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From parent to child? The long-lasting effects of social support

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Abstract

Social bonds and supportive relationships are widely recognized as being indispensable to healthy psychological functioning and well-being. Using the 2001-2016 Household Income and Labour Dynamics in Australia (HILDA) data and a multilevel approach, we assess the impact of parental social support on the individual's capacity to establish adequate social support in the future. Our sample includes 1,109 Australian young adults aged 21-28 (among them are 609 siblings). The level of social support as perceived by their parents is measured during childhood/adolescence. Our findings show that, in addition to individual characteristics and other parental outcomes, parental social support is an important predictor of the level of social support experienced by young adults. Focusing on siblings, we confirm this evidence, finding that some individuals experience more social support in their twenties than other individuals as a result of the family environment in childhood. In particular, parental social support explains about 16% of the initial sibling variance. Finally, we find that parental social support is also positively associated with the level of trust and networks experienced by young adults. Thus, both trust and networks seem to act as mediators for social support. That is, to receive social support, an individual needs a network of people linked to her/him and she/he needs to have trust in others to accept support.

Keywords: social support, intergenerational transmission, multilevel analysis

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1. Introduction

Social bonds and supportive relationships are widely recognized as being indispensable to healthy psychological functioning and well-being. Supportive relationships are also important in the Nussbaum's capability approach. In fact, in the list of basic capabilities, Nussbaum points out the importance of living for and in relation to others, recognizing and showing concern for other human beings and engaging in various forms of social interaction. In particular, social support represents a form of social interaction that allows being able to imagine the situation of another and to support other for that situation. Individuals establishing adequate social networks and exhibiting pro-social behaviour can benefit from social support. Thus, accessing social support networks requires considerable knowledge of social know-how and pro-social values. We suggest that children likely emulate the pro-social behaviour displayed by their parents and build on what they learned early on throughout their development. Even if some recent scholars (e.g. Weiss, 2012) provides some reasons to suspect that social capital (that can be seen as a broadly concept than social support) is transmitted intergenerationally, the intergenerational transmission of social support has, to our knowledge, never been explicitly tested.

Using the 2001-2016 Household Income and Labour Dynamics in Australia (HILDA) data and a multilevel approach, we assess the impact of parental social support on the individual's capacity to establish adequate social support in the future. Our sample includes 1,109 Australian young adults aged 21-28 (among them are 609 siblings). The level of social support as perceived by their parents is measured during childhood/adolescence. The measure of social support derives from answers to a set of questions about the individual perception of social support (on a 1–7 scale). In particular, the HILDA survey asks individuals whether they often need help from other people but cannot get it, whether they have anyone that they can confide in, whether they have people to lean on in times of trouble, whether they often feel very lonely, and whether when they need someone to help out they can usually find someone. Taken together, these questions provide information about how much

support an individual receives from other people. This information is used to construct a single aggregate indicator of perceived social support at individual level that can be included in our analysis. We use exploratory factor analysis as a dimension-reducing strategy to produce this indicator.

Our findings show that, in addition to individual characteristics and other parental outcomes, parental social support is an important predictor of the level of social support experienced by young adults. Focusing on siblings, we confirm this evidence, finding that some individuals experience more social support in their twenties than other individuals as a result of the family environment in childhood. In particular, parental social support explains about 16% of the initial sibling variance. Finally, we find that parental social support is also positively associated with the level of trust and networks experienced by young adults. Thus, both trust and networks seem to act as mediators for social support. That is, to receive social support, an individual needs a network of people linked to her/him and she/he needs to have trust in others to accept support.

2. Empirical strategy

In this section, we present our empirical strategy for parental social support as determinants of young adults social support. The dual goal of our analysis is first to assess the role of parental social support in childhood/adolescence as a determinant of the level of social support experienced by young adults. Second, we wish to control for both individual and parents' characteristics that impact on the level of social support as perceived by young adults. The first goal requires having data on parental social support in the childhood/adolescence (see Section 4 for a detailed discussion). The second goal requires the use of a multilevel modelling technique. Multilevel models with random effects explicitly take into account the hierarchical structure of the data, thereby allowing us to analyse — first to measure, then to explain — the proportion of the variation in social support attached to each (nested) level.

The arguments for using multilevel models to analyse hierarchical data are well known (Skrondal and Rabe-Hesketh, 2004; Snijders and Bosker, 1999; Goldstein, 1995; Hox, 1995). When units are clustered, classical regression analyses are not appropriate since the underlying hypothesis of independence of the observations is violated. As a result of this dependency, estimated standard errors are likely to be biased downwards and, hence, inferences about the effects of the covariates are not correct, leading to spurious significant results (Hox, 1995). A simple solution would be to use robust methods to estimate standard errors. However, when a multilevel structure also provides an interesting additional dimension to the analysis, the use of a multilevel model may be more appropriate and insightful (Arpino and Aassve, 2007). Moreover, multilevel models with random effects permit inclusion of time-invariant variables, while in the fixed effects model these variables are absorbed by the intercept.² This is particularly relevant in our study since the variables of interest, i.e. parental social support, are mostly time-invariant variables.

2.1 Two-level model with random intercept

We initially estimate a simple two-level model with random effects in the form of random intercepts where observations are nested within individuals (level-1 observations over time, level-2 individuals). The model can be written as

$$y_{ijt} = \beta_1 X_{ijt} + \gamma_0 s_{ij}^P + \beta_2 W_{ij} + a_{ij} + \varepsilon_{ijt} \quad (1)$$

where y_{ijt} is the social support perceived by young adult i in family j over time t , the vector X_{ijt} includes explanatory variables at the individual level, s_{ij}^P is our measure of parental social support during childhood/adolescence, the vector W_{ij} includes explanatory variables related to other parental characteristics and ε_{ijt} is the usual error term (assumed to have a mean of zero and a variance to be estimated). In this model, we assume that each individual has a different intercept coefficient, a_{ij} .

² Random effects models assume that the individual-specific effects are uncorrelated with the independent variables.

Since the latter is a random variable that varies across individuals, it is often referred to as a random coefficient. In general, an individual with a high intercept is predicted to have more social support than an individual with a low value for the intercept.

