The Impact of Youth Engagement on Life Satisfaction: A Quasi-Experimental Field Study of a UK National Youth Engagement Scheme

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Abstract

There is growing interest in the role of organized social participation in clubs, associations, and activities in shaping subjective well-being (SWB). However, the field remains contested. This study addresses key questions regarding the participation–SWB link: concerns regarding endogeneity; debate surrounding the mechanisms at work; and the role participation can play in closing inequalities in SWB. Each question is addressed through a quasi-experimental field study into the impact of a large-scale, nationally-implemented youth engagement scheme (UK National Citizen Service) on life satisfaction. Using pre-test/post-test data on a sample of participants and (propensity score matched) controls, results suggest discrete periods of youth engagement can lead to significant improvements in life satisfaction, observable at least 4–6 months after involvement ended. Participation can also help close social inequalities in SWB via a significantly stronger impact on life satisfaction among young people from more economically disadvantaged communities. Although youth from disadvantaged communities join the scheme with lower SWB, post-participation, they have entirely closed the gap in SWB with their less-disadvantaged peers. Improvements in SWB emerge from positive impacts of participation on both social- and psychological-resource pathways. However, stronger participation-effects on psychological-resources become increasingly important for explaining the additional SWB-gains of more disadvantaged young people.

Introduction

Formal social participation in clubs, associations, and activities is linked to multiple positive outcomes, such as trust, political engagement, and co-operation (Putnam, 2000). Recently, multidisciplinary interest has emerged into how participation affects subjective well-being (SWB) (Helliwell and Putnam, 2004; Zambon et al., 2010; Binder and Freytag, 2013). Although primarily focused on adults, studies are increasingly exploring this relationship among young people, such as participation in uniformed groups, youth clubs, or community projects (Zambon et al., 2010; Aminzadeh et al., 2013). This question is especially pertinent given adolescence is a period well-being begins to decline, and the implications this has for adaptive development (Goldbeck et al., 2007; Zambon et al., 2010; Aminzadeh et al., 2013).
Current research generally supports the view that participation cultivates SWB (Helliwell and Putnam, 2004; Borgonovi, 2008; Zambon et al., 2010; Aminzadeh et al., 2013), leading public-health bodies to advocate engagement as a lever for building, and closing inequalities in, the well-being of populations (WHO, 2007). However, how engagement affects well-being remains a controversial area.

The first question concerns issues of unobserved heterogeneity and reverse causality in participation’s apparent impact. Many studies into the participation–SWB link rely on cross-sectional data, making claims to a participation effect problematic. For example, unobserved differences between individuals may drive both participation and SWB, while happier people may simply be more willing to participate (Binder and Freytag, 2013; Headey and Muffels, 2016). This endogeneity is particularly salient among young people where parental/household characteristics also play key roles in both participation and well-being.

The second question regards ongoing debates into why participation matters for SWB. Studies predominantly apply a social-resources model, where networks and trust derived from participation build SWB (e.g. Kawachi and Berkman, 2001; Ding, Berry and O’Brien, 2015). However, others emphasize a psychological-resources model, where participation cultivates SWB through fostering confidence, social efficacy and perceived control (e.g. Mellor et al., 2008). Both pathways are prima facie plausible and do not necessarily compete but may complement one another. However, little research systematically tests their relative importance.

The third question is whether participation is effective at building SWB among those who need it most. Social gradients in well-being, especially across socio-economic disadvantage, are well documented and tend to persist over the life course (WHO, 2007; Elgar et al., 2015; Laurence, 2019a). However, it is unclear whether participation helps close these gaps in SWB or, at worst, widens them through augmenting the well-being of youth at the top end of such gradients (Aminzadeh et al., 2013). To be an effective intervention, participation needs to not only boost SWB but also reduce inequalities by ‘levelling up’ those at the bottom.

To address these questions, this study exploits a unique data opportunity to analyze the impact of a large-scale, nationally implemented youth engagement program on UK adolescents. Taking a quasi-experimental field-study approach, using pre-test/post-test data on a sample of participants and controls, this intervention design helps perform a stronger test of participation’s impact. However, the study’s approach also makes key contributions vis-à-vis the limited number of (quasi-)experimental, intervention-design studies in the field (e.g. Whillans et al., 2016); in particular, strengthening the study’s external validity (relative to prior intervention work) by undertaking a larger-sample, multi-site study of a nationally run program, which employs a standardized model of activities across participation sites, among a more representative sample of participants.

