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## Friendship network composition and subjective wellbeing

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### Abstract

Using data from the UK Community Life Survey, we present the first study to examine the relationship between heterogeneity in one's friendship network and subjective wellbeing. We measure network heterogeneity by the extent to which one's friends are similar to oneself with regard to ethnicity and religion. We find that people who have friendship networks with characteristics dissimilar to themselves have lower levels of subjective wellbeing. Specifically, our two-stage least squares (2SLS) estimates, using measures of ethnic and religious diversity based on the Herfindahl-type fractionalization index that are flipped between adjoining rural/urban areas as instruments, suggest that a standard deviation increase in the proportion of one's friends from different ethnic (religious) groups is associated with a decrease of 0.276 (0.451) standard deviations in subjective wellbeing.

Keywords: friendship; heterogeneity; social capital; networks; wellbeing  
JEL Codes: Z12; J15; I31

## 1. Introduction

Subjective wellbeing is recognized by various national and international bodies as the benchmark to measure quality of life. Accordingly, a large literature has focused on the determinants of subjective wellbeing (see Dolan et al., 2008 for a review). Within this literature, the importance of social networks and supportive relationships for subjective wellbeing is well-established (see, e.g., McKee et al., 1999; Miething et al., 2016). Friendships have been shown to have a positive effect on wellbeing given that they serve as important sources of social support. For instance, it has been argued that friendships can help individuals adjust to new social environments (see, e.g., Bagwell et al., 2005; Rose et al., 2007), increase social interaction and assist with the development of one's social networks, each of which enhance subjective wellbeing (see, e.g., Buote et al., 2007; Glick & Rose, 2011).

Yet, while some studies have examined the role of social networks in promoting wellbeing, we know very little about how the characteristics of one's networks are related to wellbeing. We contend that while social networks and friendships have been shown to have a positive effect on wellbeing, the composition of friendship networks are likely to have varying effects on wellbeing. The primary objective of this paper, then, is to examine how the degree of heterogeneity of one's friendship network is related to one's wellbeing. To measure heterogeneity in one's friendship networks we focus on ethnic and religious heterogeneity. Because friendship networks are endogenous, we instrument for friendship network composition using a flipped measure of ethnic and religious diversity, based on the Herfindahl-type fractionalization index (Greenberg, 1956). Using data from the UK Community Life Survey, we find that an increase in the proportion of respondents' friends from different ethnic and religious groups, respectively, is associated with lower levels of subjective wellbeing. Specifically, our two-stage least squares (2SLS) estimates, using the flipped measures of ethnic and religious diversity as instruments, suggest that a standard deviation increase in the proportion of one's friends from different ethnic (religious) groups is associated with a decrease of 0.276 (0.451) standard deviations in subjective wellbeing. We also observe some differences based on age and gender, although the results are mostly homogenous between different ethnicities and people of different religious beliefs.

We contribute to the literature by presenting the first study that examines the effects of network composition on wellbeing. Despite the explosion of research on the determinants of wellbeing and particularly, the role of friendship in enhancing wellbeing, no study has examined the importance of friendship network composition in understanding wellbeing. Without a clear perspective on what types of friendships enhance wellbeing, the existing general conclusion on the effects of friendship may be misleading.

Our results contribute to the literature on the benefits of having a strong sense of social identity and the literature that seeks to understand why groups which have strong social

identities emerge (Chen & Li, 2009). Social identity refers to a person's sense of self, derived from group membership, where the group can be defined in various ways (e.g. ethnicity, gender, occupation or religious affiliation) (Chen & Li, 2009). Social identity has been shown to generate many positive outcomes within groups. Common group identity has been shown to increase cooperation (Eckel & Grossman, 2005) and improve coordination (Charness, Rigotti & Rustichini, 2007; Chen & Chen, 2011) among group members. Building a strong group identity can be used to eliminate, or mitigate, hold-up problems (Morita & Servatka, 2013). Group identity also increases the degree of altruism (Chen & Li, 2009) and charitable giving (Eckel & Grossman, 2005) toward in-group members. Homogenous ethnic and religious friendship networks are likely sources of common group identity; hence our results suggest that individuals obtain utility from having a strong sense of social identity. As such, they also indirectly point to why groups with common membership emerge.

The next section presents a brief overview of what influences the composition of friendship networks and why friendship network composition may affect wellbeing. Section 3 explains the data and variables used in the study, while Section 4 provides an overview of the empirical methods. Section 5 presents our results. Section 6 concludes.

## **2. Why should friendship network composition effect wellbeing?**

Several arguments can be advanced for why the degree of homogeneity or heterogeneity in friendship network composition might affect subjective wellbeing. In this section, we draw on various theories to develop a hypothesis that guides our study.

In society, individuals often find that they connect with some more than others. This leads to a fundamental question, often asked in the psychology and sociology literatures: given opportunities to interact with everyone, what determines who people connect, or interact, with? The theory of assortative matching lends support to answering this question. Assortative matching occurs when individuals exhibit preferences for those who are similar (homogamy) to themselves in terms of ethnicity, religion, occupation or socioeconomic status among other attributes (see, e.g., DiMaggio & Mohr, 1985; Domingue et al., 2014; Kalmijn, 1991, 1994; Kandel, 1978; Monaghan, 2015). This has often been explained in the literature by the expression “birds of a feather flock together”. Following Becker (1973), we argue that individuals, through their choice of friends, attempt to maximize their returns to friendship. In his framework which he proposes as an explanation for optimal matching in the marriage market, Becker shows that individuals are of varying “quality” and that those of the highest “quality” are able to attract each other resulting in “quality homogamy”.

In relation to our study, which focuses on friendship network composition in terms of ethnicity and religion, “quality” can be viewed in terms of cultural resources. Cultural resources include a variety of values consistent with a person's ethnicity or religion and exert an important influence on a range of behaviours, such as taste in music and art, political views and cultural literacy. These resources govern the manner in which people interact with each other and are critical for developing important components of

relationships, such as affection and social confirmation (Kalmijn, 1994). Individuals that share similar cultural resources perceive each other as being of the same “quality” and this perception influences friendship networks. Thus, homophily among friends is influenced by a selection process which leads to assortative matching, such that individuals who share similar attributes, such as ethnicity and religion, purposefully select each other as friends (Kandel, 1978).