The amount of dependence can be expressed as a correlation coefficient: the intra-class correlation coefficient (ICC). It represents the proportion of variance in the outcome variable that is explained by the grouping structure of the hierarchical model. It is calculated as the ratio of group level error variance over the total error variance:

$$ICC = \frac{\sigma_a^2}{\sigma_a^2 + \sigma_\varepsilon^2} \quad (2)$$

where σ_a^2 is the variance of the level-2 residuals a_{ij} (within variance) and σ_ε^2 is the variance of the level-1 residuals ε_{ijt} (between variance). In other words, the ICC reports on the amount of variation unexplained by any predictors in the model that can be attributed to the grouping variable, as compared to the overall unexplained variance (within and between variance).

2.2 Siblings and the three-level model with random intercepts

Research on sibling correlations in outcomes is well established in economics and sociology (see the reviews in Griliches, 1979; Solon, 1999; Björklund and Jäntti, 2009; and Black and Devereux, 2011). Siblings are “[M]ore alike than a randomly selected pair of individuals on a variety of socioeconomic measurements” (Griliches, 1979; p. S38); the idea is that sibling correlations of outcomes is able to capture in some degree the family influences that siblings share (e.g. factors passed from parents to children). However, sibling effects also capture those influences that are shared by siblings but that do not come from the parents, such as school effects, friendship networks, or other influences operating at the community level. On the other hand, there may be family-transmitted factors that are not shared by siblings, (e.g., because of differential treatment from parents) and which are not captured by sibling correlations. In the prototypical model of sibling outcome correlations, outcomes

depend on both an individual-specific factor capturing components not shared between siblings, and a family-specific factor (sibling correlation) absorbing all determinants of outcome that are shared by siblings (Solon, 1999).

For assessing the role of parental social support in shaping sibling correlations, we follow the approach provided by Mazumder (2008) who estimates the correlation before and after conditioning sibling outcome on family attributes in a multilevel model framework (level-1 observations over time, level-2 individuals and level-3 families).³ According to Mazumder (2008), outcomes are modelled as:

$$y_{ijt} = \beta Z_{ijt} + v_{ijt} \quad (3)$$

where the vector, Z_{ijt} , contains age and year dummies to account for lifecycle effects and year effects such as business cycle conditions. These are treated as fixed effects. The residual, v_{ijt} , which is purged of these effects, is then decomposed as follows:

$$v_{ijt} = a_{ij} + f_j + \varepsilon_{ijt} \quad (4)$$

where the three terms on the righthand side are treated as random effects that are assumed to be independent of each other. The first term, a_{ij} , is the permanent component that is individual-specific. The second term, f_j , is the permanent component that is common to all siblings in family j . ε_{ijt} represents the transitory component that reflects noise due to either temporary shocks to outcome or measurement error in the survey. The variance of age-adjusted outcome, v_{ijt} , then is simply $\sigma_v^2 = \sigma_a^2 + \sigma_f^2 + \sigma_\varepsilon^2$.

³ Alternatively, the role of parental outcome can be characterized by modelling the sibling correlation as a linear function of the parental outcome, see e.g. Corcoran et al. (1990) and Björklund et al. (2010). The approach provided by Mazumder (2008), when family attributes are limited to parental outcomes, is similar to the ones used by Corcoran et al., (1990) and Björklund et al. (2010), with one difference being that Mazumder's models are estimated via maximum likelihood assuming that unobserved components of outcome are normally distributed.

The first term, σ_f^2 , captures the variance in outcomes between families, whereas the second term, σ_a^2 , captures the variance in outcomes that is due to differences within families. These two components are then used to calculate the correlation in outcomes between siblings, ρ , which is

$$\rho = \sigma_f^2 / (\sigma_a^2 + \sigma_f^2) \quad (5)$$

To understand how different observable characteristics (e.g., parental outcomes) influence the sibling correlation in outcomes, Mazumder (2008) estimates the contribution of these factors. He adds the relevant variables to the vector Z (in Eq. 3) and treat them as additional fixed effects. The inclusion of additional fixed effects should sop up some of the residual variation in the outcome variable and produce lower estimates of the family component (σ_f^{2*}) than what was found without their inclusion (σ_f^2). The reduction in the variance of the family component ($\sigma_f^2 - \sigma_f^{2*}$) can be interpreted as an estimate of the amount of the overall variance of the family component that can be attributed to the specific factor(s) in question.

3. Data and main variables

We use the 2001-2016 Household, Income and Labour Dynamics (HILDA) data. HILDA survey has been conducted annually since 2001 and it is a household-based panel study that collects information about economic and personal well-being, labour market dynamics and family life. It aims to tell the stories of the same group of Australians over the course of their lives.

Our sample includes all individuals who are aged [8, 15] in the first wave (2001). The aim is to collect information about their parents during childhood/ adolescence (from 2001 to 2003). Then, we observe these individuals later on to analyse the long lasting effects of parental outcomes on the individual capacity of constructing adequate social support. In particular, we observe the individuals

after 13 years. The resulting sample includes 1109 young adults aged [21, 28]. Among them, we can identify 609 siblings (from 279 families). Weights are used as appropriate.

Variable measuring social support

In this study, both our dependent variable (young adult's social support) and our main independent variable (parents' social support) derives from answers to a set of questions about the individual perception of social support (on a 1–7 scale). In particular, the HILDA survey asks individuals whether they often need help from other people but cannot get it, whether they have anyone that they can confide in, whether they have people to lean on in times of trouble, whether they often feel very lonely, and whether when they need someone to help out they can usually find someone. Taken together, these questions provide information about how much support an individual receives from other people. This information is used to construct a single aggregate indicator of perceived social support at individual level that can be included in our analysis. We use exploratory factor analysis as a dimension-reducing strategy to produce this indicator (that is assumed to be a cardinal variable⁴). See Appendix 1 for details.

Figure 1 shows the kernel estimates of the social support density function for our sample of young adults in 2014. The mean and the standard deviation are respectively equal to zero and one by construction.

[FIGURE 1]

Parental outcomes

⁴ We feel justified in making this assumption given the findings of Ferrer-i-Carbonell and Frijters (2004), widely followed in the economics of wellbeing literature, which show that assuming ordinality or cardinality of subjective perception makes little difference. See also Poggi (2010) and Anand and Poggi (2018).

