Social participation of youth with disability: a study with the first seven waves of HILDA

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Abstract

This research investigates the impact of disability on social participation of youth (15-24 years) in Australia and aims to contribute to the evidence base for the Social Inclusion Agenda of the Australian Government using the first seven waves of the Household, Income and Labour Dynamics in Australia (HILDA) Survey.

HILDA is a large, nationally representative Australian panel survey with rich information on social participation. This research chooses active club membership, attendance at religious services and social interaction with friends or relatives as key indicators of social participation. In addition, two comprehensive indices – involvement in group activities and personal contact – are derived from 12 items regarding community participation using factor analysis. In this study disability is defined as having any long-term health condition, impairment or disability that restricts one's everyday activities, and has lasted or is likely to last, for 6 months or more.

On average, youths with disability had lower levels of social participation as indicated by a lower probability of being an active club member, less frequent contact with friends or relatives and less personal contact. However, after controlling for other observed factors and unobserved heterogeneity, differences in social participation by the incidence, type, onset and severity of disability were not significant. In relation to social participation outcomes, disability was found to be correlated and interact with some other aspects of disadvantage such as low income. As such, the research raises issues about whether young people with disability are at risk of multiple disadvantages. Personality is also found to be an influential factor for social participation, suggesting that controlling for unobserved heterogeneity when data on personality is not available should be an important consideration when examining this issue.

Introduction

This research investigates the social participation of youth (aged 15-24 years) with disability. Social participation is a broad concept.[1] In this paper it refers to connecting with others in life through family, friends, work, personal interests and local community. Social participation is also and important and integral part of social inclusion as conceptualised in the Social Inclusion Agenda of the current Government (Australian Government 2009). The significance of the issue and related literature are discussed in the next section.

The data used for this research is the first seven waves of the Household, Income and Labour Dynamics in Australia (HILDA) survey. Several indicators are selected to reflect the social participation of youth, including active club membership, frequency of contact with friends/relatives, and attendance at religious services. In addition, two comprehensive measures of social participation are derived from the 12 items on community involvement in wave 6 of the HILDA survey using factor analysis, namely involvement in group activities and personal contact (involving individual friendships).

In this study, disability is defined as having any long-term health condition, impairment or disability that restricts one's everyday activities, and has lasted or is likely to last, for 6 months or more. In Australia, according to the latest Survey of Disability, Ageing and Carers conducted in 2003 by the Australian Bureau of Statistics (ABS), 9% of youth (aged 15-24 years) have a disability and 2.2% have a severe or profound core-activity limitation (ABS 2004a). The effects of the incidence, onset, duration and severity of disability on the selected indicators of social participation are explored using one or multiple waves of HILDA where appropriate; both bivariate and multivariate analytical techniques are applied. The research also examines the association between disability and disadvantage in other aspects (for example, low family income) as well as their interactions with respect to affecting the social participation of young people. Section 3 of the paper introduces the data, the sample and the methodology in detail.

[1] Bittman (1999), for instance, uses it as the opposite of social exclusion; in other words, equivalent to the concept of social inclusion in the Social Inclusion Agenda.

To briefly preview the results, there is no significant difference in the selected indicators of social participation by the disability status (including any disability on average and certain types, onset and severity of disability) of youth after controlling for other individual characteristics, family background and contextual factors. However, significant associations are found between disability and some other aspects of disadvantage, such as poor health conditions, non-intact family background, low family income and locational disadvantage. In addition, for young people with disability, there were significant associations between some aspects of social participation and some aspects of disadvantage; for instance, among youths with disability there were significant interactions between less frequent contact with friends/relatives and being brought up in a non-intact family or having poor/fair health. As such, this research raises issues about whether young people with disability are at risk of multiple disadvantages. The full results are reported and discussed in Section 4 of the paper, and the last section summarises the main findings and concludes.

Literature review

The importance of social participation in promoting people's wellbeing is well documented (AIHW 2007; Burt 1987; Helliwell 2006; Phillips 1967; Pinquart and Sorenson 2000; Powdthavee 2008; Putnam 2000; Taylor et al 2001; Ueno 2005). Social participation has been found to affect an individual's life in various ways, including, but not limited to, lowering anxiety, increasing confidence and self-esteem, building identity and trust, forming social networks, improving communication skills, and accumulating social capital. Lack of social participation, on the other hand, has been associated with poorer wellbeing. For instance, low levels of social participation have long been accepted as one aspect or even one definition of poverty (Gordon et al 2000; Hayes et al 2008; Platt 2006). Powdthavee (2008) estimated that in the United Kingdom (UK) an increase in the level of social involvement was worth up to an extra 85,000 pounds a year in terms of life satisfaction, much higher than the impact of actual change in income. In addition, the close relationship between social participation and political involvement, which is also an important aspect of social inclusion, is widely observed (Hyman and Shingler 1999; Cassel 1999 and references therein).

Social participation may be particularly important for youth with disability. The period from adolescence to adulthood is a critical transitional life stage for many young people, a stage of forming values and philosophy, building identity, establishing relationships and gaining independence from family. During this transition young people often encounter great uncertainties and tremendous developmental challenges. These may be made more stressful by the presence of a disability, thereby increasing the risk of social exclusion (Blacher 2001; Dewson et al. 2004; Lichtenstein 1998; Winn and Hay 2009). At the same time, the transition to adulthood may be eased by increased social involvement. Social participation has been found to be a significant predictor of the success of this life transition (Huon and Sankey 2000), and the transition success is highly correlated with the quality of life of individuals[2] with disabilities and also their families (Blacher 2001). As such, promoting the social participation of youth with disability may in turn have positive flow on effects in terms of improving both their successful transition into adulthood and their overall wellbeing.

Although it may seem evident that the presence of a disability may pose a greater risk for low levels of social participation, the actual evidence is mixed and studies of youth are fairly limited. According to the National Longitudinal Transition Study-2 (NLTS2), a nationally representative sample of youth in the United States (US), secondary-school-age youth (13-16 years) with a disability on average were substantially less likely to participate in community service or volunteer activities (41 per cent) than youth in the general population (73 per cent) (Wagner et al 2004). The level of involvement with friends and in extracurricular groups was also found to vary significantly according to the type of disability. Compared with the general population of youth with a disability, young people with a learning disability or speech impairment, for example, were among the most active; youth with hearing impairments were more likely to participate in group activities but had less frequent contact with friends; youth with emotional disturbances were less likely to be active group members; and youth with autism, multiple disabilities, or deaf-blindness had the lowest level of involvement with friends (Wagner et al 2004).

[2] McIntyre et al (2004) reported what mothers described the quality of life for their children (aged 18-24 years) with severe intellectual disability; recreation, activities, hobbies and belonging to a social network were mostly commonly mentioned as the important components of their child's quality of life. In contrast, work was a much less common response.

Another US based study on students (of elementary to high schools) with disability also found that participation in school activities (including social, recreational, communal, creative, civic and academic) varied significantly by the nature of the disability (Simeonsson et al 2000). The study found that students with attention or language and learning problems had the highest participation in these activities, followed by those with perception, hearing and vision problems, and students with emotional and behaviour problems. Students with speech, neuro-muscular, intellectual development, and neurological problems had significantly lower participation, and participation of those with multiple disabilities was the lowest. The study, however, provided no comparison between students with and without disability.

There is also evidence from research conducted in other countries that disability may be a factor in social isolation. The European Commission, for example, concluded that disability was one of the major factors leading to social exclusion in the European Union (Finnish Disability Forum 2003). A study that they conducted examined accessibility of housing, culture, restaurant, cinemas, sports, clubs and other social activities and found that individuals with a disability were considerably more disadvantaged than those without a disability. The study noted that people with a disability commonly felt excluded from leisure and cultural activities. They also faced significant barriers in other areas of social life, such as participating in religious services. Important barriers for social participation included barriers in communication, attitudes, prejudice as well as physical and architectonical barriers.

Similar barriers to social participation have been found in Australia. Australian Social Trends (ABS 2006a), for example, revealed that among all adults with disability (aged 18 years and over), one third of them did not leave their home as often as they would like; making participation in social activities outside the home more difficult. There were also large differences between disability groups in this respect; for instance, adults with a sensory or speech disability reported the highest proportion (70 per cent) of leaving home as often as they liked, while this was considerably lower among those with head injury, stroke or other brain damage (50 per cent) and especially those with a psychological disability (42 per cent) (ABS 2006a). Other studies reported similar findings relating to the type of disability. For example, a report of the Australian Institute of Health and Welfare (AIHW) on children with juvenile arthritis, showed that sports participation and fitting in socially were among the most

commonly reported difficulties in children with this particular condition (AIHW 2008). The report pointed out that these children could become socially isolated because of their difficulties in participating in a variety of physical activities. Two studies cited in the report, Ostensen et al (200) and Packham and Hall (2002), showed that young male adults with juvenile-onset arthritis were more likely to live alone without dating, had less frequent sexual activity, and were less likely to be in a stable relationship. The report noted that there were no similar data in this respect in Australia.