How is assortative matching associated with higher subjective wellbeing? Similarity in terms of cultural and religious values enables effective communication and averts potential conflicts associated with communication gaps. It further leads to mutual confirmation of worldviews and behaviour (Newcomb, 1956), a process that validates a person’s self-worth, which is an important component of subjective wellbeing (Arránz Becker, 2013). As Kalmijn (1994) explains, large differences in knowledge muddle communication processes and diverging worldviews and values reduce the level of mutual confirmation people can obtain. Accordingly, friends who share similar values in terms of culture, religion or ethnicity are more apt to agree on issues than those who do not, thus reducing the potential for tension and conflict (Laursen, Hartup, & Koplas, 1996). This enhances opportunities to participate in joint activities and create a common basis for effective interaction, components relevant for promoting wellbeing (Davis, 1981; Werner & Parmelee, 1979). Put differently, significant differences in culture, ethnicity and religion, hamper mutual understanding and may give rise to a feeling of estrangement among friends, which could adversely influence wellbeing.

Given the potential for similarities in friendship networks to avert conflicts, stability in friendship has, therefore, been associated with homophily, in which friends tend to be similar to each other in terms of age, sex, ethnicity and religion (see, e.g., Hafen et al., 2011; McPherson, Smith-Lovin, & Cook, 2001). Furthermore, through a deselection process where dissimilar individuals are excluded, peer groups tend to minimize tensions and internal divisions. This process is validated by the theory of assortative matching, demonstrated in situations in which individuals opt out of unrewarding friendships in favour of more compatible friends that are similar to themselves (Cohen, 1977; Poulin & Boivin, 2000).

Preference for similarity along friendship networks is further explained by “aversion to heterogeneity” (Alesina & La Ferrara, 2002), which suggests that people distrust those who are dissimilar from themselves. Exchanges among heterogeneous individuals involve lower levels of reciprocity and honesty (see, e.g., Glaeser et al., 2000), and this discourages heterogamy. As McPherson et al. (2001) suggest, preference for homogeneity promotes contact among similar people. Several studies suggest that higher levels of trust are associated with higher subjective wellbeing (see, e.g., Awaworyi Churchill & Mishra, 2017). Further, evidence suggests that the quality of social capital is dependent on a high degree of homogeneity and communities with high levels of heterogeneity have lower levels of interpersonal trust (Alesina & La Ferrara, 2000; Letki, 2008). Putnam (2007) suggests heterogeneity may generate social problems that can adversely impact on social cohesion, a

major component of social capital, which is associated with higher subjective wellbeing. Similarity among friends generates a stronger connection, which, in turn, promotes social support that contributes to higher wellbeing (Bagwell et al., 2005; Rose et al., 2007).

Overall, our main argument is that homophily fosters joint activities through which similar opinions are shared and preferences are enjoyed (Byrne, 1961). Further, humans prefer stability, which promotes wellbeing that is enhanced through homogamy (Bleske-Rechek & Lighthall, 2010). Lastly, friendship ties between dissimilar individuals have been shown to dissolve at higher rates (McPherson et al., 2001), which has a detrimental effect on subjective wellbeing. Based on these arguments, we formulate the following hypothesis:

*H1: Ethnic and religious heterogeneity in friendship networks negatively affect wellbeing.*

### **3. Data and variables**

Data used in this study are from the UK's Community Life Survey (CLS). The CLS consists of a nationally representative survey administered across the UK, which was commissioned by the Cabinet Office to provide official statistics on issues concerning social action, volunteering and community engagement. We use three waves of the survey; the first wave covers 2012 to 2013, the second 2013 to 2014 and the third 2014 to 2015. Regressions with the largest number of observations include information on 13,960 respondents.

Our dependent variable is a measure of self-reported subjective wellbeing, which captures an individual's evaluation of his/her life satisfaction (see, e.g., Awaworyi Churchill & Mishra, 2017; Pinquart & Sörensen, 2000). The CLS provides information on respondents' satisfaction with life through the answers to the question: "On a scale of 1 to 10, where 0 is not at all satisfied and 10 is completely satisfied, overall, how satisfied are you with your life nowadays?" In our sample, the mean score of subjective wellbeing is given as 7.77 out of 10 with a standard deviation of 1.91. The distribution of responses is shown in Figure A1.

To measure network heterogeneity, we focus on two dimensions of friendship diversity capturing heterogeneity based on ethnicity and religion. To capture network heterogeneity by ethnicity, we focus on the CLS question: "What proportion of your friends are of the same ethnic group as you?" A similar question is asked to capture heterogeneity by religion. Responses to these questions are coded on a scale of 1 to 4 where 1 means "all the same", 2 means "more than a half", 3 means "about a half", and 4 means "less than a half". We also introduce two additional measures to capture homogeneity by ethnicity and religion. Specifically, we introduce dummy variables which equal 1 if respondents have all friends from the same ethnic and religious group, respectively, as themselves.

Table 1 presents the mean wellbeing by friendship network composition. Table 1 lends preliminary support to our hypothesis – greater ethnic and religious homophily among friends is generally associated with higher mean wellbeing. This preliminary observation,

however, does not take account of other factors that influence wellbeing. Consistent with the subjective wellbeing literature, we also control for relevant covariates that are likely to affect an individual's subjective wellbeing or quality of life. These include gender, age, age squared, marital and educational status, income, employment status, race and religion, mental health and social class (see, e.g., Awaworyi Churchill & Mishra, 2017; Cheng & Smyth, 2015; Pinquart & Sörensen, 2000; Portela, Neira, & del Mar Salinas-Jiménez, 2013). Table A1 presents a description of the variables and their associated summary statistics.

#### 4. Method

We estimate the following subjective wellbeing equation:

$$\text{subjective wellbeing}_i = f(N_i, \mathbf{X}_i, \varepsilon_i) \quad (1)$$

Where *subjective wellbeing* is the life satisfaction of the *i*th respondent; *N* is a measure of network heterogeneity; *X* is a vector of individual characteristics; and  $\varepsilon$  is the error term. The existing literature on the determinants of wellbeing or individual life satisfaction uses either ordered logit regressions or ordinary least squares (OLS). In a methodological paper, Ferrer-i-Carbonell and Frijters (2004) show that findings for subjective wellbeing specifications are not sensitive to treating subjective wellbeing as ordinal or cardinal. In our main baseline results below, we estimate equation (1) using OLS. However, in robustness checks not reported here, we also used ordered logit regressions, and results are consistent.