To account for attributes of parents, we control for their level of social support, education level, financial difficulties and parenting stress.

Parental social support is computed as an average over a three years period (2001-2003).⁵ It averages the mother's and the father's social capital if there are both parents.

Parental financial difficulties is a dummy equal to one if the parents did not pay utilities bills on time, not pay the mortgage/rent on time or went without meals over at least one of the three-years considered in the analysis (2001-2003).⁶

Research on socialization argues that the intergenerational transmission of values is mediated by the closeness between parents and children (Weiss, 2012). Parenting stress can negatively affect the relationship between parents and children. Therefore, we construct an indicator to measure parenting stress drawing on a set of four questions about raising children (on a 1-7 scale). HILDA survey asks parents whether: (i) they believe that being a parent is harder than they thought it would be, (ii) they often feel tired/worn out/ exhausted from meeting the needs of their children, (iii) whether they feel trapped by their responsibilities as a parent and (iv) they find that taking care of their children is much more work than pleasure. We use exploratory factor analysis as a dimension reducing strategy. See Appendix 1 for details. We identify one factor that we label parenting stress.

Figures 2 show graphically the relationships between parents outcomes and children future level of social support. We find that parents' education and social support seem to be positively associated with the level of social support experienced by the children in the future. Instead, parents' financial difficulties and parenting stress seem to be negatively associated with the level social support experienced by the children in the future. These issues will be investigate in deep in the next sections.

⁵ See Appendix 1 for details about the construction of the indicators.

⁶ Difficulties in paying bills, mortgage/rent and meals need to be declared by both parents (if both parents live in the household)

[FIGURE 2]

Characteristics of young adults

To account for individual characteristics of young adults, we control for their gender, age in years, education level, employment status (student/employed/other), immigration status origin (at least one parent not Australian born) and aboriginal or Torres Strait Islander origin. We also control for being married or having a de facto partner, having children and having financial difficulties. The latter indicator is a dummy equal one if young adults did not pay utilities bills on time, not pay the mortgage/rent on time or went without meals. Dummies at area level are included to control for heterogeneity at area level. Descriptive statistics are reported in Tables 1 and 2.

We also control for personality types. Personality, until recently a source of unobserved variation for economists, has been conceptualised as traits or stable individual difference characteristics explaining an individual's disposition to particular patterns of behaviour, cognition and emotion (Hogan, Hogan, & Roberts, 1996). This area of psychology is dominated by a 5-dimensional model of personality comprising of emotional stability, extraversion, conscientiousness, openness to experiences and agreeableness, labelled the “Big Five” (Goldberg, 1990), which provides a natural starting point for determining individual personality traits.

The dimensionality of the Big Five has been found to generalize across most cultures (McCrae and Costa, 1997; Pulver et al. 1995; Salgado, 1997) and remains fairly stable over time in adulthood (Costa and McCrae, 1992a; 1988). Conscientiousness is manifested in three related domains: achievement orientation (hardworking and persistent), dependability (responsible and careful), and orderliness (planning oriented and organized). Thus, conscientiousness is related to an individual's degree of self-control, as well as the need for achievement, order and persistence. Openness to experience is characterized by ‘intellectance’ (philosophical and intellectual) and unconventionality (imaginative, autonomous, and non-conforming). Agreeable persons are cooperative (trusting of others and caring) as well as likeable (good-natured, cheerful and gentle). As discussed in Anand and

Poggi (2018), evidence shows the existence of a relationship between personality traits and individual social capital. In particular, extraversion is related to the amount of social capital available (Brown, 1996; Kanfer and Tanaka, 1993; Pollet et al, 2011; Russell et al, 1997; Swickert et al, 2002). There is also evidence that emotionally stable individuals are likely to have more extensive networks because they are better capable of adapting to interpersonal differences (Klein et al., 2004; Wu et al., 2008). Given their interaction with a wider variety of people (Wu et al., 2008), individuals open to experience are likely to end up with more social capital.

The 2013 HILDA data reports scores for the Big Five (based on responses to the 36 personality questions) and we assume that personality traits are stable over the period of study.⁷ Using cluster analysis (k-means non-hierarchical method), we identify three gender-indifferent personality types. We differentiate between personality types described as resilient, over-controlled, and under-controlled. Figure 3 shows the average deviations from the average value for each of the Big Five dimensions by personality type.⁸ This classification is based on Block and Block's proposal (1980), which focused, in one dimension, on ego resiliency (the degree of an individual's flexibility and adaptation towards the demands of the environment) and, in another dimension, on ego control (the intensity with which impulses and wishes are expressed – measured along an axis that has self-discipline at one end and impulsivity / explosive behaviour at the other end). The specific typology for the resilient personality is indicated by scores above the average for all the Big-Five dimensions. The typology for the over-controlled personality involves below average scores for experience openness combined with above average scores for emotional stability, with the other dimensions being less relevant for describing this type. The profile of the under-controlled personality type is

⁷ Using HILDA data and a sample of working-age adults, Cobb-Clark and Schurer (2012) demonstrate that personality (as measured by the Big Five) is stable over a four-year period.

⁸ Our personality types are consistent with findings from research studies of personality typology based on the Big-Five model such as Asendorpf and Van Aken (1999), de Fruyt, Mervielde, and van Leeuwen (2002), Robins et al. (1996) and Sava and Popa (2011). See Herzberg and Roth (2006) for a review.

characterized by low emotional stability and conscientiousness in combination with above-average levels of experience openness.

[FIGURE 3]

Figures 4 show graphically the relationships between personality types and social support. We find that resilient individuals seem to benefit from high social support than the other individuals. Instead, under-controlled seem to enjoy the lowest level of social support. This preliminary evidence confirms the idea that emotionally stable individuals having more extensive networks can benefit of more social support. Moreover, extraversion combined with emotional stability (e.g. resilient individuals) could be able to enhance the extension of the network and therefore the available social support.

[FIGURE 4]

4. Main empirical results

In this section, we provide the main results of our models for young adults social support including parental social support experienced in childhood as one of the explanatory variables. We use multilevel models to examine the effect of individual and family level characteristics on young adults' social support (see Section 2).