Other studies conducted overseas, however, suggest that the relationship between social participation and disability may not be so clear cut. According to Canada's 2003 General Social Survey (GSS) on social engagement the activities of volunteering (spending time with youth groups, sports teams, churches, political parties and other organisations) and helping others (performing tasks for a family member, friend or neighbour) were found to be significantly correlated with age and community context (Kolb 2007). However, disability did not appear to have a large effect on people's level of engagement in volunteering or helping activities. The findings of Platt (2006) also lend some support to this finding. Using a large sample British survey, Platt analysed the impact of long term illness and caring on the social engagement of working age people, selecting measures which included: lack of visiting; lack of being visited; lack of going out and lack of organised activities. The author found that, in contrast to caring, long term illness had little association with reduced social participation.

In general, young people in Australia have been found to have relatively higher levels of social participation than other adults. In 2002, 96 per cent of young people aged 18-24 years participated in at least one social activity outside home in the three months prior to interview and participation declined gradually with age (ABS 2006a). However, there are no published statistics which provide a comparison in social participation between youths with and without disability.

A more recent study in Australia was undertaken by Yu (2009). Based on the Youth in Focus (YIF) data, a large dataset of a cohort of 18-year-old young people in 2006, Yu (2009) revealed that youths growing up with developmental/learning disability were significantly less likely to have frequent contact with friends than their peers with no disability, while no significant difference was found between youths growing

up with physical disability and those with no disability with respect to having an active club membership and frequency of contact with friends.

The Australian Government strives to improve the social participation of all Australians as one important objective of the Social Inclusion Agenda. Youth with disabilities are an intersection of two focal groups targeted by the Agenda – people with disability and children at high risk of disadvantage. However, existing knowledge on the social participation of Australian youth with disability is not comprehensive. Using the HILDA data this research aims to add to the evidence base on this issue.

Data and Methodology

Data

The data source used for this research is the Household, Income and Labour Dynamics in Australia (HILDA) Survey. Several outstanding features of the HILDA survey make it ideal for this research.

Firstly, it contains a large national representative sample of the contemporary Australian population. The first wave, which was conducted in 2001, consisted of 7,682 households and 19,914 individuals.

Secondly, it has rich information on individual characteristics, family background and contextual factors; in particular, it includes the key variables of interest to this research – social participation and disability. As such, it provides a large pool of variables to be selected for empirical analyses.

Thirdly, it is a longitudinal survey. Up to the time of the study, seven waves of data were available. This makes it possible to track people over time, investigate changes and triggers in key variables of interest, and apply longitudinal statistical approaches in order to control for time-constant unobserved heterogeneity.

Notwithstanding its apparent merits, the HILDA survey also has some issues which need to be addressed in this research. Some variables, for instance severity of disability, and personality, are not measured in every wave; other variables, such as the onset of disability, were asked in different ways across waves; and the attrition rate for young people (nearly one quarter between the first and the second wave) is much higher than that for the whole HILDA sample (less than 14 per cent between the

same two waves). As such, different sub-samples and methodologies have to be applied to investigate the impact of different aspects of disability (type, onset and severity) on selected indicators of social participation (active club membership, contact with friends/relatives, religious activities, involvement in group activities and personal contact).

Sample

The target group for this research is young people aged 15-24 years, and the working sample is restricted to those in this age group who were interviewed in any of the first seven waves of HILDA[3]. This working sample consists of approximately 5,000 young people in total and around 2,300 youths in each wave. In total, there are about 16,000 observations (person-waves).

There are five measures used for identifying social participation in the HILDA survey. These are: active club membership (measured in all waves), frequency of contact with friends or relatives (all waves), frequency of attending religious services (in wave 4 only), involvement in group activities and personal contact. These two last measures were identified through principal components analysis using 12 items from Wave 6 regarding community involvement (see Appendix I for details of the analysis). All these variables reflect different aspects of social participation, and all of them are explored in this paper.

In this research, disability is defined as having any long-term health condition, impairment or disability that restricts in one's everyday activities, and has lasted or is likely to last, for 6 months or more. This definition is consistent with the one used by the Australian Bureau of Statistics (ABS 2004a). The HILDA survey also contains information on severity (in wave 4 only), type (in waves 3-7) and onset of disability (in all waves). One point to note is that the type of disability – sensory, physical or other – is not mutually exclusive and some people may have multiple disabilities[4].

[3] The observations of youths who were older than 24 years in a wave were excluded even though they may be in the working sample when they were 24 years or younger in an earlier wave.

[4] The classification in the type of disability follows Mavromaras et al (2006). Individuals with multiple disabilities were supposed to be more disadvantaged than those with only one disability. As such, a dummy variable was created to indicate having multiple disabilities; however, the variable was always insignificant, probably due to the small number of observations in this group. As such, it was not included in the final models reported in this paper.

Severity of disability is based on the degree of restriction in core activities – communication, mobility and self care – reported by the young people[5].

The description of key variables used in this research and their available waves in the HILDA survey are summarised in Table A.2 in the Appendix, and Table 1 provides a statistical summary of these variables.

(Table 1 is about here)

Methodology

The main issue of this paper is how disability affects the social participation of youth. Specifically, the paper aims to explore the following questions:

(1) Are young people with disability on average less likely to participate in social activities, and how does the onset, type and severity of disability affect the social participation of youth?

(2) Does disability have a role to play in social participation after controlling for other individual characteristics, family background and contextual factors?

(3) How does disability interact with other aspects of disadvantage, such as low income, to affect the social participation of youth?

The first question is explored by tabulating the five social participation variables by disability status. The significance of the differences between disability categories is tested using Wilcoxon rank-sum test[6] for binary variables (e.g., any disability) and regression for multi-categorical disability variables (e.g., severity of disability) without controlling for other factors.

Multivariate analysis is applied to answer the other two questions. The social participation of young people may be influenced by many factors. Generally speaking, a youth decides to participate in social activities only if he/she expects to have positive utility gains from the participation. The decision is subject to at least three key constraints: (1) free time available (apart from education and employment);

[5] The classification of severity of disability follows that in ABS (2004a).
[6] Wilcoxon rank-sum test, also known as the Mann-Whitney-Wilcoxon test, tests the hypothesis that two independent samples are from populations with the same distribution (http://en.wikipedia.org/wiki/Mann-Whitney_U_test).

(2) income constraint; and (3) available and accessible participation opportunities[7]. Factors affecting these constraints also influence the participation decisions of youth. However, the effects of some factors may not be clear cut. For instance, participation in education and employment reduces available time for social participation, but in the meantime it may also increase the opportunity for social involvement as classmates and colleagues may become friends[8].

Fortunately, HILDA contains measures or proxies for most of the factors. However, some variables which may have significant impact on social participation, such as preference and personality, are still unavailable in all or most waves. This is where a fixed effect model can be a better choice. In addition, not all variables of interest are available in all the seven waves, as such, different waves of HILDA were used and different methodologies were applied to answer these questions. Ordinary Least Square (OLS), Logistic, Ordered Logistic, and/or Fixed Effect models were estimated where appropriate as discussed below.

(I) Active club membership and frequency of contact with friends/relatives.

Active club membership and frequency of contact with friends/relatives are available in every wave of HILDA; the former is a binary variable and the latter is a categorical variable (treated as a continuous variable in the fixed effect models). Six models were estimated for each measure.

First, a pooled logistic or ordered logistic model was estimated using all the seven waves and including a dummy variable for having any disability (1 for yes and 0 for no). Onset of disability was not included in this model as in the first two waves it was asked in different ways from the other five waves. Other control variables included age, sex, country of birth, Indigenous status, current health conditions, studying, labour force status, equivalised household income[9] (in 2001 dollars) and income squared, negative household income, partnered, having children, being a carer, education, type of school attended, both parents from non-English-speaking countries,

[7] Bittman (1999) argues that the ability to participate in leisure is the product of both access to leisure goods and services, and a sufficient availability of leisure time. Income is found to powerfully determine the consumption of leisure goods and services, but has no significant effect on available leisure time. This paper includes another constraint to reflect other limitations for participation caused by, for instance, availability and accessibility of community facilities and services.
[8] As Murray (2002) points out , schooling is the place where most young people make friends.
[9] The Australian Bureau of Statistics' equivalence scale was used to calculate the equivalised household income (ABS 2006b).

family type when the youth aged 14 years, homeownership, being oldest child in the family, number of siblings, having a resident sibling with disability, state, location, SEIFA disadvantage index and SEIFA squared[10]. These control variables either potentially affect the income constraint, available time or opportunities for youth social participation, or have been reported to be a significant factor in the literature. Robust tests showed that the main findings were not sensitive to the inclusion/exclusion of some control variables such as education, type of school attended, number of siblings and location.