OLS estimates will be biased if the composition of friendship networks is endogenous. To ensure that our results are robust, we adopt a 2SLS estimation approach. Our choice of instrument is influenced by the existing literature which suggests that geographic factors, such as ethnic and religious diversity, could influence friendship network composition. Specifically, existing literature has demonstrated that the choice of friends or partners is conditional on the pool of potential friends, from which an individual can choose (see, e.g., Kalmijn & Flap, 2001; Van Zantvliet & Kalmijn, 2013). Thus, geographic distribution determines the composition of friendship networks, given that opportunities for social contact determine social associations (Blau, 1977; Lieberson & Waters, 1988). Accordingly, the likelihood of interethnic or inter-religious friendships increase in a racially or religiously heterogeneous social context (see, e.g., Moody, 2001 Mollenhorst et al. 2008).

We instrument friendship network composition using a flipped measure of ethnic and religious diversity, based on the Herfindahl-type fractionalization index (Greenberg, 1956). We calculate indices of fractionalization based on the nine Government Office Regions (GORs) of England: South East, London, North West, East of England, West Midlands, South West, Yorkshire and the Humber, East Midlands and North East. Based on UK census data, we calculate indices of ethnic and religious fractionalization for a total of 17 geographic

areas. We split each of the nine GORs into rural and urban, except for London which is urban only; thus, giving us a total of 17 geographic areas.  $FRACTIONALIZATION_j = 1 - \sum_{e=1}^N s_{ej}^2$ , where  $s_{ej}$  is the share of ethnic/religious group  $e$  in region  $j$ . The index of fractionalization in a given neighbourhood measures the probability that two randomly selected individuals belong to different ethnic/religious groups. Just using ethnic/religious diversity for a geographic location as an instrument for friendship network composition of a respondent from the same location would arguably not satisfy the exclusion criteria given a potential indirect link between wellbeing and ethnic/religious diversity. Hence, for each respondent, we flip the measure of ethnic/religious diversity between urban and rural locations in each of the nine GORs. Thus, for respondents in rural areas, we use the measure of diversity for corresponding urban areas as the instrument and vice versa.

For instance, we use the ethnic/religious diversity variable for rural West Midlands as an IV for friendship network heterogeneity for respondents in urban West Midlands. Clearly, the level of diversity in another location, in which the respondent does not live would not affect the respondent's wellbeing. However, diversity in friendships between rural and urban West Midlands should be similar because they have the same regional patterns<sup>1</sup>.

As a robustness check, we also adopt the Lewbel (2012) 2SLS approach. Lewbel (2012) proposes a 2SLS approach which utilizes a heteroskedastic covariance restriction to construct an internal instrument. This method is often used in the literature as a robustness check on findings from 2SLS with conventional instrument(s) (see, e.g., Awaworyi Churchill et al., 2017; Emran & Shilpi, 2012; Mishra & Smyth, 2015). With this approach, a precondition for identification is the presence of heteroscedasticity. In the data used in this paper, the Breusch and Pagan (1979) test for heteroskedasticity is highly significant throughout, indicating that the heteroskedasticity assumption for Lewbel (2012) is fulfilled.<sup>2</sup>

As a further robustness check, we employ propensity score matching (PSM). PSM provides a means to draw a causal inference about the effect of friendship network heterogeneity on subjective wellbeing with non-experimental data (see, e.g., Awaworyi Churchill & Smyth, 2017; Belfield & Kelly, 2012; Dehejia & Wahba, 2002). In our study, the treatment is considered as respondents with homogenous friendship networks given that our hypothesis is that respondents with homogenous friendship networks have higher subjective wellbeing (and that the OLS results below are consistent with that hypothesis).<sup>3</sup>

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<sup>1</sup> For respondents in London, which is urban, we use average ethnic/religious fractionalization for rural areas closest to London.

<sup>2</sup> See Lewbel (2012) for more details

<sup>3</sup> In our dataset, friendship network heterogeneity by ethnicity and religion are captured by the question "what proportion of your friends are of the same ethnic/religious group as you? 1 means "all the same", 2 means "more than a half", 3 means "about a half", and 4 means "less than a half". We consider respondents with response 1 as having homogeneous friendship networks and others as having heterogeneous friendship networks.



In order to draw causal inferences about the effect of friendship network heterogeneity on wellbeing using PSM, we ask the question: What is the outcome (in terms of wellbeing) for respondent  $j$  who is treated (i.e., with homogenous friendship networks) relative to the hypothetical outcome that would have prevailed if the same respondent had heterogeneous friendship networks? We estimate the average treatment effect as follows:

$$\begin{aligned}\tau &\equiv E\{O_1 - O_0 | B = 1\} \\ &= E\{E\{O_1 - O_0 | B = 1, p(W)\}\} \\ &= E\{E\{O_1 | B = 1, p(W)\} - E\{O_0 | B = 0, p(W)\} | B = 1\}\end{aligned}$$

Where  $\tau$  is the average effect of the treatment,  $B$  is a dichotomous variable equal to one if the respondent has homogenous friendship networks and zero otherwise.  $O$  represents our outcome variable, subjective wellbeing.  $W$  is a vector of pre-treatment characteristics represented by the covariates in our models. The propensity score,  $p(W)$ , is the probability of having lower subjective wellbeing given pre-treatment characteristics ( $W$ ).<sup>4</sup>

## 5. Results

Table 2 presents OLS results for the association between network composition and subjective wellbeing. Columns 1 and 2 report results for the effects of diversity by ethnicity and religion, respectively while Columns 3 and 4 report results for the effects of homogeneity by ethnicity and religion, respectively. In columns 1 and 2, network heterogeneity is associated with lower subjective wellbeing. A one standard deviation increase in the proportion of respondents' friends from different ethnic groups is associated with a decrease of 0.034 standard deviations in subjective wellbeing. Similarly, a standard deviation increase in the proportion of respondents' friends from different religious groups is associated with a decrease of 0.026 standard deviations in subjective wellbeing.

For Columns 3 and 4, we find that friendship network homogeneity is associated with higher levels of subjective wellbeing. Specifically, for Column 3, we find that the coefficient on the same ethnicity dummy is 0.077, implying 0.077 higher subjective wellbeing, on a scale of 1-10, if all of the respondent's friends are from the same ethnic group as themselves. Here, a standard deviation increase in friendship network homogeneity on the basis of ethnicity is associated with an increase of 0.020 standard deviations in subjective wellbeing. From Column 4, the coefficient on the same religion dummy is 0.099, implying 0.099 higher subjective wellbeing, on a scale of 1-10, if all of the respondent's friends are from the same religious group as themselves. Turning to the standardized coefficients, a standard deviation increase in friendship network homogeneity on the basis of religion is associated with an increase of 0.025 standard deviations in subjective wellbeing. The findings for the above variables are generally consistent with the existing literature; notably, subjective wellbeing

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<sup>4</sup> See Becker and Ichino (2002) and Rosenbaum and Rubin (1983) for more details.

is non-linear with respect to age, women and married respondents have higher subjective wellbeing and those in poor mental and physical health have lower subjective wellbeing.