Given evidence of increasing emotional problems among adolescents (Collishaw et al., 2004) and widening socio-economic inequalities in children’s mental well-being (Anderson, 2016), understanding youth engagement’s role for SWB is critical. This study provides a compelling test of how engagement impacts life satisfaction alongside critical insights into the mechanisms underpinning participation’s relationship with SWB, contributing to theoretical frameworks on how civil institutions influence people’s lives.

**Theoretical Framework**

### Youth Engagement and Subjective Well-Being

Extensive research investigates the links between organized social participation and adult SWB, demonstrating that participants appear happier and more satisfied with their lives (Helliwell and Putnam, 2004; Borgonovi, 2008; Brown, Hoye and Nicholson, 2012). Research into the youth participation–SWB link, however, is less established. Youth engagement involves formal, voluntary social participation in clubs, groups, or activities, undertaken with peers, out of the home (Gilman, 2001; Dworkin, Larson and Hansen, 2003). This includes participation in community organizations (e.g. youth/uniformed groups), after-school groups (e.g. sports, drama), or discrete engagement opportunities (e.g. community projects) (Zambon et al., 2010; Pancer, 2015). A key component of such participation is that it involves discretionary, structured, cooperative-orientated activities, within the structural parameters of an organization/group (Gilman, 2001; Bundick, 2011).

As observed among adults, nationally representative samples of young people show that engagement in various associations predicts higher SWB (Morgan and Haglund, 2009; Zambon et al., 2010; Aminzadeh et al., 2013). Small-scale studies, of one/two schools, similarly show participants involved in after-school- or community-activities report higher well-being (Maton, 1990; Gilman, 2001; Palen and Coatsworth, 2007). In addition, more frequent engagement (Maton, 1990;
Morgan and Haglund, 2009; Bundick, 2011), and engaging in a larger number of activities (Gilman, 2001; Palen and Coatsworth, 2007), contributes to even greater well-being.

This work provides compelling initial evidence that participation can boost youth-SWB. However, despite the consistency of findings, key questions remain.

Does Youth Engagement Lead to Greater Subjective Well-Being?
The first question is whether such studies do identify an impact of participation, given their frequent reliance on cross-sectional data. Several studies highlight how selection processes are critical in understanding how participation impacts individuals, and take steps to account for the potential bias such processes may introduce into their estimates of participation’s effect (e.g. Borgonovi, 2008; Binder and Freytag, 2013). Other characteristics of individuals, such as personality traits (e.g. extroversion), are key components of both SWB and engagement behaviours, feasibly accounting for any observed participation- SWB link (Wilson, 2012; Binder and Freytag, 2013). Reverse causality, where improvements in SWB, in turn, leads to greater participation, may also bias cross-sectional associations (Headey and Muffels, 2016), especially as models of engagement stress how individuals with greater psychological resources (including SWB) are more likely to seek, be sought for, and to respond positively to requests for, engagement (Wilson, 2012).

To overcome these issues, studies increasingly turn to longitudinal approaches (Jenkinson et al., 2013; although see also Borgonovi’s (2008) cross-sectional instrumental-variable approach to addressing potential selection bias, demonstrating evidence of participation’s effect). One approach marshals longitudinal observational studies (e.g. general population representative panel data, and cohort studies), which help minimize bias from time-invariant unobserved heterogeneity (especially when analyzing *within*-individual change), while also benefiting from high external validity. Several such studies among adults demonstrate positive impacts of participation on SWB over time (e.g. Headey, Muffels and Wagner, 2010). Youth longitudinal observational studies also find short-/long-term benefits of engagement, although others find cross-sectional associations disappear when followed-up longitudinally (Fredricks and Eccles, 2006; Bundick, 2011). This work provides stronger evidence that participation effects may not solely be an artefact of endogeneity.