Second, a pool logistic or ordered logistic model was estimated using waves three to seven and including the onset and type of disability. Other variables were the same as in the first model.

Third, a fixed effect model[11] was applied using all seven waves and a dummy variable for disability. All time constant variables in the first two models, such as Indigenous status, were excluded, and the others remained the same except that a continuous variable of health – transformed SF36 general health (0-100) – was used instead of a categorical variable for self-reported health.

Fourth, a fixed effect model was estimated using waves three to seven and including dummies for three types of disability – sensory disability, physical disability and other disability. Other control variables were the same as in the third model.

Fifth, severity of disability was included in the model along with onset and type of disability. Since severity was only reported in wave 4, the model was estimated using wave 4 only with a logistic model for active club membership, and with an ordered logistic model for contact with friend. Religion and religiosity were also included in this model along with the variables in the second model.

Finally, as participating in a club or association and contact with friend may be affected be one's personality, in the sixth model five personality variables from wave 5 were included for those young people who were interviewed in both wave 4 and wave 5. The other control variables remained the same as in model 5.

(II) Frequency of attending religious services.

[10] Some models also included wave dummies.
[11] Hausman tests were conducted and the results consistently suggested fixed effect models be more appropriate than random effect models where possible in this research.

Attendance at religious services was only available in wave 4; as such a fixed effect model could not be applied. In HILDA this variables has nine levels from (1) never to (9) everyday.

This variable was treated in two ways. One was transforming it into a new categorical variable with five categories (each with about 100 or more observations): (1) never; (2) less than once a year; (3) about once a year; (4) several times a year; and (5) once a month or more frequently. Two ordered logistic models were applied for this indicator with or without controlling for personality.

The other way was treating the frequency as a continuous variable. Since more than half of the youths in the sample had never attended any religious services, a tobit model was applied for estimation. The other control variables were the same as in the fifth model for active club membership and contact with friends/relatives.

(III) Involvement in group activities and personal contact.

There were two variables derived from the 12 items regarding community participation in wave 6 (see Appendix I for details of the 12 items and the factor analysis). Two models were estimated for each of them with the onset and type of disability included. One model was estimated with OLS controlling for the same set of variables as in the fifth model for active club membership. In the other model, as was done in the sixth model for active club membership, the five personality variables from wave 5 were also included using a sub-sample of youths who were interviewed in both wave 5 and wave 6.

(IV) Interaction between disability and other aspects of disability

To investigate the third question – whether multiple disadvantages are more detrimental for social participation – an interaction term of disability and selected indicators of disadvantage, such as Indigenous status and low family income, was included in the models. Depending on the specific analysis/model, some variables are re-classified to reach a reasonable sample size. The results of the analysis are reported and discussed in the next section.

Results

1. Are young people with disability on average less likely to participate in social activities?

This section compares the social participation of youth by disability status (yes/no) and also by type, onset and severity of disability. The results are reported in Table 2.

(Table 2 is about here)

First, the distributions in the five selected indicators of social participation of youths with and without any disability were compared using the Wilcoxon rank-sum test, and shown in the first panel of Table 2 (the first two lines). On average, youths with disability had a lower probability of being an active club member, had less frequent contact with friends/relatives, and also had less personal contact overall than those with no disability (all significant at the 5 per cent level). The differences in attendance at religious services and involvement in group activities were not statistically significant.

Second, when types of disability were considered (see the second panel of Table 2), youths with sensory, physical or other types of disability all had less frequent contact with friends/relatives than youths without these types of disabilities. Youths with a sensory disability or disabilities other than sensory and physical also had a significantly lower probability of being an active club member than others; however, the difference between youths with and without a physical disability was not significant in this respect.

Third, differences in the five indicators by the onset of disability are shown in the third panel of Table 2. On average youths who had a disability since birth had significantly lower club membership, less frequent contact with friends or relatives, and less frequent attendance at religious services than those without disability. Interestingly, for youths who acquired their disability after the age of 20 years, although they had a significantly less frequent contact with friends/relatives, they were significantly more likely to participate in group activities than the reference group – those who had no disability.

Finally, as shown in the fourth panel of Table 2, the association between the severity of disability and social participation was generally not significant, except that

disability with no restriction in core activities was associated with a significantly lower probability of having an active club membership[12].

2. Does disability have a role to play in social participation after controlling for other individual characteristics, family background and contextual factors?

The last section reports some significant differences in social participation between youths with and without disability, and also differences by type, onset and severity of disability. However, these differences may not necessarily be attributable to disability, but may be due to differences in socio-economic status and other factors. This section examines whether the differences remain significant after controlling for other observed and unobserved factors in HILDA.

Tables 3-6 report the associations between different measures of disability and the five selected indicators of social participation estimated using various different models – pooled OLS, logistic, ordered logistic, tobit and fixed effect models. Each model has its pros and cons, using larger samples, or including more variables, or being technically more reliable. Overall, the results consistently showed no evidence on the existence of significant associations (at the five per cent level) between social participation and type, onset and severity of disability in the HILDA youth sample with a single exception; that is, youths with a disability other than sensory and physical type had significantly higher levels of involvement in group activities than others after controlling for personality and other variables (model IV.2 in Table 6). Interestingly, the difference was not significant when personality was not controlled for (model IV.1 in Table 6). This result was due to a high (negative) correlation between personality (emotional stability) and other type of disability.

(Tables 3-6 about here)

Using the Youth in Focus (YIF) data, Yu (2009) also found that youths with physical or developmental/learning disability were not significantly different from those with no disability in having an active club membership. However, Yu (2009) reported a

[12] There is no simple explanation for this result, while labour force status may have some role to play. The proportion of unemployment was the highest among youths who have a disability with no restriction in core activities (15.2%), nearly twice as high as among youths with no disability. Although youths with mild to severe disability had the lowest proportion of employment (50%), few of them were unemployed (less than 7%); in other words, many of them were not in the labour force.

significantly lower frequency of contact with friends for youths with developmental/learning disability than those with no disability. What is likely to be the source of this difference? A few differences between the YIF and the HILDA data should be noted here. First, the way disability is conceptualised differs between the two surveys. In the YIF data disability is defined as any prior or current diagnosis of a disability, while in the HILDA disability refers to a self reported current disability (see methodology for a full definition). Second, in this paper the contact variable includes contact with friends as well as relatives, whereas in the previous study, the variable only included contact with friends. In addition, the YIF sample only consists of a single cohort of 18 year old youths (from low to middle income families only), while youths in this HILDA sample are aged between 15 to 24 years old.

3. How does disability interact with other aspects of disadvantage to affect the social participation of youth?

One concern when examining this issue is that disability may be correlated with other aspects of disadvantage and double or multiple disadvantages may make youth outcomes even worse. Yu (2009) reported a significant relationship between growing up with a disability and poor current health as well as poor school attainment. However no significant correlation was found between disability and most other disadvantages, including Indigenous status, intensive family income support receipt (as an indicator of low family income), maternal teenage motherhood and poor education, remoteness and socio-economically disadvantaged location.

Consistent with Yu (2009), this research also found that disability was significantly associated with poor health and poor educational attainment (Year 11 or below). However, unlike the results from the YIF sample reported by Yu (2009), significant associations were also found between disability and other aspects of disadvantage in the pooled HILDA youth sample[13], including non-English-speaking family background (negative correlation)[14], non-intact family background, low family income (the lowest 20 percentiles of equivalised household income in 2001 $), and

[13] The association between disability and Indigenous status was not always significant, probably due to small sample size. Indigenous young people were not significantly more likely to have a disability than other youths but they were significantly more likely to have more severe disabilities.
[14] Youths whose parents were both born in a non-English-speaking country were significantly less likely to have a disability, probably due to the selective immigration policy of Australia.

socio-economically disadvantaged areas (the lowest 20 percentiles of SEIFA disadvantage index).

Notwithstanding the insignificant associations between disability and other aspects of disadvantage, Yu (2009) found that among young people with disability, there were significant associations between certain outcome indicators and certain other disadvantages, including non-intact and non-English-speaking family background, exposure to intensive family income support receipt, maternal teenage motherhood and poor educational attainment, and socio-economically disadvantaged location. It should be noted here that the associations reported in Yu (2009) and also in the current research do not necessarily indicate a causal relationship. As the ABS (2008) pointed out, the relationship between disability and socioeconomic disadvantage is complex and causality may exist in both directions.

The next question is whether the findings regarding multiple disadvantages of Yu (2009) are also valid for the youths in the HILDA sample. For this purpose, Models I.3, I.4, I.6, II.3, II.4, II.6, III.2, IV.2, and V.2 were estimated including interaction terms of disability (any disability or certain types of disability) and indicators of other disadvantage (Indigenous status, non-English-speaking family background, non-intact family background, poor/fair health conditions, low household income, and locational disadvantage). The results are summarised in Table 7.