Overall, the OLS results suggest that friendship network heterogeneity is associated with lower subjective wellbeing while network homogeneity is associated with higher subjective wellbeing. However, OLS results are biased if friendship network composition is endogenous. The 2SLS results are reported in Table 3. Panel A reports results for 2SLS regressions with the external instrument (i.e., the flipped measure of ethnic and religious diversity), while Panel B reports Lewbel 2SLS results which combines both external and internally generated instruments. Consistent, across Panels A and B in Table 3, the first stage F statistics are greater than 10, which suggests that at the 10% level, our instruments are not weakly correlated with friendship network composition (Stock and Yogo, 2005). In the first stage the negative sign on our instrument in the network heterogeneity regressions and the positive sign in the network homogeneity regressions are consistent with the findings from the literature (see, e.g., Moody, 2001; Mollenhorst, Völker, & Flap, 2008). In regressions with multiple instruments (Table 3, Panel B), we fail to reject the null hypothesis for the Sargan-Hansen overidentifying restriction (OIR) tests, which suggests that the instruments used in the first-stage regressions were not overidentified.

We find that endogeneity generates considerable downward bias in OLS estimates across Panels A and B. Specifically, from Panel A, a standard deviation increase in the proportion of respondents' friends from different ethnic groups is associated with a decrease of 0.276 standard deviations in subjective wellbeing, while a standard deviation increase in the proportion of respondents' friends from different religious groups is associated with a decrease of 0.451 standard deviations in subjective wellbeing. Similarly, a standard deviation increase in friendship network homogeneity on the basis of ethnicity is associated with an increase of 0.275 standard deviations in subjective wellbeing while a standard deviation increase in friendship network homogeneity on the basis of religion is associated with an increase of 0.439 standard deviations in subjective wellbeing. The results in Panel B for the Lewbel method, which combines both external and internal instruments, are consistent with the findings in Panel A. The magnitude of the coefficients on the Lewbel estimates lie between that of the OLS estimates and the estimates using the conventional instrument, which is consistent with the existing literature (see e.g., Mishra & Smyth, 2015).

Table 4 reports results for the effects of network composition on wellbeing using PSM. The treatment comprises respondents with homogenous friendship networks given that OLS results suggest that network homogeneity is associated with higher levels of subjective wellbeing. We find that, on average, subjective wellbeing is higher for individuals with relatively homogeneous friendship networks. Thus, the PSM results are consistent with the conclusion from the OLS and 2SLS regressions and are consistent with our hypothesis.

We extend our results to examine if results for friendship network heterogeneity differ across age and gender. Following the UN age classification of youth, which is 15 to 24 years, we classify respondents up to 24 years as young people. Previous research has shown that younger people are more open minded and open to new ideas than older people (see, e.g., Gopnik, Griffiths, & Lucas, 2015; Roberts, Walton, & Viechtbauer, 2006). This research is consistent with the demographic breakdown in the United Kingdom on how people voted in the 'Brexit' referendum. Statistical evidence from the "Brexit" referendum suggests that relatively more older people voted for Britain leaving the European Union while younger people voted to remain in the European Union.<sup>5</sup> Similarly, prior research has identified that men are more open to new ideas than women (Costa, Terracciano & McCrae, 2001). If so, younger people and men, may exhibit a more positive relationship between friendship network heterogeneity and subjective wellbeing than older people and women respectively. We also consider if the relationship between friendship network heterogeneity and subjective wellbeing differs across religious beliefs (Buddhist, Christian, Hindu, Jewish, Muslim, Sikh) with atheist treated as the reference group, and ethnicity (Asian, Black, White) with 'other or mixed race' as the reference group.

The results are reported in Table 5. We find that the interaction between gender and friendship network heterogeneity by ethnicity is negative and statistically significant, but not the interaction with heterogeneity by religion. Thus, results suggest that, consistent with expectations, for female respondents, an increase in network heterogeneity by ethnicity is associated with lower levels of subjective wellbeing than men. The results also suggest that for young people, an increase in network heterogeneity by ethnicity or religion is associated with higher levels of subjective wellbeing, relative to older people, which is also consistent with our conjecture that younger people are likely to be more open to others who differ from them in terms of race and religion. We do not observe much difference across ethnic and religious groups. Exceptions include the interaction between ethnic group (Black=1) and heterogeneity by ethnicity as well as the interaction religious group (Sikh=1) and heterogeneity by religion, where both interaction terms are negative. This suggests that for a respondent who is Black, an increase in network heterogeneity is associated with lower levels of subjective wellbeing, relative to the reference – 'others or mixed race'. This also is true for respondents that observe an increase in network heterogeneity and belong to the Sikh religious group, relative to those who identify as atheist.

## 6. Summary and Conclusion

While a large literature shows that having social networks are positively related with subjective wellbeing, to this point no study has examined the relationship between friendship network composition and subjective wellbeing. Drawing on the assortative

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<sup>5</sup> <http://www.politico.eu/article/graphics-how-the-uk-voted-eu-referendum-brexit-demographics-age-education-party-london-final-results/>

matching literature, we hypothesised that ethnic and religious heterogeneity in friendship network composition will negatively affect subjective wellbeing. Consistent with this hypothesis, we find that an increase in the proportion of respondents' friends from different ethnic and religious groups, respectively, is associated with lower levels of subjective wellbeing. The corollary of this result is that friendship network homogeneity on the basis of ethnicity and religious beliefs is associated with higher levels of subjective wellbeing. While the existence of social networks *per se* have been shown in the previous literature to be positively associated with subjective wellbeing, overall, our results suggest that friendship network composition is important for higher subjective wellbeing, and therefore needs to be considered when formulating policies to promote this objective.

Our findings help to explain why groups that have a strong sense of social identity, borne out of a homogenous common membership, emerge. Our findings point to an important benefit from homogenous common membership – higher subjective wellbeing of group members – that complements the extant literature on the benefits of common identity. At the same time, though, social identity has been shown to lead to negative economic outcomes (Chen, 2010), homogenous friendship networks can promote 'in groups' and 'out groups' along ethnic and religious lines. When groups are formed, the concepts of "them" and "us" trigger emotional responses, which can lead to discrimination against members of the other group (Ahmed, 2007). In particular, there is much evidence from experimental economics showing that participants exhibit in-group bias, meaning that they favor those from their own social group over those from another social group (see e.g. Chen & Li, 2009).