The second approach employs (quasi-)experimental randomized- and non-randomized designs to examine how discrete periods of engagement impact SWB (Pancer, 2015). These approaches complement insights from observational studies, especially via manipulating the timing of the intervention (participation) between pre-test/post-test outcome measurements, to provide additional insights into the directionality of the participation–SWB relationship (although limitations still exist, as when selection into participant/control groups can continue to bias estimates) (Fujiwara and Kawachi, 2008). Few such (quasi)-experimental tests have been carried out in the field, and available tests produce mixed findings. A small quasi-experimental pre-test/ post-test study (n = 80) of New Zealand youth found a 14-month participation program improved SWB; however, this focused on low-efficacy youth (Furness et al., 2017). While a random-assignment study of a US youth service-learning scheme (n = 232 participants, n = 56 controls) found no impact on well-being 10–12 weeks after starting the program (Whillans et al., 2016). In fact, a meta-analysis of adult volunteering found that positive effects observed in longitudinal observational studies (e.g. cohort studies) were generally not replicated in quasi-/randomized–experimental settings (Jenkinson et al., 2013).

In sum, prior instrumental-variable/longitudinal observational studies demonstrate promising evidence that participation’s effects are not simply a product of selection processes (e.g. Borgonovi, 2008; Binder and Freytag, 2013). However, (quasi-)experimental analyses find less conclusive support. This discrepancy could suggest the presence of unaccounted for bias between approaches. However, it could also reflect weaknesses among current quasi-experimental studies, which are largely conducted on small samples, often at a single site of participation, and among sub-groups of individuals, affecting their ability to pick up effects, as well as generalize outside of their specific sites (Jenkinson et al., 2013). To complement the insights derived from observational studies, there is a need for more (quasi-)experiment intervention design approaches that are conducted on larger samples, tested across multiple participation sites, among groups more representative of the broader population.

How Does Youth Engagement Impact SWB?
The second key question is that despite agreement that participation should build SWB, studies diverge on why participation will matter. The dominant perspective is the social-resources model (Kawachi and Berkman, 2001; Proctor, Linley and Maltby, 2009; Pancer, 2015). Here, participation enlarges social networks, cultivating
support ties for the maintenance of SWB, particularly through expanding bridging networks (Kawachi and Berkman, 2001; Helliwell and Putnam, 2004; Zambon et al., 2010). Participation can similarly improve inter-action valence, fostering more positive (and less negative) relations (Dworkin, Larson and Hansen, 2003; Pancer, 2015; Laurence, 2019; 2020). Participation can also cultivate more ‘cognitive’ elements of social capital, such as trust and reciprocity, which bear on young people’s SWB (Borgonovi, 2008; Aminzadeh et al., 2013; Ding, Berry and O’Brien, 2015). Community-focused engagement in particular can lead to greater cohesion and collective efficacy, while also reducing daily stresses from one’s environment (Borgonovi, 2008; Morgan and Hallund, 2009).

In contrast to the social-resources model, other studies highlight the importance of psychological resources (Mellor et al., 2008; Brown, Hoye and Nicholson, 2012; Whitehead et al., 2014). Here, engagement is posited to build various psychological-resources, including perceived control, self-esteem, and social efficacy, important for SWB (Baumeister and Leary, 1995; Proctor, Linley and Maltby, 2009). Participation can foster greater perceived control over one’s life through the achievement of group goals, opportunities for self-directed behaviour, and experiences of impacting one’s environment (Zimmerman and Rappaport, 1988; Mellor et al., 2008). Skill building and involvement in decision-making can also augment one’s self-validation, instilling self-efficacy (Mellor et al., 2008; Morton and Montgomery, 2012). Youth engagement may also foster a greater sense of belonging, both among co-participants and the wider community, also beneficial for self-esteem (Baumeister and Leary, 1995). Similarly, participation can engender confidence in communication, relating to/working with peers, and interacting with strangers, strengthening one’s self-efficacy (Dworkin, Larson and Hansen, 2003; Musick and Wilson, 2003; Mellor et al., 2008; Pancer, 2015).

