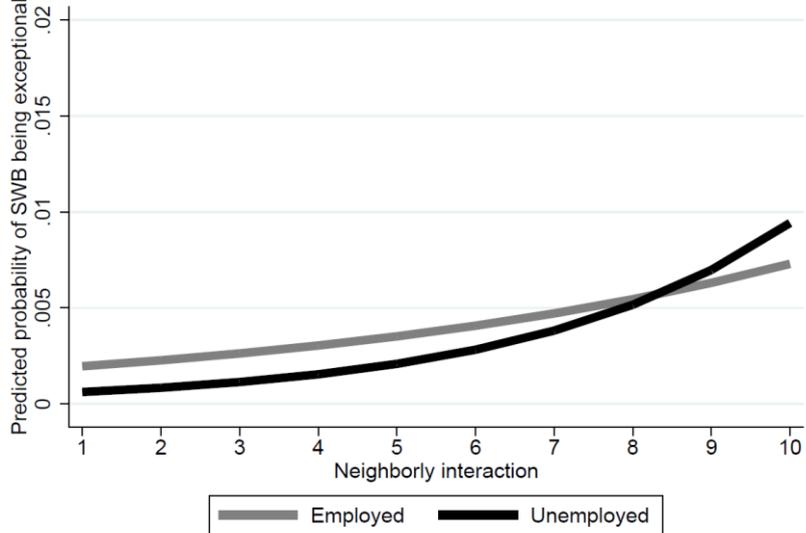


Figure 2a: Relationship between neighborly interaction, retirement and SWB

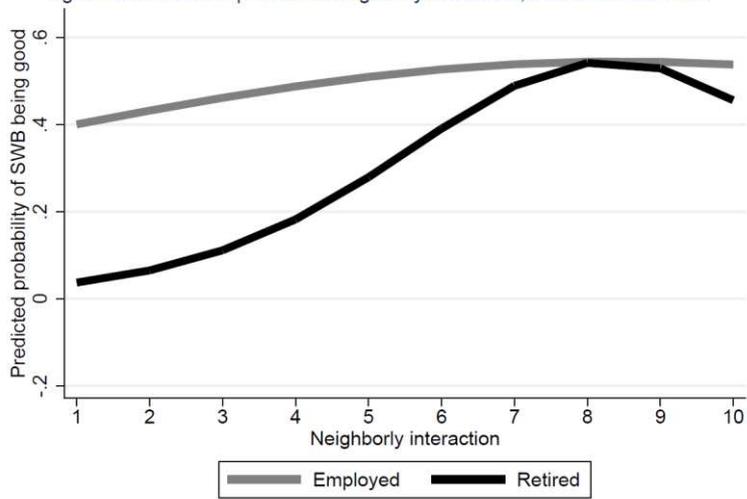


Figure 2b: Relationship between neighborly interaction, retirement and SWB

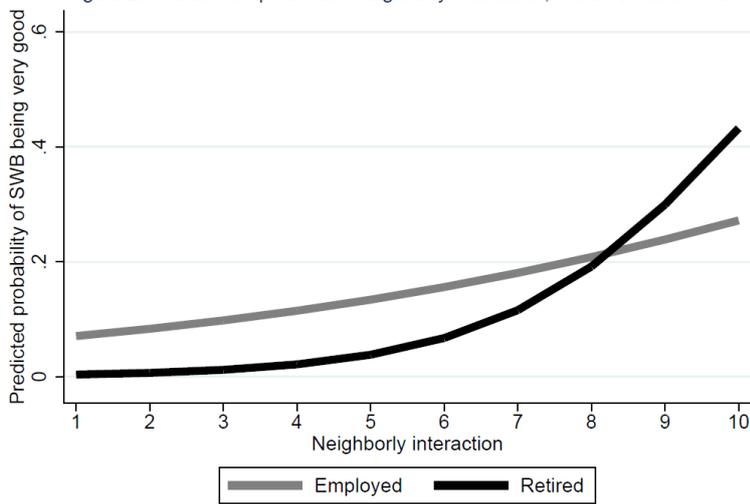


Figure 2c: Relationship between neighborly interaction, retirement and SWB