At one level, a darker interpretation of our results might suggest that homogenous networks are associated with higher subjective wellbeing because a sense of common identity provides each grouping with solace in the face of a lack of tolerance and trust across ethnic and religious boundaries. Identity-based favoritism has been the basis of much ethnic-religious intolerance and conflict (Alesina, Baqir & Easterly, 1999). In-group bias, coupled with a strong sense of social identity, also underpins elements of ideological/religious extremism, which has been shown to contribute to social violence in many parts of the world (Chen, 2010). In this sense, our results point to the need for policies designed to improve understanding across ethnic and religious groups. Evidence suggests that the use of superordinate goals can be used to promote tolerance and trust while reducing tensions among heterogeneous groups (see, e.g., Sherif, 1958). Evidence also points to the importance of education in promoting social capital and tolerance across ethnic groups (see, e.g., Miguel, 2006). One important avenue forward is to continue to promote the benefits of diversity among younger people, given that our results suggest that for this demographic, having heterogeneous friendship networks are associated with higher subjective wellbeing than for older people.

## References

- Ahmed, A.M. (2007). Group identity, social distance and intergroup bias. *Journal of Economic Psychology*, 28, 324-337.
- Alesina, A., Baqir, R. & Easterly, W. (1999). Public goods and ethnic divisions. *Quarterly Journal of Economics*, 114, 1243-1284.
- Alesina, A., & La Ferrara, E. (2000). Participation in Heterogeneous Communities. *The Quarterly Journal of Economics*, 115(3), 847-904.
- Alesina, A., & La Ferrara, E. (2002). Who trusts others? *Journal of Public Economics*, 85(2), 207-234. doi:http://doi.org/10.1016/S0047-2727(01)00084-6
- Arránz Becker, O. (2013). Effects of similarity of life goals, values, and personality on relationship satisfaction and stability: Findings from a two-wave panel study. *Personal Relationships*, 20(3), 443-461.
- Awaworyi Churchill, S., & Mishra, V. (2017). Trust, Social Networks and Subjective Wellbeing in China. *Social Indicators Research*, 132(1), 313-339. doi:10.1007/s11205-015-1220-2
- Awaworyi Churchill, S., Ocloo, J. E., & Siawor-Robertson, D. (2017). Ethnic Diversity and Health Outcomes. *Social Indicators Research*, 1-36. doi:10.1007/s11205-016-1454-7
- Awaworyi Churchill, S., & Smyth, R. (2017). Ethnic Diversity and Poverty. *World Development*, 95, 285-302. doi:http://doi.org/10.1016/j.worlddev.2017.02.032
- Bagwell, C. L., Bender, S. E., Andreassi, C. L., Kinoshita, T. L., Montarello, S. A., & Muller, J. G. (2005). Friendship quality and perceived relationship changes predict psychosocial adjustment in early adulthood. *Journal of Social and Personal Relationships*, 22(2), 235-254.
- Becker, G. S. (1973). A Theory of Marriage: Part I. *Journal of Political Economy*, 81(4), 813-846. doi:doi:10.1086/260084
- Becker, S. O., & Ichino, A. (2002). Estimation of average treatment effects based on propensity scores. *The stata journal*, 2(4), 358-377.
- Belfield, C. R., & Kelly, I. R. (2012). The benefits of breast feeding across the early years of childhood. *Journal of Human Capital*, 6(3), 251-277.
- Bjørnskov, C. (2008). Social capital and happiness in the United States. *Applied Research in Quality of Life*, 3(1), 43-62.
- Blau, P. M. (1977). A Macrosociological Theory of Social Structure. *American Journal of Sociology*, 83(1), 26-54. doi:doi:10.1086/226505
- Bleske-Rechek, A., & Lighthall, M. (2010). Attractiveness and rivalry in women's friendships with women. *Human Nature*, 21(1), 82-97.
- Breusch, T.S. and Pagan, A.R. (1979). Simple test for heteroscedasticity and random coefficient variation". *Econometrica*, 47 (5), 1287-1294.
- Buote, V. M., Pancer, S. M., Pratt, M. W., Adams, G., Birnie-Lefcovitch, S., Polivy, J., & Wintre, M. G. (2007). The importance of friends: Friendship and adjustment among 1st-year university students. *Journal of Adolescent Research*, 22(6), 665-689.
- Byrne, D. (1961). Interpersonal attraction and attitude similarity. *The Journal of Abnormal and Social Psychology*, 62(3), 713.
- Charness, G., Rigotti, L. & Rustichini, A. (2007). Individual behavior and group membership. *American Economic Review*, 97, 1340-1352.
- Chen, D. (2010). Club goods and group identity: Evidence from Islamic resurgence during the Indonesian financial crisis. *Journal of Political Economy*, 118(2), 300-354.