(Table 7 is about here)

Generally, among youths with disability there were significant associations between:

- lower levels of contact with friends/relatives and being brought up in a non-intact family or having poor/fair health; and
- lower likelihood of being an active club member and having poor/fair health.

On the other hand, there was also a significant association between having more frequent contact with friends/relatives and living in socio-economically disadvantaged areas.

When specific types of disability were considered, for youths with a sensory disability there were significant associations between:

- more frequent attendance at religious services and having both parents born in non-English-speaking countries;

- lower levels of personal contact and having poor/fair health; and
- lower levels of involvement in group activities and personal contact, and low household incomes.

For youths with a physical disability, there were significant associations between lower likelihood of being an active club member, and having both parents from non-English-speaking countries, poor/fair health and low household incomes. However, there were also significant associations between a higher likelihood of being an active club member, and being brought up in non-intact families and living in socio-economically disadvantaged areas. In addition, for youths with a physical disability less frequent contact with friends/relatives was also significantly associated with poor health.

Among youths with a disability other than a physical or sensory type, there was a significant association between less frequent contact with friends/relatives, and poor/fair current health and low household income. Interestingly, however, poor/fair health was significantly associated with a higher likelihood of being an active club member.

As such, the results of the estimations did show evidence for significant interactions between disability and other types of disadvantage. However, the outcomes of these interactions were not necessarily always negative with respect to the social participation of youth; for instance, the interaction between disability and socio-economically disadvantaged location. In addition, the results also indicated that involvement in group activities (such as being a club member) and personal contact (such as contact with friends/relatives) reflect different dimensions of community participation. They also have different implications for young people with disability. Friends and relationships are highly valued by young people with disability and also their families, and participating in group activities is an important way to make friends and form relationships.

4. Which other factors matter for social participation of youth?

So far the discussion has mainly focused on the associations between disability and social participation. This section looks at other influencing factors of social participation for youth overall (see Table 8 for a summary of the results).

(Table 8 about here)

Money and time are expected to be two key constraints for social participation of youth. Equivalised Household income (in 2001 $)[15] was included in all the models along with income squared and a dummy variable for having negative household income. Higher equivalised household income was significantly correlated with a higher level of personal contact (controlling for personality or not). It was also positively associated with active club membership and frequency of contact with friends/relatives, but these associations became insignificant when unobserved heterogeneity was considered. The associations between household income and attendance at religious services and involvement in group activities were generally insignificant after controlling for other factors.

As discussed in the methodology section, participation in education and employment is likely to reduce the available time for social activities, but it may also increase the opportunity for social participation. The results of this paper suggested that the latter effects either dominate over or cancel out the former. Full-time study was consistently associated with significantly higher levels of attendance at religious services and involvement in group activities for youth. It was also positively correlated with club membership, contact with friends/relatives and overall personal contact; however, these associations became insignificant when unobserved heterogeneity or personality was taken into consideration. Employment was also not found to affect social participation of youth. Labour force status variables were generally insignificant in nearly all the models estimated with just a few exceptions, and when unobserved heterogeneity was taken into consideration these variables all became insignificant. As such, available time may not be a significant constraint for youth participation in social activities.

[15] Using individual disposable income led to similar findings.

Unlike disability, the current health condition of youth was found to be a significant predictor for all types of social participation except religious activities. Generally, poor/fair health was associated with a significantly lower level of participation as measured by active club membership, contact with friends/relatives, and personal contact. Involvement in group activities was also negatively correlated with poor/fair health but this correlation became insignificant after controlling for personality. One point to note here is that, although there was a strong correlation between the two variables of disability and health condition, the size and the significance of one of these variables was not strongly affected by the inclusion or exclusion of the other. As such, disability and health conditions seem to reflect different aspects of one's health.

The importance of personality for social participation has also been highlighted in the literature (Powdthavee 2008). While measures of personality are rarely readily available for researchers, wave 5 of the HILDA data contains a personality measure based on the Big Five Personality Inventory. This makes it possible to directly examine the association between personality and social participation.

The results confirmed the important relationship that personality has with the social participation of youth, with different personality types being differentially associated with different types of social participation. Emotional stability was negatively associated with active club membership; extroversion was positively associated with frequency of contact with friends/relatives; a higher level of conscientiousness was associated with less frequent attendance at religious services; involvement in group activities was higher among youths with higher levels of emotional stability and openness to experience; and personal contact overall was positively related to extroversion, agreeableness and openness to experience. The significance of personality shown in the results in turn highlighted the importance of controlling for unobserved heterogeneity in the analysis on social participation when data on personality is not available.

Home ownership tends to encourage investment both in local amenities and social connections, probably due to lower mobility rates for homeowners (DiPasquale and Glaeser 1999). The results of this paper also found renters were significantly less likely to be involved in group activities than homeowners, but the differences between renters and homeowners were not significant with respect to attendance at religious services and personal contact.

Female youth were found to be significantly less likely to be an active club member and also have significantly less frequent contact with friends/relatives than male youth. However, they had significantly higher personal contact overall – including, for example, talking about current affairs with friends, family or neighbours – than males, and they were not much different from males in the attendance at religious services and involvement in group activities.

Preliminary analysis showed different indicators of social participation had clear and different age patterns. As such, age was included in all the models, and the most flexible form of age – a dummy for each single age – was used (using age and age squared led to similar results). The results showed that club membership, contact with friends/relatives and attendance at religious services generally decreased with the age of youth. The two comprehensive measures of social participation – involvement in group activities and personal contact – however, did not vary much across age after controlling for other factors.

Platt (2006) found caring affected people's opportunities for sociability in the UK while long-term illness did not. To see if this is also true in Australia, a variable of actively caring for other household member due to long-term health condition, elderly or disability was included in all the models estimated. The variable was mostly insignificant, but it may be due to the small number of carers (less than one per cent) in the sample.

Partnered youths had significantly less frequent contact with friends/relatives than those who were not partnered in all the six models estimated. They were also less likely than single youths to be an active club member, but the coefficient was not always significant.

Indigenous status was generally insignificant for most indicators of social participation except that Indigenous young people tended to have more frequent contact with friends/relatives; however, once personality factors were considered, this difference became insignificant. Youths born in non-English-speaking countries were less likely to be active club members and had less frequent contact with friends/relatives than Australian-born youths; again, controlling for personality removed this difference.

Lower levels of completed education were associated with significantly less frequent attendance at religious services, but they were generally insignificant in the models of other social participation indicators.

In comparison to youths who were living with both parents – from intact families – at age 14 years, those from stepfamilies were less likely to be an active club member, and had lower levels of involvement in group activities; youths from single-parent families were also less likely to have an active club membership.

Youths whose parents were from non-English-speaking countries had significantly higher attendance at religious services than other youths. They were less likely to be an active club member but the difference from other youths became insignificant once personality was controlled for.

Religion (only available in wave 4) and religiosity, as expected, were significant predictors for attendance at religious services; the attendance monotonically increased with religiosity. Youths with a Christian religion were also significantly more likely to be an active club member than those with no religion, but the difference between youths with non-Christian religions and those with no religion were not much different in this aspect. Youths who attended Catholic or other non-government schools were also significantly more likely to attend religious activities.

The social participation of youth did not show clear locational patterns except that youths living in Queensland had significantly lower levels of personal contact and less frequent contact with friends/relatives than those living at New South Wales or ACT. Other factors including being the oldest child in the family and having a sibling with disability were generally insignificant.

Conclusions

This paper investigated social participation of Australian youth with disability using the HILDA data. Five indicators of social participation were selected, including active club membership, frequency of contact with friends/relatives, attendance at religious services, and two comprehensive measures of community participation – involvement in group activities and personal contact. Various methodologies were applied and the results were compared.

On average, youths with disability had lower levels of social participation as indicated by a lower probability of being an active club member, less frequent contact with friends/relatives, and less personal contact. However, no significant difference was found in attendance at religious services and involvement in group activities, on average, between youth with disability and others. Levels of social participation also varied with the type, onset and severity of disability.

Notwithstanding the significant differences observed between youths with and without disability on average, after considering other factors such as health conditions and personality, no evidence was found that disability of youth (including type, onset and severity of disability) significantly affected their social participation.

However, disability of youth was found to be significantly associated with other aspects of disadvantage, such as poor health conditions, poor educational attainment, non-intact family background, low family income, and socio-economically disadvantaged location. Of course, as mentioned above, the associations reported here do not necessarily indicate a causal relationship.

Consistent with the findings of Yu (2009), this research also found that in relation to social participation outcomes, disability of youth was likely to interact with other aspects of disadvantage. For instance, although on average youths with disability were not much different from those with no disability with respect to measures of social participation, among youths with disability less frequent contact with friends/relatives was significantly associated with being brought up in non-intact families or having poor/fair health; and poor/fair health was also significantly associated with a lower likelihood of being an active club member. As such this research, similar to Yu (2009), raises issues about whether young people are at risk of multiple disadvantages.