First, we estimate a model containing parental and individual demographic information, as well as measures of family affluence, financial difficulties and parenting stress, while controlling for personality type. Second, we focus on siblings to understand the impact of family-specific factors and individual-specific factors. Third, we analyse the impact of parental social support on other dimensions of social capital, such as trust and networks. Trust and networks can be seen as mediators for social support. i.e. to receive social support, you need a network of people linked to you and you need to have trust in others to accept support.

4.1 Parental social support as a predictor of children's social support

Table 3 presents estimates of two level models for young adults social support that proceed from baseline by adding individual controls about the personality types. The last specification is the preferred specification on the basis of log-likelihood statistics though estimates appear to be relatively robust across the specifications.

Parental attributes in childhood/adolescence are important predictors of the level of social support experienced by young adults as hypothesized and discussed in section 2. This confirms the preliminary evidence presented in Section 4. The coefficient on the parental social support is positive and highly statistically significant. It implies that there is substantial correlation between parental social support in childhood/adolescence and the level of social support experienced in the twenties. This result supports the idea that children emulate the pro-social behaviour displayed by their parents and build on what they learned early on throughout their development. However, the level of social support experienced by young adults is negatively correlated with parenting stress. Thus, parenting stress seems to act as mediator for the intergenerational transmission of values. In other words, parenting stress, reducing the closeness between parents and children, negatively affect the emulation of the pro-social behavior eventually displayed by parents. The level of parental financial difficulties also significantly reduces of the level of social support experienced by young adults. Parental financial difficulties could reduce parent-child activities as well as participation in costly social events reducing closeness between parents and children and/or leading to a deficit in childhood/adolescence social support. The coefficient of parents' education is not significant once we control for personality types and young adults' education.

Individual characteristics are also associated with the level of social support. We find a correlation between personality type and social support: resilient individuals experience high social support than

other individuals (the estimated coefficient is equal to 0.32 and statistical significant). No statistical significant differences are registered between over-controlled and under-controlled individuals. We can interpret this results observing that personality traits that defines resilient individuals, as extroversion and emotional stability, are particularly important for developing large networks able to ensure social support.

We also find that high-educated individuals appear to benefit from more social support. Living in consensual union increases the level of social support experienced by the individuals, while having children decreases the level of social support perceived by individuals. Employed individuals benefit from more social support, probably because they can benefit from larger networks on the job and more financial stability. Coherent with this argument, financial difficulties seem to constrain the development of social support networks. Moreover, individuals experiencing financial difficulties can desire/need more social support than the one available. Therefore, it is more likely that they have perception of low support.

[Table 3]

4.2 Siblings

In Table 5, we present the estimates of the correlation before and after conditioning sibling social support on family attributes. As explained in Section 3.2, we run a three-level model that is able to identify the proportion of variance in social support that is explained by the grouping structure of the hierarchical model (level-1 observations, level-2 individuals and level-3 family).

[Table 5]

Before conditioning sibling social support on family attributes, we find that the estimates of the variances of both the random intercept for individuals (σ_a^2) and the random intercept for families (σ_f^2) are positive and statistically significant (Table 5, columns 2 and 3). The proportion of the total variability explained by the individual is equal to 57%, while the proportion of the total variability explained by the family is equal to 18%. This means that some individuals are more inclined to experienced social support than other individuals do simply on the basis the family they born in. In facts, our estimates of the correlation in siblings social support, ρ , is 0.24 (see Table 5, columns 2 and 3).

The inclusion of the parents attributes reduce the variance of the random intercept for families and, consequently, the proportion of the total variability explained by the family (from 18.2% to 12.2%). Once we control for family attributes (social support, education, financial difficulties and parenting stress), the estimated siblings correlation also reduces from 0.24 (σ_f^2) to 0.17 (σ_f^{2*}) (see Table 5, columns 10 and 11). In other words, family attributes explains about 37% of the initial family variance $((\sigma_f^2 - \sigma_f^{2*}) / \sigma_f^2)$. In particular, parental social support explains about the 16% of the initial family variance (Table 5, columns 4 and 5). Parents' financial difficulties contributes explaining a further 12% (Table 5, columns 6 and 7). Parents' education contributes explaining a further 16% (Table 5, columns 8 and 9). Parenting stress contributes explaining a further 3% (Table 5, columns 10 and 11).

4.3 Other dimensions of social capital

The 2010 and 2014 HILDA surveys include a set of questions about the individuals' networks and their level of trust (on a 1–7 scale). About networks, the HILDA surveys ask individuals whether they often get together socially with friends or relatives not living with you, whether they have a lot of friends, whether they have telephone, email or mail contact with friends or relatives, whether they keep in touch with friends, whether they see members of their extended family in person and whether

they attend events that bring people together such as fetes, shows, festivals or other community events. About trust, the HILDA surveys ask individuals whether they agree or disagree with the following statements (on a 1-7 scale): most people would try to take advantage of them if they got a chance; most people they meet keep their word; most people they meet succeed by stepping on other people; most people they meet make agreements honestly; most of the time people try to be helpful; people mostly look out for themselves; most people can be trusted.

This information is used to construct indicators of network and trust that can be used in our analysis as dependent variables. As explained in Appendix 1, exploratory factor analysis is used as a dimension reducing strategy to compute the indicators. In our view, trust and network are mediators for social support. i.e. individuals need a network of people linked to them and they need to have trust in others to receive support. Therefore, it is important to understand whether parental social support, as well as other parents' attributes, in childhood/ adolescence are determinants of the network of people and the level of trust in others experienced in the future. Our results support this view (see Table 6).

[TABLE 6]

At family level, parents' attributes experienced in childhood/adolescence are associated with the future networks and trust. In particular, parental social support and education are positively associated with both trust in other individuals and the development of networks. Instead, parents' financial difficulties are negatively associated with both trust and network. Parenting stress negative impacts only on the level of future trust.

At individual level, our results point out that personality type is associated with the size of the network and the level of trust. Resilient individuals trust more other individuals and develop larger networks. These results confirm the idea that personality traits that defines resilient individuals, as extroversion and emotional stability, are particularly important for developing large networks able to ensure social

support and creating long lasting relationships that can enhance trusts in other individuals. The latter can offer social support if it needed.