Despite this established theoretical framework, research explicitly testing these social- and psychological-resource models is sparse. Studies have tested these models separately, demonstrating evidence that pathways of psychological resources (perceived control/self-efficacy) or social resources (network ties/generalized trust) can account for at least part of the participation–SWB relationship (Borgonovi, 2008; Mellor et al., 2008). However, separate testing of the social-/psychological-resource models limits our understanding of the extent to which both pathways operate alongside one another, or how mutually exclusive they are; for example, one pathway may operate through another, as when social efficacy can foster more social interactions (Dworkin, Larson and Hansen, 2003). One study found initial evidence that participation may drive greater SWB through independent gains across both sets of resources (Brown, Hoye and Nicholson, 2012). However, based on cross-sectional data, similar concerns about endogeneity remain among these studies, especially given social/psychological resources may be just as likely to recruit individuals into participation as build SWB.

Taken together, studies variably stress the importance of either social or psychological resources for understanding why participation matters for SWB. There is therefore a need to explicitly test the posited mechanisms underlying the participation–SWB relationship; in particular, to examine both social-/psychological-resource pathways simultaneously to understand their relative importance, as well as how competing/complementary they are.

Can Youth Engagement Reduce Inequalities in SWB?

The third key question is how far participation can reduce inequalities in SWB (WHO, 2007). One well-established SWB gradient is across socioeconomic disadvantage, documented across individuals, households, and communities (Elgar et al., 2015; Laurence, 2019a). However, currently, it is unclear whether participation is helpful for those at the lower end of such gradients, working to close inequalities, whether it boosts SWB among all people while preserving inequalities, or whether it widens inequalities by only benefiting those at the upper end. Studies of older populations, for example, show that participation can act as a protective against processes weakening SWB, such as social isolation (Musick and Wilson, 2003), or can be particularly beneficial for those with lower SWB (Binder, 2015), suggesting participation could help those who need it most.

One SWB gradient that youth participation could be especially effective at reducing is inequalities across community socioeconomic disadvantage (WHO, 2007; Vyncke et al., 2013; Elgar et al., 2015; Laurence, 2019b). One possibility is through participation’s role in cultivating social resources. Neighbourhoods provide access to networks and positive ties, giving rise to trust and cohesion beneficial to SWB; however, such social resources are often weaker in disadvantaged areas (while negative social relations are more common), and these deficits appear to (partly) account for why youth-SWB is lower in disadvantaged communities (Vyncke et al., 2013; Laurence, 2019b). Potentially, engagement may work to interrupt the negative effects of community engagement.
disadvantage on SWB. Through encouraging more positive relations with residents, and fostering trust and a sense of efficacy, particularly when engaging with local issues, participation may lead to greater gains in (re-)building social resources among participants from disadvantaged areas.

A second possibility relates to participation’s posited effects on psychological resources. Socioeconomic gradients in SWB may also emerge from differences in those psychological resources important for SWB (Whitehead et al., 2014). For example, deficits in perceived control/self-esteem in disadvantaged communities can also partly explain SWB gradients across neighbourhoods (Ross, Mirowsky and Pribesh, 2001; Whitehead et al., 2014). Although the causes of such deficits may be myriad, one theory is that disadvantaged youth are socialized into more fatalistic, externalized loci of control, through gaining an awareness of their relative status in society and attendant life chances (Wheaton, 1980; Zimmerman and Rappaport, 1988). As Wheaton (1980: p. 105) suggests, through ‘an accumulated learning history involving a series of situations in which differentiation by status—whether achieved or ascribed—is made evident to the individual”, disadvantaged environments weaken one’s perceived control. These processes can also lead adolescents to internalize the (often) negative societal views toward lower socioeconomic backgrounds, harming self-worth (‘reflected appraisals’) (Haney, 2007). Potentially, youth engagement could decouple this link between one’s socioeconomic background and one’s perceived life chances/self-worth. In particular, self-directed, community-focused, goal-orientated behaviours may be especially empowering for disadvantaged participants, helping (re-)build those psychological resources in social-environments which normally weaken them. Accounts of disadvantaged participants, for example, observe particularly positive changes in their social efficacy relative to what they thought themselves capable of (Davies, 2016).