Time and money were expected to be two main constraints for social participation, but they, especially time, turned out to be not very important for youth social participation in general. In contrast, personality was found to be a significant predictor for participation of youth overall including those with disability, and different personality types were associated with different patterns of social participation. For instance, a higher level of emotional stability was associated with a lower probability of being an active club member; extroversion tended to increase the frequency of

contact with friends/relatives; a higher level of conscientiousness led to less frequent attendance at religious services; involvement in group activities was higher among youths with higher levels of emotional stability and openness to experience; and higher levels of extroversion, agreeableness and openness to experience also predicted higher level of personal contact overall. As such, the results confirmed the importance of controlling for unobserved heterogeneity in the analysis on social participation when data on personality is not available.

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Table 1 Statistical summary of the youth sample

Variable	*Min-max*	*Mean*	*S.D.*	*N (person-wave)*
Social participation variables:				
Active_club_membership	0-1	42.6%	0.49	13,738
Contact_with_friend	1-5	3.44	1.13	13,724
Religious_activity	1-6	2.52	1.80	1,865
Involvement_in_group_activity	1-6	1.71	0.79	2,068
Personal_contact	1-6	3.89	0.80	2,063
Disability variables:				
Any_disability	0-1	11.36%	0.32	15,876
Sensory_disability	0-1	1.99%	0.14	11,504
Physical_disability	0-1	4.09%	0.20	11,504
Other_type_of_disability	0-1	7.99%	0.27	11,504
Onset_of_disability	0-24	9.28	7.69	470
Onset_of_disability_category:	0-6			11,504
0. No disability		89.47%		
1. Birth		2.79%		
2. 4 years or younger		0.97%		
3. 5-9 years		1.48%		
4. 10-14 years		2.16%		
5. 15-19 years		2.29%		
6. 20-24 years		0.85%		
Severity_of_disability:	0-3			2,158
0. No disability		83.90%		
1. No restriction		13.66%		
2. Mild/moderate		1.49%		
3. Severe/profound		0.96%		
Other control variables:				
Girl[†]	0-1	49.06%	0.50	15,876
Age (years)	15-24	19.33	2.88	15,876
Indigenous	0-1	3.70%	0.19	15,876
Country_of_birth:	1-3			15,873
1. Australia		84.31%		
2. Main English-speaking countries		3.16%		
3. Other countries		12.53%		
Non_English_parents	0-1	16.42%	0.37	15,876
Health	0-100	73.28	18.87	13,774
Health_category:	1-4			13,624
1. Excellent		21.25%		
2. Very good		41.60%		
3. Good		29.74%		
4. Fair		7.40%		
Studying	0-1	45.41%	0.50	15,876
Employment_status:	1-3			15,876
1. Employed		65.68%		
2. Unemployed		8.56%		
3. Not in the labour force		25.76%		
Equivalised_household_income (non-negative, in 2001$)	0-371,390	28,388	15,206	15,825
Negative_household_income	0-1	0.31%	0.06	15,876
Individual income (in 2001$)	0-167,407	11,333	11,581	15,865
Partnered	0-1	12.72%	0.33	15,876
Parenting	0-1	5.48%	0.23	15,876
Carer	0-1	0.73%	0.09	15,876
Oldest_child	0-1	28.45%	0.45	15,876
Number_of_siblings	0-17	2.21	1.56	15,435
Disable_sibling	0-1	6.95%	0.25	15,876

Famiy_type_age14	1-4			15,867
1. Intact family		73.41%		
2. Parent and stepparent family		7.24%		
3. Single parent family		17.08%		
4. Other family type		2.28%		
Type_of_school_attended	1-4			15,863
1. Government school		68.29%		
2. Catholic school		18.34%		
3. Other non-government school		12.86%		
4. Other than the three above		0.50%		
Highest_education_level:	1-4			15,873
1. Bachelor or above				
2. Other post-school qualification				
3. Year 12				
4. Year 11 or below				
Homeownership:	1-3			15,876
1. Own		63.18%		
2. Renting		24.74%		
3. Other type		2.08%		
Personality_extroversion	1-7	4.61	1.05	1,996
Personality_agreeableness	1-7	5.19	0.99	1,996
Personality_conscientiousness	1-7	4.63	1.00	1,995
Personality_emotional_stability	1-7	4.82	1.08	1,995
Personality_openness_to_experience	1-7	4.39	1.05	1,995
Religion (wave 4):	0-4			1,857
0. No religion		38.32%		
1. Catholic		25.80%		
2. Anglican		12.78%		
3. Other Christian		16.62%		
4. Non-Christian religions		6.49%		
Religiosity (wave 4)	0-10	3.29	3.41	1,856
SEIFA	396-1,194	1,007.19	93.03	15,873
State_of_residence:	1-5			15,876
1. NSW/ACT		34.42%		
2. VIC/TAS		28.28%		
3. QLD		19.04%		
4. SA/NT		8.64%		
5. WA		9.62%		
Location:	0-3			15,876
1. Major urban		69.59%		
2. Other urban		19.67%		
3. Bounded locality		2.33%		
4. Rural balance		8.41%		
Wave:	1-7			15,876
1.		15.43%		
2.		14.24%		
3.		14.20%		
4.		13.67%		
5.		14.10%		
6.		14.27%		
7.		14.09%		

Note: All means and standard deviations were weighted with the responding person sample weights in the HILDA data.

[†] There are more girls than boys in all waves but wave 2 if not weighted.

Table 2: Social participation of youth by type, onset and severity of disability

Disability status	*Active club membership (0-100%)*	*Contact with friend (1-5)*	*Religious activity (1-6)*	*Involvement in group activity (1-6)*	*Personal contact (1-6)*
Any disability: No	43.2 (49.5)	3.46 (1.12)	2.54 (1.80	1.71 (0.77)	3.90 (0.78)
Yes	37.7 (48.5)*	3.30 (1.24)*	2.37 (1.79)	1.77 (0.88)	3.75 (0.93)*
Type of disability:					
Sensory: No	42.2 (49.4)	3.42 (1.13)	2.52 (1.79)	1.71 (0.79)	3.89 (0.80)
Yes	36.2 (48.2)*	3.10 (1.31)*	2.44 (2.10)	1.69 (0.73)	3.66 (0.91)
Physical: No	42.2 (49.4)	3.41 (1.13)	2.52 (1.81)	1.71 (0.78)	3.89 (0.79)
Yes	39.1 (48.9)	3.32 (1.21)*	2.38 (1.64)	1.93 (0.95)	3.72 (0.97)
Other: No	42.6 (49.5)	3.42 (1.13)	2.54 (1.80)	1.71 (0.77)	3.90 (0.79)
Yes	36.2 (48.1)*	3.23 (1.23)*	2.27 (1.71)	1.82 (0.94)	3.77 (0.90)
Onset of disability:					
No disability	42.5 (49.4)	3.42 (1.13)	2.53 (1.80)	1.70 (0.78)	3.89 (0.79)
At birth	30.7 (46.2)*	3.21 (1.27)*	1.88 (1.55)*	1.69 (0.72)	3.77 (0.82)
0-4 years	45.0 (50.0)	3.48 (1.26)	2.79 (1.93)	1.77 (0.89)	3.89 (0.99)
5-9 years	43.4 (49.7)	3.34 (1.16)	2.67 (2.05)	1.95 (0.89)	4.07 (0.68)
10-14 years	38.7 (48.8)	3.42 (1.14)	2.74 (1.99)	1.85 (0.97)	3.99 (0.81)
15-19 years	39.7 (49.0)	3.30 (1.11)	2.08 (1.62)	1.68 (0.84)	3.73 (0.90)
20-24 years	48.4 (50.2)	3.13 (0.98)*	2.81 (1.92)	2.20 (0.95)*	3.70 (0.91)
Severity of disability[†]*:*					
No disability	46.2 (49.9)	3.48 (1.14)	2.53 (1.79)	–	–
No restriction	35.7 (48.0)*	3.37 (1.27)	2.42 (1.85)	–	–
Mild/ moderate	48.7 (50.8)	3.37 (0.87)	2.51 (1.69)	–	–
Server/ profound	36.0 (49.4)	3.33 (1.19)	2.51 (1.95)	–	–

Note: All values weighted with responding person sample weight;
– No observations;
* Significantly different from the reference category – the category with no disability or without the type of disability in question.
[†] Combining the mild/moderate with the severe/profound category does not change the significance.