- Chen, R. & Chen, Y. (2011). The potential of social identity for equilibrium selection. *American Economic Review*, 101(6), 2562-2589.
- Chen, Y. & Li, S. (2009). Group identity and social preferences. *American Economic Review*, 99(1), 431-457.
- Cheng, Z., & Smyth, R. (2015). Sex and happiness. *Journal of Economic Behavior & Organization*, 112, 26-32.
- Cohen, J. M. (1977). Sources of Peer Group Homogeneity. *Sociology of Education*, 50(4), 227-241. doi:10.2307/2112497
- Costa, P., Terracciano, A. & McCrae, R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology*, 81(2) 322-331.
- Davis, D. (1981). Implications for interaction versus effectance as mediators of the similarity-attraction relationship. *Journal of Experimental Social Psychology*, 17(1), 96-117.
- Dehejia, R. H., & Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *Review of economics and statistics*, 84(1), 151-161.
- DiMaggio, P., & Mohr, J. (1985). Cultural Capital, Educational Attainment, and Marital Selection. *American Journal of Sociology*, 90(6), 1231-1261. doi:10.1086/228209
- Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, 29(1), 94-122.
- Domingue, B. W., Fletcher, J., Conley, D., & Boardman, J. D. (2014). Genetic and educational assortative mating among US adults. *Proceedings of the National Academy of Sciences*, 111(22), 7996-8000.
- Easterlin, R. A. (1974). Does economic growth improve the human lot? Some empirical evidence. *Nations and households in economic growth*, 89, 89-125.
- Eckel, C. & Grossman, P. (2005). Managing diversity by creating team identity. *Journal of Economic Behavior and Organization*, 58(3), 371-392.
- Emran, M. S., & Shilpi, F. (2012). The extent of the market and stages of agricultural specialization. *Canadian Journal of Economics/Revue canadienne d'économique*, 45(3), 1125-1153.
- Ferrer-i-Carbonell, A., & Frijters, P. (2004). How important is methodology for the estimates of the determinants of happiness? *The Economic Journal*, 114(497), 641-659. doi:10.1111/j.1468-0297.2004.00235.x
- Glaeser, E. L., Laibson, D. I., Scheinkman, J. A., & Soutter, C. L. (2000). Measuring trust. *The Quarterly Journal of Economics*, 115(3), 811-846.
- Glick, G. C., & Rose, A. J. (2011). Prospective associations between friendship adjustment and social strategies: Friendship as a context for building social skills. *Developmental Psychology*, 47(4), 1117-1132. doi:10.1037/a0023277
- Gopnik, A., Griffiths, T. L., & Lucas, C. G. (2015). When Younger Learners Can Be Better (or at Least More Open-Minded) Than Older Ones. *Current Directions in Psychological Science*, 24(2), 87-92. doi:doi:10.1177/0963721414556653
- Greenberg, J. H. (1956). The measurement of linguistic diversity. *Language*, 32(1), 109-115. doi:10.2307/410659
- Hafen, C. A., Laursen, B., Burk, W. J., Kerr, M., & Stattin, H. (2011). Homophily in stable and unstable adolescent friendships: Similarity breeds constancy. *Personality and Individual Differences*, 51(5), 607-612.

- Helliwell, J. F., & Wang, S. (2011). Trust and well-being. *Journal of Wellbeing*, 1(1), 42-78.
- Kalmijn, M. (1991). Shifting Boundaries: Trends in Religious and Educational Homogamy. *American Sociological Review*, 56(6), 786-800. doi:10.2307/2096256
- Kalmijn, M. (1994). Assortative mating by cultural and economic occupational status. *American Journal of Sociology*, 100(2), 422-452. doi:10.1086/230542
- Kalmijn, M., & Flap, H. D. (2001). Assortative meeting and mating: Unintended consequences of organized settings for partner choices. *Social Forces*, 79(4), 1289-1312.
- Kandel, D. B. (1978). Homophily, selection, and socialization in adolescent friendships. *American Journal of Sociology*, 84(2), 427-436. doi:10.1086/226792
- Klein, C. (2013). Social capital or social cohesion: What matters for subjective well-being? *Social Indicators Research*, 110(3), 891-911.
- Laursen, B., Hartup, W. W., & Koplas, A. L. (1996). Towards Understanding Peer Conflict. *Merrill-Palmer Quarterly*, 42(1), 76-102.
- Letki, N. (2008). Does Diversity Erode Social Cohesion? Social Capital and Race in British Neighbourhoods. *Political Studies*, 56(1), 99-126. doi:10.1111/j.1467-9248.2007.00692.x
- Lewbel, A. (2012). Using Heteroscedasticity to Identify and Estimate Mismeasured and Endogenous Regressor Models. *Journal of Business & Economic Statistics*, 30(1), 67-80. doi:10.1080/07350015.2012.643126
- Lieberson, S., & Waters, M. C. (1988). *From many strands: Ethnic and racial groups in contemporary America*. New York: Russell Sage Foundation.
- McKee, K., Harrison, G., & Lee, K. (1999). Activity, friendships and wellbeing in residential settings for older people. *Aging & Mental Health*, 3(2), 143-152.
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology*, 27, 415-444.
- Miething, A., Almquist, Y. B., Östberg, V., Rostila, M., Edling, C., & Rydgren, J. (2016). Friendship networks and psychological well-being from late adolescence to young adulthood: a gender-specific structural equation modeling approach. *BMC Psychology*, 4(1), 34. doi:10.1186/s40359-016-0143-2
- Miguel, E., & Gugerty, M. K. (2005). Ethnic diversity, social sanctions, and public goods in Kenya. *Journal of Public Economics*, 89(11-12), 2325-2368.
- Mishra, V., & Smyth, R. (2015). Estimating returns to schooling in urban China using conventional and heteroskedasticity-based instruments. *Economic Modelling*, 47, 166-173.
- Mollenhorst, G., Völker, B., & Flap, H. (2008). Social contexts and personal relationships: The effect of meeting opportunities on similarity for relationships of different strength. *Social Networks*, 30(1), 60-68.
- Monaghan, D. (2015). Income inequality and educational assortative mating: Evidence from the Luxembourg Income Study. *Social Science Research*, 52, 253-269.
- Moody, J. (2001). Race, School Integration, and Friendship Segregation in America. *American Journal of Sociology*, 107(3), 679-716. doi:10.1086/338954
- Morita, H. & Servatka, M. (2013). Group identity and relation-specific investment: An experimental investigation. *European Economic Review*, 58, 95-109.
- Newcomb, T. M. (1956). The prediction of interpersonal attraction. *American Psychologist*, 11(11), 575-586. doi:10.1037/h0046141

- Pinquart, M., & Sörensen, S. (2000). Influences of socioeconomic status, social network, and competence on subjective well-being in later life: A meta-analysis. *Psychology and Aging, 15*(2), 187-224. doi:10.1037/0882-7974.15.2.187
- Portela, M., Neira, I., & del Mar Salinas-Jiménez, M. (2013). Social capital and subjective wellbeing in Europe: A new approach on social capital. *Social Indicators Research, 114*(2), 493-511.
- Poulin, F., & Boivin, M. (2000). The role of proactive and reactive aggression in the formation and development of boys' friendships. *Developmental Psychology, 36*(2), 233-240. doi:10.1037/0012-1649.36.2.233
- Putnam, R. D. (2007). E Pluribus Unum: Diversity and Community in the Twenty-first Century The 2006 Johan Skytte Prize Lecture. *Scandinavian Political Studies, 30*(2), 137-174. doi:10.1111/j.1467-9477.2007.00176.x
- Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin, 132*(1), 1-25. doi:10.1037/0033-2909.132.1.1
- Rose, A. J., Carlson, W., & Waller, E. M. (2007). Prospective associations of co-rumination with friendship and emotional adjustment: Considering the socioemotional trade-offs of co-rumination. *Developmental Psychology, 43*(4), 1019-1031. doi:10.1037/0012-1649.43.4.1019
- Rosenbaum, P. R., & Rubin, D. B. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika, 70*(1), 41-55. doi:10.2307/2335942
- Sherif, M. (1958). Superordinate Goals in the Reduction of Intergroup Conflict. *American Journal of Sociology, 63*(4), 349-356.
- Stock, J. H., & Yogo, M. (2005). Testing for Weak Instruments in Linear IV Regressions in. D. Andrews and J Stock (Eds) *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg* (Cambridge: Cambridge University Press), pp. 80-105.
- Stoet, G., O'Connor, D. B., Conner, M., & Laws, K. R. (2013). Are women better than men at multi-tasking? *BMC Psychology, 1*(1), 18. doi:10.1186/2050-7283-1-18
- Van Zantvliet, P. I., & Kalmijn, M. (2013). Friendship networks and interethnic union formation An analysis of immigrant children. *Journal of Social and Personal Relationships, 30*(7), 953-973.
- Werner, C., & Parmelee, P. (1979). Similarity of Activity Preferences Among Friends: Those Who Play Together Stay Together. *Social Psychology Quarterly, 42*(1), 62-66. doi:10.2307/3033874