There are therefore good reasons to believe participation could exert stronger positive effects on SWB among youth from disadvantaged communities, through greater improvements in social and/or psychological resources, in turn, closing inequalities in SWB. However, little work has explored this question, nor the mechanisms accounting for any additional SWB gains among disadvantaged participants (although see Aminzadeh et al., 2013).

Summary
Key gaps remain in our understanding of the participation–SWB relationship; especially among young people. This study aims to advance our understanding across three areas. First, we aim to develop our understanding of the mechanisms linking participation to SWB, particularly via simultaneously testing the relative importance of social-/psychological-resource models. Second, we will investigate how and why participation can help reduce inequalities in SWB, especially SWB gradients across community disadvantage. Third, we aim to complement evidence into the participation–SWB relationship derived from longitudinal observational studies by applying a quasi-experimental intervention approach, to further explore the robustness of the participation–SWB relationship, while also accounting for shortcomings within current quasi-experimental tests. In particular, we aim to undertake a quasi-experimental field test of a nationwide scheme, across multiple participation sites, on a larger sample of participants, who are more representative of the broader youth population.

The Present Study
To investigate the study’s aims, we explore a nationally implemented youth engagement scheme: the UK National Citizen Service (NCS) program. NCS involves young people, aged 15–17, taking part in a program of activities over 3–4 weeks within small groups of 12–15 people (National Audit Office, 2017). Phase 1 involves ‘outward-bound activities’ (e.g. outdoor pursuits, raft building). Phase 2 encompasses a residential for participants to build ‘life skills’ in personal/civic/social competency (e.g. communication skills). Both phases 1 and 2 are undertaken away from participants’ homes. In phase 3, participants return home and commence 60 hours of designing/implementing a social action project within their communities; for example, building a communal garden (National Audit Office, 2017).

The scheme is nationwide, and eligibility is determined solely by age: 16- and 17-year olds, or 15-year olds turning 16 by 31 August of the participation year. The scheme currently involves high uptake: in 2018, one in six of all eligible 15–17 year olds took part (National Citizen Service Trust, 2018). Parents/guardians also pay £50/participant, although where families experience financial constraints costs are reduced/waived (National Audit Office, 2017). Importantly, the composition of participants is broadly reflective of the eligible youth population but with some over-representation among groups, including: females (59 per cent on the scheme versus 49 per cent in society), ethnic minorities (32 per cent versus 20 per cent), youth eligible for free school meals (17 per cent versus 8 per cent), and youth from the top quantile of community deprivation (13 per cent
versus 11 per cent) (National Audit Office, 2017). Further information can be found in the NCS audit report (National Audit Office, 2017).

The structure of the scheme makes it a compelling test-bed to assess how engagement affects SWB. NCS aims to build cohesion, support transition into adulthood, and foster (local) engagement (National Audit Office, 2017). However, the nature of the program could result in improved well-being, given its activities fulfil the criteria of formal youth social participation previously outlined, involving: structured (task/skill related), co-operative activities, within structural parameters of a defined group, providing young people opportunities to connect with peers, in the pursuit of common goals.

Data and Methods

Study Design

As NCS is open to all age-eligible youth, randomized assignment was not possible. With non-random assignment, difference-in-difference (DiD) methods represent a useful approach to testing the impact of interventions (in our case, a period of youth engagement), comparing pre-test/post-test changes in outcomes over time ($t_{-1}$ to $t_0$) between a participant group and control group; the latter, in theory, represents the counterfactual of how the outcome would have changed among participants absent of the intervention. In theory, the difference in the changes between groups provides the estimate for participation’s effect, absent of self-selection. DiD approaches are part of the fixed-effects methods family, removing the impact of time-invariant unobserved heterogeneity, alongside secular outcome trends. In addition, intervention designs (as undertaken here) can also provide further insights into the directionality of the participation–SWB relationship by isolating the exact timing of participation relative to when pre-test/post-test outcome measurements are observed. However, unbiased effect estimates depend on the validity of the parallel-trends assumption, that is, absent of engagement, participants would exhibit the same trend in outcome over the period as controls. Where selection processes lead to systematic differences between participant/control groups, this assumption is threatened. Steps are taken to strengthen this assumption via enhancing participant/control group similarity: the more similar the groups, the stronger the assumption they would have identical secular outcome trends.