5. Conclusions

Using the 2001-2016 Household Income and Labour Dynamics in Australia (HILDA) data and a multilevel approach, we assess the impact of parental social support on the individual's capacity to establish adequate social support in the future. We find the following results. *First*, we find substantial correlation between parental social support in childhood/adolescence and the level of social support experienced in the twenties offering empirical support to the idea that children emulate the pro-social behaviour displayed by their parents. Focusing on siblings, we confirm the evidence that parental social support is an important predictor of the level of social support experienced by young adults. We find that parental social support explains about 16% of the initial sibling variance. *Second*, we find that the level of social support experienced by young adults is negatively correlated with parenting stress and parental financial difficulties in childhood/adolescence suggesting that these factors could act as mediators for the intergenerational transmission of values. *Third*, we find that parental social support is also positively associated with the level of trust and networks experienced by young adults. Thus, both trust and networks seem to act as mediators for social support. That is, to receive social support, an individual needs a network of people linked to her/him and she/he needs to have trust in others to accept support.

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Figure 1. Kernel density estimate of young adults social support (year=2014)

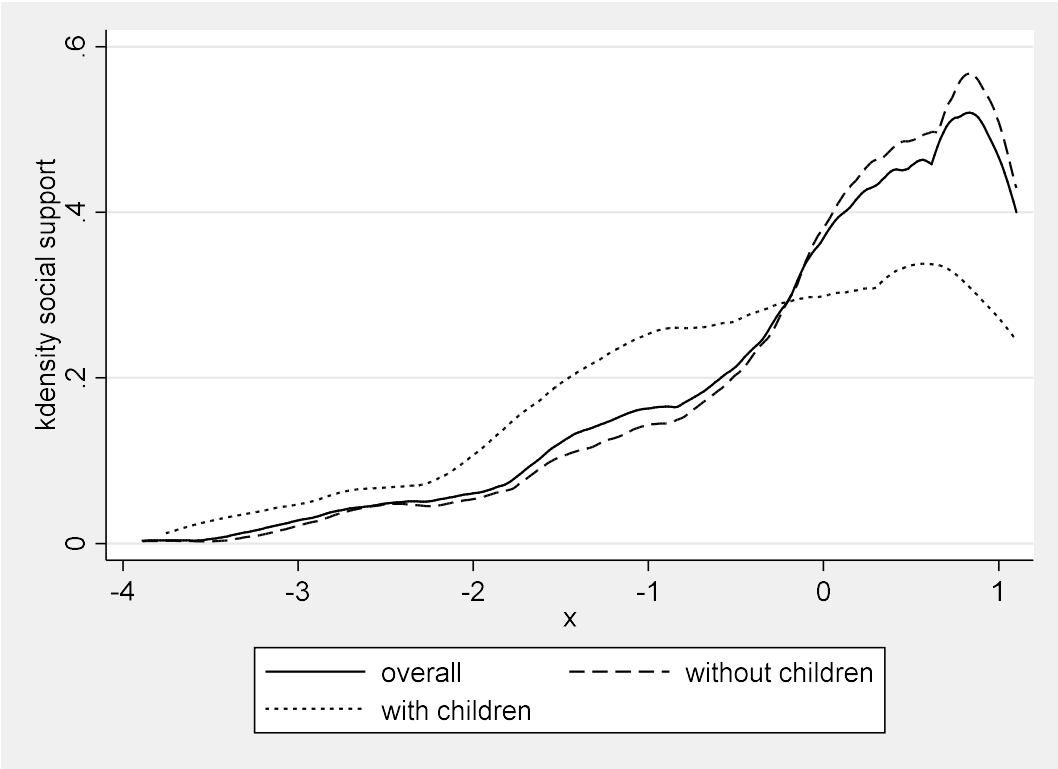


Figure 2. Social support by parents attributes

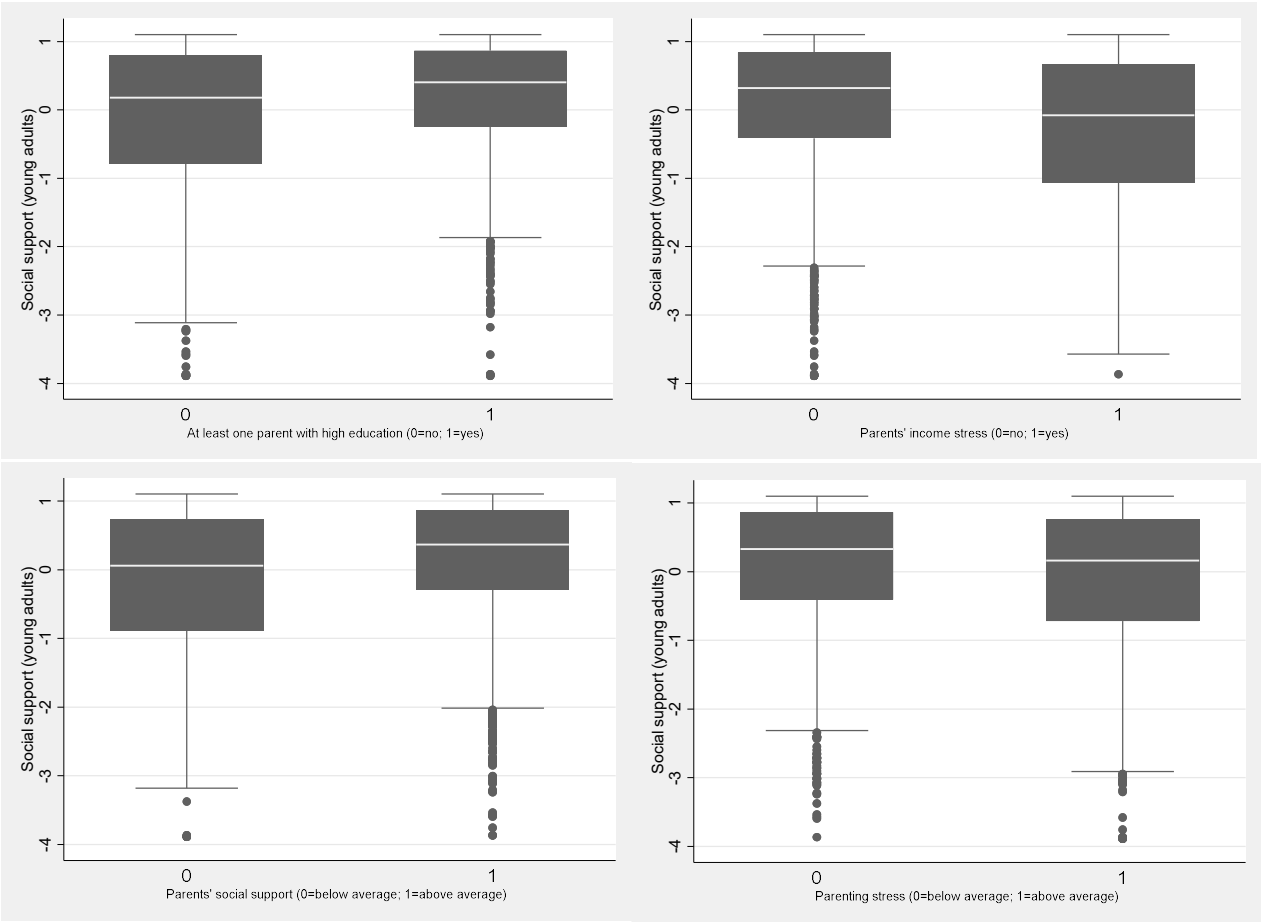


Figure 3. Prototype for the three identified personality types

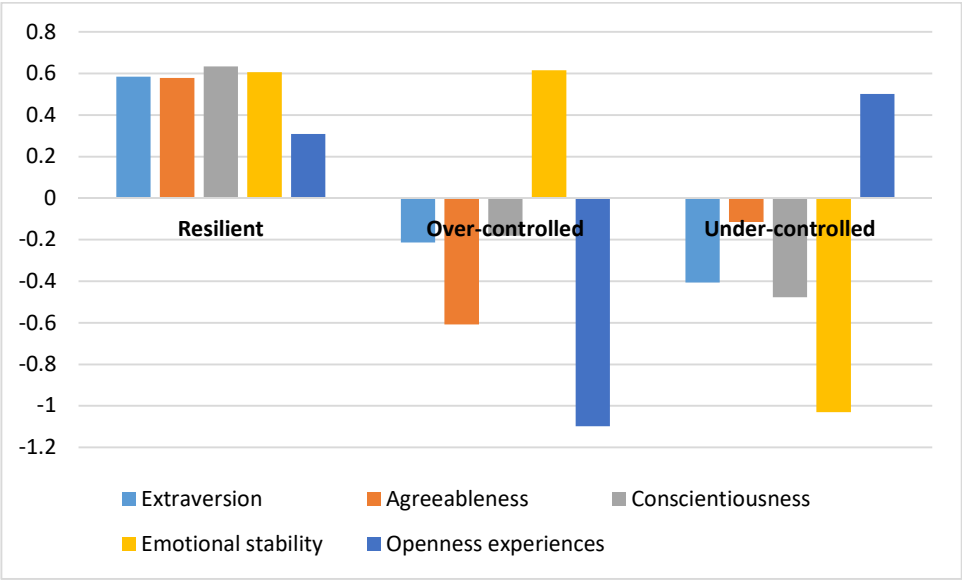


Figure 4. Young adults social support by personality type

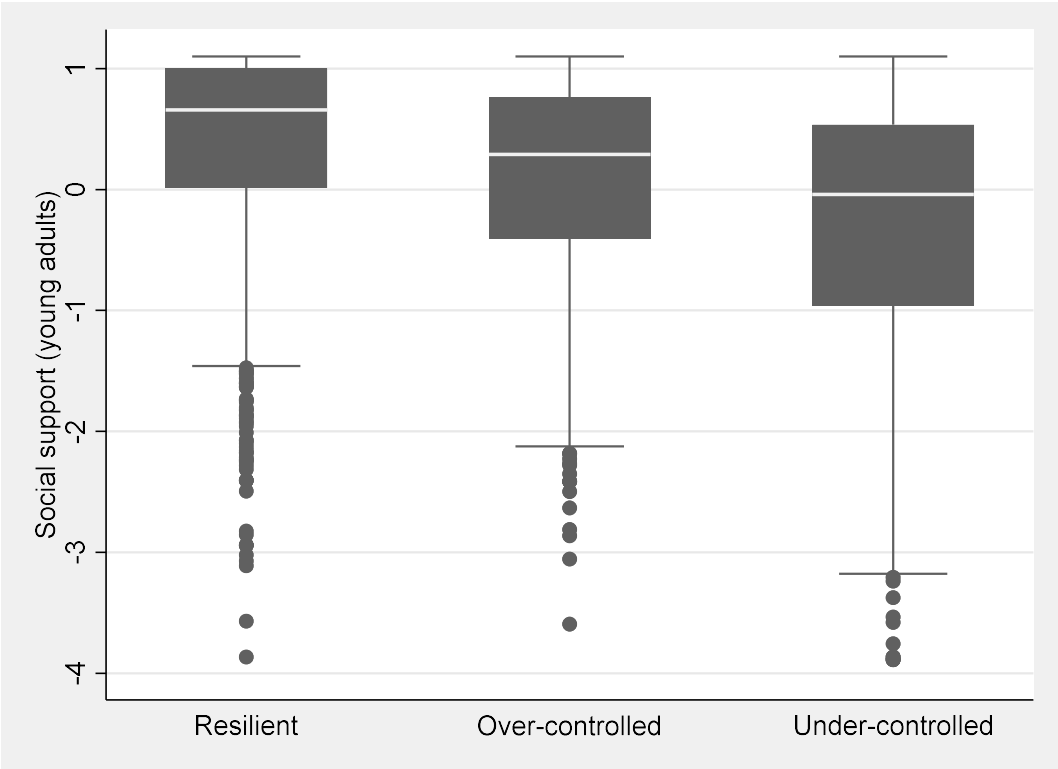


Table 1. Young adults: descriptive statistics (period: 2014-2016)