**Table 1 – Mean wellbeing by group composition**

	<b>Ethnic</b>	<b>Religious</b>
All friends of the same group	7.94	7.86
More than a half from same group	7.67	7.79
About a half from same group	7.58	7.88
Less than a half from same group	7.39	7.71

**Table 2 – Network composition and Wellbeing (OLS)**

	<b>Dependent variable: Subjective Wellbeing</b>			
	(1)	(2)	(3)	(4)
Diversity (by ethnicity)	-0.076*** (0.021) [-0.034]			
Diversity (by religion)		-0.049*** (0.018) [-0.026]		
Same ethnicity			0.077** (0.034) [0.020]	
Same religion				0.099*** (0.038) [0.025]
Female	0.187*** (0.032)	0.214*** (0.035)	0.187*** (0.032)	0.212*** (0.035)
Age	-0.078*** (0.006)	-0.074*** (0.006)	-0.078*** (0.006)	-0.074*** (0.006)
Age squared	0.086*** (0.006)	0.083*** (0.006)	0.086*** (0.006)	0.083*** (0.006)
Degree	-0.013 (0.042)	-0.016 (0.047)	-0.016 (0.042)	-0.016 (0.047)
Below degree	-0.089 (0.056)	-0.110* (0.061)	-0.091 (0.056)	-0.110* (0.061)
A level	0.060 (0.049)	0.071 (0.055)	0.060 (0.049)	0.072 (0.055)
Married	0.549*** (0.038)	0.542*** (0.041)	0.554*** (0.038)	0.545*** (0.041)
Single	-0.060 (0.052)	-0.043 (0.058)	-0.062 (0.052)	-0.043 (0.058)
Unemployed	0.019 (0.043)	0.028 (0.047)	0.021 (0.043)	0.028 (0.047)
Income	0.099*** (0.010)	0.097*** (0.011)	0.099*** (0.010)	0.098*** (0.011)
Illness	-0.810*** (0.046)	-0.819*** (0.050)	-0.812*** (0.046)	-0.821*** (0.050)
Asian	0.103 (0.151)	0.072 (0.156)	0.142 (0.151)	0.082 (0.156)
Black	-0.107 (0.167)	-0.149 (0.175)	-0.075 (0.167)	-0.146 (0.175)
White	0.115 (0.132)	0.154 (0.137)	0.185 (0.130)	0.166 (0.137)
Christian	0.153*** (0.042)	0.131** (0.052)	0.153*** (0.042)	0.137*** (0.052)
Buddhist	0.083	0.070	0.084	0.076

	(0.053)	(0.062)	(0.053)	(0.062)
Hindu	-0.146	-0.126	-0.134	-0.133
	(0.198)	(0.202)	(0.198)	(0.202)
Jewish	0.109	0.132	0.116	0.129
	(0.208)	(0.209)	(0.207)	(0.209)
Muslim	0.322**	0.333**	0.326**	0.339**
	(0.140)	(0.144)	(0.140)	(0.144)
Sikh	0.256	0.293	0.254	0.287
	(0.198)	(0.200)	(0.199)	(0.201)
Mental health	-0.982***	-0.961***	-0.983***	-0.960***
	(0.100)	(0.112)	(0.100)	(0.112)
Children	0.048	0.048	0.048	0.048
	(0.039)	(0.043)	(0.039)	(0.043)
Constant	8.352***	8.188***	8.111***	8.044***
	(0.200)	(0.207)	(0.191)	(0.204)
Observations	13,960	11,539	13,960	11,539
R-squared	0.120	0.116	0.119	0.116

Notes: Robust standard errors adjusted for heteroskedasticity in parentheses. Standardized coefficients in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3 – Network composition and Wellbeing (2SLS)**

	(1) Diversity (by ethnicity)	(2) Diversity (by religion)	(3) Same ethnicity	(4) Same religion
<b>Panel A – 2SLS with external instrument</b>				
Network composition	-0.625*** (0.112) [-0.276]	-0.852*** (0.175) [-0.451]	1.067*** (0.190) [0.275]	1.757*** (0.358) [0.439]
Controls?	Yes	Yes	Yes	Yes
Observations	13,960	11,539	13,960	11,539
R-squared	0.073	0.049	0.065	0.042
<b>First stage</b>				
Instrument	0.873*** (0.046)	1.059*** (0.910)	-0.509*** (0.011)	-0.500*** (0.039)
R-squared	0.312	0.118	0.560	0.278
F-statistic	361.83	135.53	515.53	160.20
<b>Panel B – Lewbel 2SLS with external and internal instruments</b>				
Network composition	-0.326*** (0.081) [-0.144]	-0.430*** (0.115) [-0.227]	0.308** (0.129) [0.079]	0.229*** (0.046) [0.057]
Controls?	Yes	Yes	Yes	Yes
Observations	13,960	11,539	13,960	11,539
R-squared	0.110	0.079	0.116	0.114
<b>First stage</b>				
R-squared	0.237	0.209	0.317	0.125
F-statistic	46.62	11.35	35.20	21.11
J-statistic	25.17	17.430	43.628	37.319
J P-value	0.0670	0.3583	0.1002	0.1109

Notes: In each column, the dependent variable is subjective wellbeing. Labels on top of each column represent the measure of network composition. Instrument is the flipped index of fractionalization (i.e., urban area index for respondent in rural areas). Robust standard errors adjusted for heteroskedasticity in parentheses. Standardized coefficients in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4 – Propensity Score Matching results**