Table 3: Estimated association between active club membership and disability

Disability status	***I.1 Pooled logit***	***I.2 Pooled logit***	***I.3 Fixed effect***	***I.4 Fixed effect***	***I.5 Logit***	***I.6 Logit***
Any disability: No	Reference				–	–
Yes	0.01 (0.07)	–	-0.04 (0.12)	–	–	–
Type of disability:						
Sensory: No	–	Reference	–			
Yes	–	-0.15 (0.21)	–	0.28 (0.41)	0.10 (0.45)	0.22 (0.53)
Physical: No	–	Reference	–			
Yes	–	0.20 (0.14)	–	0.26 (0.22)	0.37 (0.34)	0.23 (0.42)
Other: No	–	Reference	–			
Yes	–	0.08 (0.10)	–	-0.20 (0.18)	0.28 (0.30)	0.16 (0.36)
Onset of disability:						
No disability		Reference			Reference	Reference
At birth	–	-0.21 (0.22)	–	–	-0.07 (0.36)	0.02 (0.41)
0-4 years	–	0.16 (0.32)	–	–	0.72 (0.51)	0.73 (0.55)
5-9 years	–	0.12 (0.27)	–	–	-0.28 (0.50)	-0.20 (0.59)
10-14 years	–	-0.09 (0.24)	–	–	-0.29 (0.38)	-0.16 (0.43)
15-19 years	–	-0.15 (0.21)	–	–	-0.08 (0.34)	0.30 (0.38)
20-24 years	–	0.36 (0.29)	–	–	0.36 (0.51)	0.25 (0.66)
Severity of disability:						
No disability					Reference	
No restriction	–	–	–	–	-0.39 (0.25)	-0.39 (0.30)
Mild/ moderate	–	–	–	–	-0.41 (0.56)	-0.06 (0.67)
Server/ profound	–	–	–	–	-0.54 (0.64)	-0.79 (0.74)
Wave used	1-7	3-7	1-7	3-7	4	4-5
Pseudo R^2	0.0843	0.0877	–	–	0.1098	0.1144
No. of obs.	13,196	9,478	6,095	3,702	1,771	1,305

Note: Dependent variable is being an active club member (1) or not (0).
Robust standard errors in brackets; very small figures reported to the first non-zero digit.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%; – Not included or not available.
Models I.1 and I.2 are estimated with logistic model accounting for clustered sample using waves 1-7 and waves 3-7, respectively (other control variables see the main text); Models I.3 and I.4 are fixed effect OLS models, estimated using waves 1-7 and waves 3-7, respectively; Model I.5 uses wave 4 only and the other variables are the same as in Model I.2; Model I.6 includes all variables in Model I.5 and also personality from wave 4, and is estimated using a balanced panel of wave 4 and wave 5.

Table 4: Frequency of contact with friends/relatives

Disability status	*II.1 Pooled ologit*	*II.2 Pooled ologit*	*II.3 Fixed effect*	*II.4 Fixed effect*	*II.5 Ologit*	*II.6 Ologit*
Any disability: No					–	–
Yes	-0.11 (0.06)*	–	0.001 (0.04)	–	–	–
Type of disability:						
Sensory: No	–		–			
Yes	–	-0.22 (0.19)	–	-0.17 (0.14)	0.23 (0.38)	-0.07 (0.45)
Physical: No	–		–			
Yes	–	0.04 (0.12)	–	0.04 (0.08)	0.07 (0.29)	-0.07 (0.37)
Other: No	–		–			
Yes	–	-0.17 (0.09)*	–	0.01 (0.06)	-0.12 (0.24)	-0.22 (0.29)
Onset of disability:						
No disability		Reference			Reference	Reference
At birth	–	-0.01 (0.19)	–	–	0.05 (0.32)	-0.02 (0.37)
0-4 years	–	0.11 (0.25)	–	–	-0.27 (0.41)	-0.02 (0.45)
5-9 years	–	-0.01 (0.26)	–	–	-0.12 (0.45)	0.28 (0.51)
10-14 years	–	0.05 (0.19)	–	–	-0.55 (0.31)*	-0.52 (0.35)
15-19 years	–	0.16 (0.17)	–	–	0.12 (0.30)	0.29 (0.33)
20-24 years	–	-0.11 (0.17)	–	–	-0.34 (0.38)	-0.01 (0.49)
Severity of disability:						
No disability					Reference	Reference
No restriction	–	–	–	–	0.15 (0.20)	0.29 (0.24)
Mild/ moderate	–	–	–	–	0.12 (0.46)	0.65 (0.57)
Server/ profound	–	–	–	–	-0.39 (0.53)	-0.33 (0.64)
Wave used	1-7	3-7	1-7	3-7	4	4-5
Pseudo R^2	0.0259	0.0266	–	–	0.0452	0.0609
No. of obs.	13,187	9,456	12,132	8,577	1,777	1,309

Note: Dependent variable is frequency of contact with friends/relatives (from 1.once in a month or less to 5. everyday). In Models II.1, II.2, II.5, and II.6 it is treated as a categorical variable, whereas in Models II.3 and II.4 it is treated as a continuous variable.
Robust standard errors in brackets; very small figures reported to the first non-zero digit.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%. – Not included or not available.
Models II.1 and II.2 are estimated with logistic model accounting for clustered sample using waves 1-7 and waves 3-7, respectively (other control variables see the main text); Models II.3 and II.4 are fixed effect OLS models, estimated using waves 1-7 and waves 3-7, respectively; Model II.5 uses wave 4 only and the other variables are the same as in Model II.2; Model II.6 includes all variables in Model II.5 and also personality from wave 4, and is estimated using a balanced panel of wave 4 and wave 5.

Table 5: Attendance at religious services

Disability status	*III.1 Ologit*	*III.2 Ologit*	*III.3 Tobit*	*III.4 Tobit*
Any disability: No	–	–	–	–
Yes	–	–	–	–
Type of disability:				
Sensory: No				
Yes	-0.13 (0.48)	0.02 (0.55)	-0.20 (0.51)	-0.06 (0.58)
Physical: No				
Yes	-0.35 (0.35)	-0.56 (0.45)	-0.40 (0.38)	-0.70 (0.47)
Other: No				
Yes	0.18 (0.30)	0.16 (0.37)	0.24 (0.33)	0.14 (0.40)
Onset of disability:				
No disability	Reference	Reference	Reference	Reference
At birth	-0.40 (0.39)	-0.43 (0.43)	-0.67 (0.43)	-0.60 (0.48)
0-4 years	-0.03 (0.46)	0.09 (0.48)	0.18 (0.53)	0.39 (0.55)
5-9 years	0.23 (0.54)	0.38 (0.61)	-0.28 (0.39)	-0.01 (0.66)
10-14 years	0.24 (0.37)	0.54 (0.42)	0.43 (0.55)	0.56 (0.44)
15-19 years	-0.30 (0.38)	-0.31 (0.45)	-0.06 (0.16)	-0.25 (0.44)
20-24 years	0.41 (0.48)	-0.04 (0.67)	-0.16 (0.18)	-0.21 (0.78)
Severity of disability:				
No disability	Reference	Reference	Reference	Reference
No restriction	0.41 (0.25)	0.37 (0.30)	0.48 (0.28) *	0.46 (0.33)
Mild/ moderate	0.55 (0.58)	0.62 (0.72)	0.67 (0.61)	0.84 (0.73)
Server/ profound	-0.31 (0.68)	0.18 (0.78)	-0.53 (0.73)	-0.09 (0.81)
Wave used	4	4-5	4	4-5
(Pseudo) R^2	0.3091	0.3238	0.2629	0.2739
No. of obs.	1,775	1,307	1,775	1,307

Note: Dependent variable is frequency of attendance at religious services. In Models III.1 and III.2 it is treated as a categorical variable, whereas in Models III.3 and III.4 it is treated as a continuous variable. Robust standard errors in brackets; very small figures reported to the first non-zero digit.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%; – No included or not available.

Table 6: Community involvement (group and personal)

Disability status	***Group activity***		***Personal contact***	
	IV.1 OLS	IV.2 OLS	V.1 OLS	V.2 OLS
Any disability: No	–	–	–	–
Yes	–	–	–	–
Type of disability:				
Sensory: No				
Yes	0.03 (0.15)	-0.07 (0.15)	-0.05 (0.13)	0.01 (0.16)
Physical: No				
Yes	0.11 (0.10)	0.04 (0.12)	-0.07 (0.10)	-0.11 (0.12)
Other: No				
Yes	0.13 (0.09)	0.23 (0.11) **	0.05 (0.08)	0.07 (0.10)
Onset of disability:				
No disability	Reference	Reference	Reference	Reference
At birth	0.01 (0.10)	-0.001 (0.11)	-0.004 (0.11)	-0.03 (0.14)
0-4 years	0.12 (0.17)	0.12 (0.19)	0.01 (0.17)	0.06 (0.19)
5-9 years	0.26 (0.18)	0.35 (0.21)	0.25 (0.13) *	0.20 (0.15)
10-14 years	0.18 (0.14)	0.16 (0.15)	0.10 (0.12)	-0.03 (0.13)
15-19 years	0.02 (0.12)	-0.03 (0.14)	-0.06 (0.12)	-0.06 (0.14)
20-24 years	0.41 (0.23) *	0.33 (0.22)	-0.22 (0.22)	-0.25 (0.23)
Severity of disability:				
No disability	Reference	Reference	Reference	Reference
No restriction	–	–	–	–
Mild/ moderate	–	–	–	–
Server/ profound	–	–	–	–
Wave used	4	4-5	4	4-5
R^2	0.0808	0.1134	0.1153	0.1499
No. of obs.	1,972	1,361	1,967	1,358

Note: Dependent variable of Models IV.1 and IV.2 is the derived scale for involvement in group activities, and dependent variable of Models V.1 and V.2 is the derived scale for personal contact. Robust standard errors in brackets; very small figures reported to the first non-zero digit.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%; – Not included or not available.