Young Adults (period: 2014-2016)	%
Female	51.36
Age is 21 (in 2014)	13.14
Age is 22 (in 2014)	12.68
Age is 23 (in 2014)	15.97
Age is 24 (in 2014)	11.83
Age is 25 (in 2014)	13.71
Age is 26 (in 2014)	12.46
Age is 27 (in 2014)	12.05
Age is 28 (in 2014)	8.16
Personality type is resilient	35.03
Personality type is over controlled	28.62
Personality type is under controlled	36.35
Aboriginal or Torres Strait Islander origin	2.79
At least one parent not Australia born	5.79
Region is Greater Sydney	16.88
Region is Rest of NSW	12.25
Region is Greater Melbourne	20.35
Region is Rest of Victoria	5.18
Region is Greater Brisbane	10.72
Region is Rest of Qld	8.5
Region is Greater Adelaide	7.49
Region is Rest of SA	1.21
Region is Greater Perth	8.82
Region is Rest of WA	1.65
Region is Tasmania	3.12
Region is Northern Territory	1.03
Region is Australian Capital Territory	2.8
<i>Parents attributes (2001-2003)</i>	Mean
Social support (mean)	0.00
At least one parent with high education (%)	33.79
Financial difficulties (%)	20.57
Parenting stress (mean)	0.00

Table 2. Descriptive statistics: time varying variables

Young Adults	2014	2015	2016
High education (%)	24.39	29.39	32.35
Living with parents (%)	36.95	30.50	27.27
Living in consensual union (%)	36.30	40.45	43.66
Having children (%)	16.77	19.31	22.87
Student (%)	31.29	26.94	21.55
Employed (%)	76.70	79.69	80.89
Financial difficulties (%)	18.11	17.87	17.13

Table 3. Two level model (random effects): period of study: 2014-2016

Dependent variable is social support	Coef	SE	Coef	SE
Individual attributes				
Female	0.118 **	0.051	0.083	0.051
age dummies	yes	yes	yes	Yes
high education	0.098 **	0.048	0.541 ***	0.058
Personality type is resilient			0.316 ***	0.063
Personality type is over controlled			0.061	0.048
Personality type is under controlled			ref.	
living with parents	0.008	0.038	-0.017	0.040
living in consensual union	0.209 ***	0.038	0.189 ***	0.040
having children	-0.122 **	0.052	-0.153 ***	0.054
Student	0.013	0.031	-0.004	0.033
Employed	0.125 ***	0.036	0.094 **	0.039
Financial difficulties	-0.200 ***	0.036	-0.199 ***	0.040
Aboriginal and Torres Strait Islander origin	-0.477 ***	0.141	-0.486 ***	0.137
At least one parent not Australia born	-0.078	0.092	-0.104	0.094
Greater Sydney	ref.		ref.	
Rest of NSW	-0.207 ***	0.077	-0.193 **	0.078
Greater Melbourne	-0.105	0.072	-0.075	0.073
Rest of Victoria	-0.026	0.103	-0.020	0.105
Greater Brisbane	-0.160 *	0.084	-0.232 ***	0.084
Rest of Qld	-0.288 ***	0.086	-0.284 ***	0.089
Greater Adelaide	-0.221 **	0.101	-0.287 ***	0.101
Rest of SA	-0.077	0.148	-0.212	0.164
Greater Perth	-0.136	0.098	-0.127	0.095
Rest of WA	-0.286	0.185	-0.358 *	0.201
Tasmania	-0.311 **	0.135	-0.233 *	0.135
Northern Territory	-0.172	0.192	-0.219	0.187
Australian Capital Territory	-0.114	0.120	-0.137	0.118
Parents attributes (2001-2003)				
social support (average)	0.176 **	0.03787	0.127 ***	0.038014
at least one parent with high education	0.109 *	0.056121	0.087	0.055325
Financial difficulties (average)	-0.151 **	0.064196	-0.208 ***	0.065594
parenting stress (average)	-0.099 ***	0.035336	-0.078 **	0.035347
Year dummies	yes	yes	yes	Yes
Constant	no	no	no	No
σ_a^2	0.589 ***	0.030	0.487 ***	0.027
ICC_individual	0.687		0.643	
log-likelihood	-3657.8		-3120.9	
No. Individuals	1109		968	
No. Observations	3327		2904	

Note: Variance at level 1 is 0.27

Table 5. Siblings: three level mixed model (period of study: 2014-2016)

Dependent variable is social support	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Parents attributes (2001-2003)										
social support (average)			0.232 ***	0.057	0.170 ***	0.059	0.171 ***	0.058	0.137 ***	0.052
at least one parent with high education							0.199 ***	0.072	0.214 ***	0.082
Financial difficulties (average)					-0.363 ***	0.107	-0.320 ***	0.107	-0.327 ***	0.107
parenting stress (average)									-0.101 **	0.046
age and year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	Yes
σ_a^2	0.561 ***	0.050	0.563 ***	0.050	0.565 ***	0.051	0.567 ***	0.051	0.568 ***	0.051
σ_f^2	0.178 ***	0.046	0.150 ***	0.044	0.129 ***	0.043	0.118 ***	0.043	0.113 ***	0.043
ICC_individual	57.3%		59.0%		60.5%		61.3%		61.6%	
ICC_family	18.2%		15.7%		13.8%		12.7%		12.2%	
ρ	0.241		0.210		0.185		0.172		0.166	
% family variance explained by parental outcomes ($\sigma_f^2 - \sigma_f^{2*}$)/ σ_f^2			16%		28%		34%		37%	
Log-likelihood	-1990.45		-1982.55		-1976.95		-1974.03		-1966.32	
No. Obs.	1827		1827		1827		1827		1827	
No. Individuals	609		609		609		609		609	
No. Families	279		279		279		279		279	