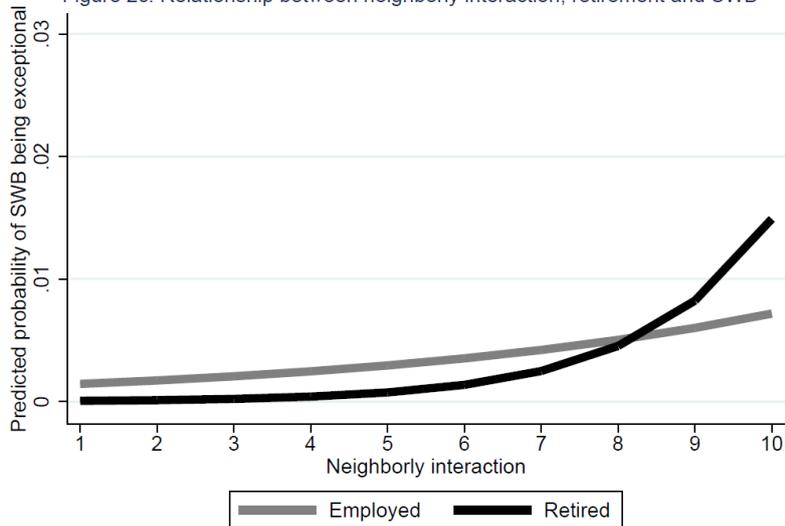


Figure 3a: Relationship between neighborly interaction, relationship status and SWB

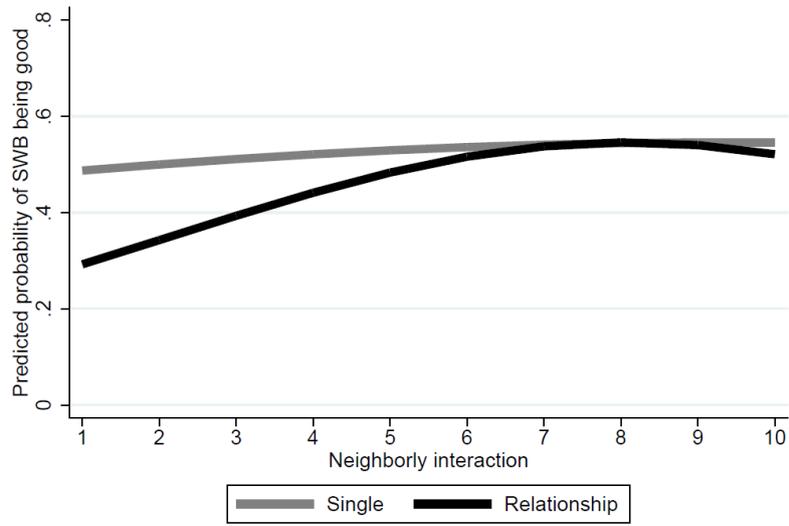


Figure 3b: Relationship between neighborly interaction, relationship status and SWB

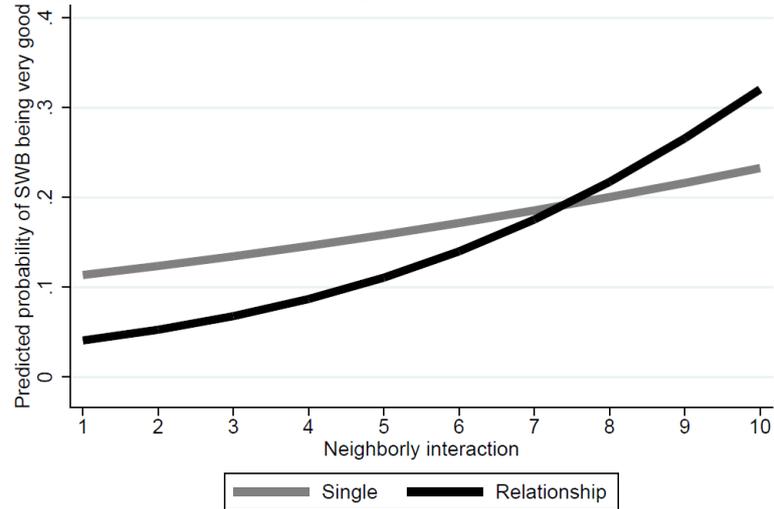


Figure 3c: Relationship between neighborly interaction, relationship status and SWB