Table 7: How does disability interact with other aspects of disadvantage?

Variable	*Any disability*	**Type of disability**		
		Sensory	***Physical***	***Other types***
Indigenous status				
Non-English-speaking family background		More religious activities (model III.2)	Lower club membership (model I.4)	
Non-intact family background	Less contact with friends/relatives (model II.3)		Higher club membership (model I.4)	
Poor/fair health	Less frequent contact with friends/relatives (model II.3); lower club membership (model I.3)	Lower personal contact (V.2)	Lower club membership (I.4); less contact with friends (II.4)	Less frequent contact with friends/relatives (model II.4, II.6); Higher club membership (I.6)
Low household income		Lower involvement in group activities (model IV.2); less personal contact (model V.2)	Lower club membership (model I.6)	less contact with friends (model II.6)
Low SEIFA	Higher contact with friends (model II.3)		Higher club membership (model I.4, I.6); higher contact with friends (model II.4)	

Note: The interaction terms of Indigenous status and the disability variables are always insignificant probably due to small number of observations.

Table 8: Other influencing factors of social participation of youth

Variable	*Club membership (6 models)*	*Contact with friends/ relatives*	*Religious activities*	*Involvement in group activities*	*Personal contact*
Female[†]	– – / / – –	– – / / – –	0 0	0 0	+ +
Age (years)	– – – – – 0	– – – – – –	– –	0 0	0 0
Indigenous	0 0 / / 0 0	+ + / / + 0	0 0	0 0	0 0
Country_of_birth:					
1. Australia	r r / / r r	r r / / r r	r r	r r	r r
2. Main English-speaking countries	0 0 / / 0 0	0 0 / / 0 0	0 0	0 0	0 0
3. Other countries	0 0 / / – 0	– 0 / / – 0	0 0	0 0	0 0
Non_English_parents	– – / / 0 0	– – / / 0 0	+ +	0 0	0 0
Health (continuous variable)	/ / + + / /	/ / + + / /	/ /	/ /	/ /
Health_category:					
1. Excellent	r r / / r r	r r / / r r	r r	r r	r r
2. Very good	– – / / – 0	– – / / 0 0	0 0	0 0	0 0
3. Good	– – / / – –	– – / / 0 0	0 0	0 0	– –
4. Fair/poor	– – / / – 0	– – / / – –	0 0	– 0	– –
Studying	+ + 0 0 + +	+ + 0 0 + 0	+ +	+ +	+ 0
Employment_status:					
1. Employed	r r r r r r	r r r r r r	r r	r r	r r
2. Unemployed	– – 0 0 0 0	0 0 0 0 0 0	0 0	0 0	0 0
3. Not in the labour force	– – 0 0 – –	– 0 0 0 0 0	0 0	0 0	0 0
Equivalised_household_income (in 2001$)	+ + 0 0 0 0	+ + 0 0 0 0	0 0	0 0	+ +
Negative_household_income	0 0 0 0 0 0	0 0 0 0 0 0	+ 0	– –	0 0
Partnered	– 0 – 0 0 0	– – – – – –	0 0	0 0	0 0
Parenting	0 0 0 0 0 0	0 0 0 0 + 0	0 0	0 0	0 0
Carer	0 0 0 0 / /	0 0 0 0 / /	/ /	0 0	– 0
Oldest_child	0 0 / / 0 0	0 0 / / 0 0	0 0	0 0	0 0
Number_of_siblings	0 0 / / 0 0	0 0 / / 0 0	+ +	+ +	0 0
Disable_sibling	0 0 / / 0 0	0 0 / / 0 0	0 0	0 0	0 0
Personality_extroversion	/ / / / / 0	/ / / / / +	/ 0	/ 0	/ +
Personality_agreeableness	/ / / / / 0	/ / / / / 0	/ 0	/ 0	/ +
Personality_conscientiousness	/ / / / / 0	/ / / / / 0	/ –	/ 0	/ 0
Personality_emotional_stability	/ / / / / –	/ / / / / 0	/ 0	/ +	/ 0
Personality_openness_to_experience	/ / / / / 0	/ / / / / 0	/ 0	/ +	/ +
Famiy_type_age14:					
1. Intact family	r r / / r r	r r / / r r	r r	r r	r r
2. Parent and stepparent family	– – / / – 0	0 0 / / 0 0	0 0	– –	0 0
3. Single parent family	– – / / – –	0 0 / / 0 0	0 0	0 0	0 0
4. Other family type	0 0 / / 0 0	0 0 / / 0 0	0 0	+ +	0 0
Type_of_school_attended:					
1. Government school	r r / / r r	r r / / r r	r r	r r	r r
2. Catholic school	+ + / / 0 0	0 0 / / 0 0	+ +	0 0	0 0
3. Other non-government school	0 0 / / 0 0	0 0 / / 0 0	+ +	0 0	0 0
4. Other than the three above	0 0 / / 0 0	0 0 / / 0 0	0 0	0 0	0 0
Highest_education_level:					
1. Bachelor or above	r r r r r r	r r r r r r	r r	r r	r r
2. Other post-school qualification	0 0 + 0 0 0	0 0 + 0 0 0	0 0	0 0	0 0
3. Year 12	0 0 0 0 0 0	0 0 0 0 0 0	– –	0 0	0 0
4. Year 11 or below	– 0 0 0 0 0	0 0 0 0 0 0	– –	0 0	0 0

Homeownership:					
1. Own	r r r r r r	r r r r r r	r r	r r	r r
2. Renting	– – – 0 0 0	0 0 – 0 0 0	0 0	– –	0 0
3. Other type	0 0 0 0 + 0	0 0 0 0 0 +	0 0	0 0	0 0
Religion:					
0. No religion	/ / / / r r	/ / / / r r	r r	/ /	/ /
1. Catholic	/ / / / + +	/ / / / 0 0	+ +	/ /	/ /
2. Anglican	/ / / / + +	/ / / / + 0	+ +	/ /	/ /
3. Other Christian	/ / / / + +	/ / / / 0 0	+ +	/ /	/ /
4. Non-Christian religions	/ / / / 0 0	/ / / / – –	+ +	/ /	/ /
Religiosity	/ / / / 0 0	/ / / / – –	+ +	/ /	/ /
Religiosity squared	/ / / / 0 0	/ / / / + +	+ +	/ /	/ /
State_of_residence:					
1. NSW/ACT	r r r r r r	r r r r r r	r r	r r	r r
2. VIC/TAS	0 0 0 0 0 0	0 0 0 – 0 0	0 0	0 0	0 0
3. QLD	0 0 0 0 – –	– – 0 – – –	0 0	0 0	– –
4. SA/NT	0 0 0 0 0 0	0 0 0 0 0 0	0 0	0 0	0 0
5. WA	0 – 0 0 – –	0 0 0 0 0 0	0 0	– 0	0 0
Location:					
1. Major urban	r r r r r r	r r r r r r	r r	r r	r r
2. Other urban	0 0 0 0 0 0	+ 0 0 0 0 0	0 0	0 0	0 0
3. Bounded locality	0 0 0 0 0 0	0 0 0 + 0 0	0 0	0 0	0 0
4. Rural balance	0 0 0 0 0 0	– – 0 0 0 –	0 0	0 0	0 0
SEIFA	0 0 – 0 0 0	0 0 – 0 – 0	0 0	0 0	0 0
SEIFA squared	0 0 0 0 0 0	+ + 0 0 + 0	0 0	0 0	0 0
Wave:					
1.	r / / / / /	r / / / / /	/ /	/ /	/ /
2.	0 / / / / /	0 / / / / /	/ /	/ /	/ /
3.	0 r / / / /	0 r / / / /	/ /	/ /	/ /
4.	0 0 / / / /	– 0 / / / /	/ /	/ /	/ /
5.	– – / / / /	– – / / / /	/ /	/ /	/ /
6.	– – / / / /	– – / / / /	/ /	/ /	/ /
7.	– – / / / /	– – / / / /	/ /	/ /	/ /

Note: Results from models I1-I6 for club membership, II1-II6 for contact with friends/relatives, III1-III2 for religious activities, IV1-IV2 for involvement in group activities, and V1-V2 for personal contact. r , reference group; +, significantly positive at 5%; –, significantly negative at 5%; 0, insignificant at 5%; /, not included.