	(1)	(2)
Diversity (by ethnicity)	0.101** (0.044)	
Diversity (by religion)		0.106** (0.047)
Observations	13,960	11,539

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5 – Difference by age, gender, ethnic and religious groups**

	(1) Diversity (by ethnicity)	(2) Diversity (by ethnicity)	(3) Diversity (by ethnicity)	(4) Diversity (by religion)	(5) Diversity (by religion)	(6) Diversity (by religion)
Network composition	-0.022 (0.029)	-0.086*** (0.022)	-0.012 (0.124)	-0.034 (0.027)	-0.059*** (0.019)	-0.007 (0.044)
Female*Diversity (by ethnicity)	-0.096** (0.038)					
Young*Diversity (by ethnicity)		0.104*** (0.037)				
Asian*Diversity (by ethnicity)			-0.114 (0.147)			
Black*Diversity (by ethnicity)			-0.299* (0.172)			
White*Diversity (by ethnicity)			-0.053 (0.126)			
Female*Diversity (by religion)				-0.027 (0.035)		
Young*Diversity (by religion)					0.131*** (0.038)	
Christian*Diversity (by religion)						-0.057 (0.050)
Buddhist*Diversity (by religion)						0.026 (0.060)
Hindu*Diversity (by religion)						-0.105 (0.196)
Jewish*Diversity (by religion)						-0.071 (0.199)
Muslim*Diversity (by religion)						-0.132 (0.125)
Sikh*Diversity (by religion)						-0.436*** (0.152)

Controls?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,960	13,960	13,960	11,539	11,539	11,539
R-squared	0.120	0.120	0.120	0.116	0.117	0.117

Notes: In each column, the dependent variable is subjective wellbeing. Labels on top of each column represent the measure of network composition  
Robust standard errors adjusted for heteroskedasticity in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A1 - Description and Summary Statistics of Variables**

<b>Variable</b>	<b>Descriptions</b>	<b>Mean</b>	<b>S.D.</b>
Wellbeing	On a scale of 0-10, where 0 is not at all satisfied and 10 is completely satisfied, overall, how satisfied are you with your life nowadays?	7.77	1.91
Diversity (by ethnicity)	What proportion of your friends are of the same ethnic group as you? 1 means “all the same”, 2 means “more than a half”, 3 means “about a half”, and 4 means “less than a half”	1.70	0.86
Diversity (by religion)	What proportion of your friends are of the same religious group as you? 1 means “all the same”, 2 means “more than a half”, 3 means “about a half”, and 4 means “less than a half”	2.01	1.05
Same ethnicity	Dummy variable equals 1 if respondent has all friends from same ethnic group as themselves	0.50	0.50
Same religion	Dummy variable equals 1 if respondent has all friends from same religious group as themselves	0.41	0.49
Female	Dummy variable equals to 1 if respondent is female	0.58	0.49
Age	Age of respondent	52.02	18.59
Age squared	Square of age/100	30.51	19.72
Degree	Dummy variable equals to 1 if respondent’s highest level of education is at the tertiary level (degree)	0.23	0.42
Below degree	Dummy variable equals to 1 if respondent’s highest level of education is at the tertiary level (non-degree)	0.09	0.29
A level	Dummy variable equals to 1 if respondent’s highest level of education is A-level	0.13	0.33
Married	Dummy variable equals to 1 if respondent is married	0.46	0.49
Single	Dummy variable equals to 1 if respondent is single (never married)	0.21	0.40
Unemployed	Dummy variable equals to 1 if respondent is unemployed	0.47	0.49
Income	Nine-point income scale	4.46	2.02
Illness	Dummy variable equals to 1 if respondent has no long-term illness	0.37	0.48
White	Dummy variable equals to 1 if respondent is of White ethnic origin	0.88	0.32
Black	Dummy variable equals to 1 if respondent is of African ethnic origin	0.03	0.16
Asian	Dummy variable equals to 1 if respondent is of Asian ethnic origin	0.06	0.24
Other/mixed race	Dummy variable equals to 1 if respondent is of other ethnic origin or Mixed race (not Black, Asian, White)	0.03	0.16
Christian	Dummy variable equals to 1 if respondent is Christian	0.59	0.49
Buddhist	Dummy variable equals to 1 if respondent is Buddhist	0.17	0.38
Hindu	Dummy variable equals to 1 if respondent is Hindu	0.01	0.10
Jewish	Dummy variable equals to 1 if respondent is Jewish	0.01	0.09
Muslim	Dummy variable equals to 1 if respondent is Muslim	0.03	0.16
Sikh	Dummy variable equals to 1 if respondent is Sikh	0.01	0.11
Mental health	Dummy variable equals to 1 if respondent has any physical or mental health conditions	0.07	0.26
Children	Dummy variable equals to 1 if respondent lives in a household with children	0.29	0.45
Female*Diversity (by ethnicity)	Interaction between gender (female=1) and Diversity (by ethnicity)	0.96	1.07
Young*Diversity (by ethnicity)	Interaction between young people dummy and Diversity (by ethnicity)	0.16	0.61
Asian*Diversity (by ethnicity)	Interaction between ethnicity (Asian=1) and Diversity (by ethnicity)	0.13	0.59
Black*Diversity (by ethnicity)	Interaction between ethnicity (Black=1) and Diversity (by ethnicity)	0.07	0.44
White*Diversity (by ethnicity)	Interaction between ethnicity (White=1) and Diversity (by ethnicity)	1.47	0.89
Female*Diversity (by religion)	Interaction between gender (female=1) and Diversity (by religion)	1.18	1.29



Young*Diversity (by religion)	Interaction between young people dummy and Diversity (by religion)	0.17	0.64
Christian*Diversity (by religion)	Interaction between religion (Christian=1) and Diversity (by religion)	1.22	1.23
Buddhist*Diversity (by religion)	Interaction between religion (Buddhist=1) and Diversity (by religion)	0.37	0.89
Hindu*Diversity (by religion)	Interaction between religion (Hindu=1) and Diversity (by religion)	0.03	0.32
Jewish*Diversity (by religion)	Interaction between religion (Jewish=1) and Diversity (by religion)	0.02	0.26
Muslim*Diversity (by religion)	Interaction between religion (Muslim=1) and Diversity (by religion)	0.08	0.46
Sikh*Diversity (by religion)	Interaction between religion (Sikh=1) and Diversity (by religion)	0.04	0.34

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**Figure A1 – Distribution of Subjective wellbeing response**