Note: Variance at level 1 is 0.24

Table 6. Two level model (random effects): period of study: 2011 and 2014

Dependent variable is:	Trust		Network	
(two level model)	Coef	SE	Coef	SE
Individual attributes				
Personality type is resilient	0.348 ***	0.049	0.349 ***	0.056
Personality type is over controlled	0.023	0.053	0.023	0.060
other covariates	yes	yes	yes	yes
Parents attributes (2001-2003)				
Social support (average)	0.124 ***	0.041	0.074 **	0.032
At least one parent with high education	0.123 **	0.056	0.176 ***	0.053
Financial difficulties (average)	-0.157 **	0.069	-0.201 ***	0.065
Parenting stress (average)	-0.076 **	0.038	-0.032	0.035
Year dummies	yes	yes	yes	yes
σ_a^2	0.455 ***	0.032	0.342 ***	0.030
ICC_individual	52.4%		41.9%	
log-likelihood	-2435.1		-2433.7	
No. Individuals	1029		1029	
No. Observations	2058		2058	

Note: "other covariates" includes all covariates reported in Table X1 (less "Financial difficulties", information not available in 2010)

Appendix 1. Variable construction using factor analysis

Factor analysis is a statistical data reduction technique used widely to explain variability among observed random variables in terms of fewer unobserved random variables called factors. In general, factor analysis models the observed variables as linear combinations of the factors, plus normally distributed error terms. The algorithm produces a factor structure matrix representing the correlations between the variables and the factors and is called the factor loading matrix. The interpretation of each factor is marked by high loadings on a certain sub-sample of attributes that give information on a specific kind of unobservable.⁹ Each factor score has zero mean (and standard deviation of one) by construction.

First, we focus on the parents. Using factor analysis, we construct the indicators of social support and parenting stress. Factor analysis is performed separately in each year. In this way, outcomes can be seen as deviations from yearly means (that are equal zero by construction). In each year, we identify one factor, labelled social support (see Table A1) and one factor, labelled parenting stress (see Table A2). The Kaiser–Meyer–Olkin measures of sampling adequacy report values of about 0.7 thus confirming that the variables have enough in common for the factor analysis to be valid.

Second, we focus on the young adults. Using factor analysis, we construct the indicators of social support, trust and network as appropriate. In each year, we identify one factor, labelled social support (see Table A3) and two factors, labelled respectively trust and network (see Table A4). The Kaiser–Meyer–Olkin measures of sampling adequacy report values of about 0.8 thus confirming that the variables have enough in common for the factor analysis to be valid.

Table A1. Factor analysis: social support (parents)

Parents attributes:	Social support		
	2001	2002	2003
Issupnh - I often need help from other people but can't get it	0.647	0.655	0.684
alssupac - I don't have anyone that I can confide in	0.790	0.805	0.823
Issuplt - I have no one to lean on in times of trouble	0.832	0.825	0.831
Issupvl - I often feel very lonely	0.694	0.734	0.712
Issupsh - When I need someone to help me out, I can usually find someone	-0.619	-0.654	-0.681
Explained proportion of total variance	0.52	0.55	0.56
Kaiser-Meyer-Olkin measure of sampling adequacy	0.76	0.78	0.79

Note: scale from 1 (strongly agree) to 7 (strongly disagree)

⁹ We retain only factors which account for sufficient variance: meaning that unless a factor extracts at least as much as the equivalent of one original variable, we do not consider it (Kaiser criterion). Since factor analysis is based on a correlation matrix, it assumes that the observed variables are measured continuously, are distributed normally, and that the association among indicators is linear. Our observed variables are discrete, so we assume that they are indicators of underlying continuous unobserved variables and use the appropriate correlations in the factor analysis. If we retain more than one factor, we perform an oblique rotation allowing factors to be correlated

Table A2. Factor analysis: parenting support

Parents attributes:	Parenting stress		
	2001	2002	2003
pahard - Being a parent is harder than I thought it would be	0.716	0.748	0.728
patird - I often feel tired, worn out, or exhausted from meeting the needs of my children	0.772	0.794	0.792
patrap - I feel trapped by my responsibilities as a parent	0.778	0.778	0.791
pawork - I find that taking care of my child/children is much more work than pleasure	0.737	0.758	0.756
Explained proportion of total variance	0.56	0.59	0.59
Kaiser-Meyer-Olkin measure of sampling adequacy	0.71	0.74	0.75

Note: scale from 1 (strongly disagree) to 7 (strongly agree).

Table A3. Factor analysis: social support (young adults)

Young adults attributes:	Social support			
	2010	2014	2015	2016
Issupnh - I often need help from other people but can't get it	0.982	0.777	0.797	0.822
alssupac - I don't have anyone that I can confide in	0.984	0.881	0.853	0.862
Issuplt - I have no one to lean on in times of trouble	0.986	0.880	0.869	0.872
Issupvl - I often feel very lonely	0.976	0.770	0.783	0.781
Issupsh - When I need someone to help me out, I can usually find someone	0.945	-0.790	-0.807	-0.790
Explained proportion of total variance	0.95	0.67	0.68	0.68
Kaiser-Meyer-Olkin measure of sampling adequacy	0.92	0.85	0.85	0.85

Note: scale from 1 (strongly agree) to 7 (strongly disagree).

Table A4. Factor analysis: trust and network (young adults)

Young adults attributes:	2010		2014	
	Trust	Network	Trust	Network
Issocal - how often do you get together socially with friends or relatives not living with you? **		-0.670		-0.647
Issuplf - I seem to have a lot of friends		0.525		0.526
Isnwcon - Have telephone, email or mail contact with friends or relatives not living with you		0.640		0.659
Isnwkit - Take time to keep in touch with friends		0.791		0.752
Isnwexf - See members of your extended family (or relatives not living with you) in person		0.456		0.583
Isnwce - Attend events that bring people together such as fetes, shows, festivals or other community events		0.548		0.584
Isadv - Most people would try to take advantage of you if they got a chance	-0.630		-0.661	
Iskeep - Most people you meet keep their words	0.786		0.804	
Issop - Most people you meet succeed by stepping on other people	-0.651		-0.667	
Ismah - Most people you meet make agreements honestly	0.795		0.815	
Ishlpfl - Most of the time people try to be helpful	0.739		0.770	
jlstrust - Generally speaking, most people can be trusted	0.767		0.783	
Explained proportion of total variance		0.53		0.58
Kaiser-Meyer-Olkin measure of sampling adequacy		0.84		0.86

Note: scale from 1 (strongly disagree) to 7 (strongly agree); (**) scale from 1 (every day) to 7 (Less often than once every 3 months)