Appendix I: Factor analysis[16]

In the sixth wave of HILDA, participants were asked 12 questions regarding their community participation; that is how often they:

- have telephone, email or mail contact with friends or relatives not living with them;
- chat with their neighbours;
- attend events that bring people together such as fetes, shows, festivals or other community events;
- get involved in activities for a union, political party, or group that is for or against something;
- make time to attend services at a place of worship;
- encourage others to get involved with a group that is trying to make a difference in the community;
- talk about current affairs with friends, family or neighbours;
- make time to keep in touch with friends;
- volunteer their spare time to work on boards or organising committees of clubs, community groups or other non-profit organisations;
- see members of their extended family (or relatives not living with them) in person;
- get in touch with a local politician or councillor about issues that concern them; and
- give money to charity if asked.

To reduce the 12 items into meaningful factors, a Principal Components Analysis was conducted on the items using the Stata statistical package[17]. Orthogonal varimax rotation of the matrix was used to increase interpretability of the factors.

[16] The author acknowledges Ibolya Losoncz for her invaluable help with the factor analysis.
[17] The Kaiser-Myer-Olkin (KMO) measure of sampling adequacy was 0.84, exceeding the recommended value of 0.60 (Kaiser, 1974).

Two factors were extracted using both an inspection of the scree plot and those with eigenvalues exceeding 1.0[18]. These collectively explained 44% of the variance (see Table A.1 for factor loadings). Two factors cross loaded or did not load strongly and were subsequently removed from the scale; these were "attend events that bring people together such as fetes, shows, festivals or other community events", and "give money to charity if asked". The remaining factors loaded cleanly, with values less than .44 suppressed.

The labels of "Involvement in Group Activities" and "Personal Contact" were applied to the factors. Both factors were found to be internally consistent and well defined by the variables. The Cronbach's alpha (for the internal consistency of the indices) was larger than 0.7 for the index of involvement in group activities of both males and females, and it was around 0.6 for the index of personal contact, which were in the region of acceptability for such indices (Platt 2006).

Table A.1: Rotated factor loadings on Social Participation items for Principal Components Analysis using Varimax Rotation.

Items	***Factor 1: Involvement in group activities***	***Factor 2: Personal contact***
Encourage others to be involved	0.81	
Volunteer for non-profit organisation	0.70	
Involvement in political activities	0.70	
Contact local politician	0.68	
Attend religious services	0.51	
Contact with friends or relatives		0.77
Keep in touch with friends		0.77
See extended family		0.63
Talk about current affairs		0.52
Chat with neighbours		0.45
Attend community events*	0.50	0.44
Donate to charity*		
Percent of Variance	0.31	0.14

Note: Only loadings >0.4 reported
* Item omitted due to cross loading or low loadings
Source: wave 6 of HILDA

[18] Using other rotation methods and using the working sample of youth only or the entire HILDA sample led to similar results. One notable difference is that "chat with neighbours" had a lower loading on the second factor (0.36) when the youth sample was used than using the entire HILDA sample (0.45 as reported in Table A.1), but its loading on the second factor was still much larger than that on the first factor (0.21). Excluding the item from factor two did not affect the main findings.

Appendix II: Tables and Figures

Table A.2: Description of key variables and available waves in the HILDA

Variable	*Description*	*Available wave*
Active_club_membership	Being an active member of a sporting, hobby or community-based club or association (0/1): 0. No; 1. Yes.	Waves 1-7
Contact_with_friend	How often get together socially with friends or relatives not living with oneself (1-5): 1. Once a month or less; 2. Two or three times a month; 3. About once a week; 4. Several times a week; 5. Everyday	Waves 1-7
Religious_activity	How often does one attend religious services (1-6): 1. Never; 2. Less than once a year; 3. About once a year; 4. Several times a year; 5. Every month; 6. Every week.	Wave 4
Involvement_in_group_activity	Index derived from the 12 community participation items after factors analysis (see Appendix I) on a scale of 1-6.	Wave 6
Personal_contact	Index derived from the 12 community participation items after factors analysis (see Appendix I) on a scale of 1-6.	Wave 6
Any_disability	Any long-term health condition, impairment or disability that restricts one's everyday activities, and has lasted or is likely to last, for 6 months or more (0/1): 0. No; 1. Yes.	Waves 1-7
Sensory_disability	Having long-term health conditions including: sight problems not corrected by glasses/lenses; hearing problems; and speech problems. 0. No; 1. Yes.	Waves 3-7
Physical_disability	Having long-term health conditions including: limited use of arms or fingers; difficulty gripping things; limited use of feet or legs; any condition that restricts physical activity or physical work; chronic or recurring pain; long-term effects as a result of a head injury, stroke or other brain damage. 0. No; 1. Yes.	Waves 3-7
Other_disability	Having other long-term health conditions such as difficulty learning or understanding things; a nervous or emotional condition which requires treatment; arthritis, asthma and heart disease. 0. No; 1. Yes.	Waves 3-7
Onset_of_disability	Age when the disability was acquired. Derived from date of birth and year of onset of disability (in waves 3-7). In waves 1 and 2, interviewee was only asked whether the disability developed in the last 12 months or since the last interview.	Waves 3-7
Onset_of_disability_category	Seven categories of onset age of disability: 0. no disability; 1. at birth; 2. aged 0-4 years; 3. 5-9 years; 4. 10-14 years; 5. 15-19 years; 6. 20-24 years.	Waves 3-7
Severity_of_disability	Severity of disability (0-5): 0. No disability; 1. No restriction: no restriction in core activities – self-care, mobility and communication in own language; 2. Mild: need aids but not necessarily need help or supervision with core activities; 3. Moderate: have difficulties with core activities, not necessarily need help; 4. Severe: need help or supervision, not always;	Wave 4

	5. Profound: always need help with core activities.	
Non-English_parent	Both parents born in a non-English speaking country	Waves 1-7
Health	Transformed SF36 general health (0-100)	Waves 1-7
Health_category	General health from self-completed questionnaire: 1. Excellent; 2. Very good; 3. Good; 4. Fair; 5. Poor.	Waves 1-7
Studying	Studying full-time	Waves 1-7
Employment_status	Brief labour force status: 1. employed; 2. unemployed; 3. not in the labour force.	Waves 1-7
Equivalised_household_income	Household financial year disposable income measured in 2001 dollars and adjusted for size and age structure of household.	Waves 1-7
Negative_household_income	Having negative household income: 0. No; 1. Yes.	Waves 1-7
Individual_income	Individual annual disposable income measured in 2001 dollars.	Waves 1-7
Partnered	Legally married or in a de facto relationship: 0. No; 1. Yes.	Waves 1-7
Parenting	Having child(ren): 0. No; 1. Yes.	Waves 1-7
Carer	Actively cares for household member due to long-term health condition, elderly or disability: 0. No; 1. Yes.	Waves 1-7
Oldest_child	Being the oldest child in the family: 0. No; 1. Yes.	Waves 1-7
Number_of_siblings	Number of siblings	Waves 1-7
Disable_sibling	Having a resident sibling with a disability: 0. No; 1. Yes.	Waves 1-7
Family_type14	Family type when youth was aged 14 years: 1. intact family; 2. parent and stepparent; 3. single parent; 4. other	Waves 1-7
Type_of_school_attended	Type of school attended: 1. Government schools; 2. Catholic; 3. Other non-government schools; 4. Other schools.	Waves 1-7
Highest_education_level	Highest education level completed: 1. Bachelor or above; 2. Other post-school qualifications; 3. Year 12; 4. Year 11 or below.	Waves 1-7
Homeownership	1. Own/currently paying off; 2. Rent (or pay board) / rent-buy scheme; 3. Live here rent free / life tenure.	Waves 1-7
Personality variables	Five variables derived from Big Five personality Inventory after factor analysis: I. Extroversion (1-7); II. Agreeableness (1-7); III. Conscientiousness (1-7); IV. Emotional stability (1-7); V. Openness to experience (1-7).	Wave 5
Religion	1. Catholic; 2. Anglican; 3. Other Christian; 4. Non-Christian religions; 5. No religion.	Wave 4
Religiosity	Importance of religion (0-10): 0. One of the least important things in life; 10. One of the most important things in life.	Waves 1 & 4
SEIFA	SEIFA Index of relative socio-economic disadvantage	Waves 1-7
Fathers_education	Father's completed education: 1. Year 11 or below; 2. Year 12; 3. Post-school qualification	Waves 5-7
State_of_residence	1. New South Wales (NSW) or Australian Capital Territory (Act); 2. Victory (VIC) or Tasmania (TAS); 3. Queensland (QLD); 4. South Australia (SA) or Northern Territory (NT); 5. Western Australia (WA).	Waves 1-7
Location	1. Major urban; 2. Other urban; 3. Bounded locality; 4. Rural balance.	Waves 1-7