First, the control group was sampled from a pool of young people who ‘expressed an interest’ in participating on NCS (e.g. McAdam, 1986). This group attended a recruitment event, and provided their details for further information, but did not eventually take part in the program that summer. Second, propensity-score matching is undertaken between participants/controls to strengthen the counterfactual through further increasing similarity between participants/controls (e.g. Binder and Freytag, 2013). Together, this approach constitutes a propensity-score matched difference-in-difference (PSM-DiD) approach. Efficacy of this approach depends on available covariates for matching (and unobserved characteristics can continue to bias analyses). We discuss these issues below.

Sample and Data

Scheme evaluation is overseen by the UK Department for Digital, Culture, Media and Sport. A mixed-mode approach was taken to data collection, including postal surveys and online surveys to maximize response. Participants were surveyed just before engaging. Questionnaires were administered to all participants who took part during a four-week evaluation window during the 2015 summer program, which covered all participation sites across the country. They then completed follow-up surveys 4–6 months after the program was completed. A random sample of young people was contacted from the pool who ‘expressed an interest’ in participating, to form the control group. They were surveyed over the same pre-test/post-test period as participants. Pre-participation response rates among the participant and control group sample were 85 per cent and 46 per cent, respectively. A random sample of $n = 3,985$ participants/$n = 3,985$ controls were then invited to complete the follow-up survey. Post-participation follow-up response rates for participants and controls were 51 per cent and 53 per cent. The higher baseline response rate among participants likely occurs from the survey being part of information gathered from participants before beginning the scheme, boosting completion. The follow-up response rates are in line with youth panel surveys and the similarity of follow-up response rates between participants/controls is reassuring regarding group similarity.

Missing complete cases from non-response can affect external validity. At baseline, males, and youth reporting lower trust, lower perceived social capital, who drink more alcohol, and exhibit less civic engagement, were less likely to respond at follow-up (see ‘Robustness and sensitivity’ section, and accompanying supplementary appendix). Reassuringly, pre-participation SWB did not predict attrition. External validity is also threatened...
by missing within-case data (although it never exceeds 2 per cent on any variable). Extensive testing using weights and multiple imputation is performed to assess bias (see the ‘Robustness and sensitivity’). Respondents’ local areas are measured at the Lower Super Output Area (LSOA) geographic-scale (average n = 1,500).

**Measures**

**Outcome**

Our pre-test/post-test outcome is life satisfaction. Respondents were asked: ‘On a scale of 0–10, where 0 is not at all satisfied and 10 is completely satisfied, overall, how satisfied are you with your life nowadays?’ Life satisfaction is often applied as a subjective evaluation of overall quality of life, involving cognitive judgments, less reliant on day-to-day emotional changes (Gilman, 2001; Proctor, Linley and Maltby, 2009). Questions exist over the validity of life satisfaction measures for youth SWB given adult research identifies the importance of ‘life choices’, which are less salient in young respondents (e.g. Headey, Muffels and Wagner, 2010). However, recent work suggests life satisfaction measures can form valid global indicators of youth-SWB (e.g. Huebner, 2004).

**Mechanisms**

Table 1 outlines the social- and psychological-resource mechanism measures (captured pre-/post-participation). Structural social resources are measured through the presence of support tie networks (tie quantity) and an index of bridging social capital to tap the diversity of one’s support network, for example, amount of support ties across ethnicity, economic status, etc. (tie quality). Factor analysis demonstrates tie-quality questions form a single index of tie diversity (Eigen value: 2.13; minimum loading: 0.47; Cronbach’s alpha: 0.78). To measure frequency of positive/negative social interactions with others, we mobilize measures initially designed to capture positive/negative contact with ethnic in-/out-group members. Testing (factor analysis/Cronbach’s alpha) demonstrates these measures load on to constructs of positive or negative contact with others, which are less salient in young respondents (e.g. Headey, Muffels and Wagner, 2010). However, recent work suggests life satisfaction measures can form valid global indicators of youth-SWB (e.g. Huebner, 2004).

To capture psychological resources, first, we measure confidence in one’s abilities, especially one’s social efficacy. Four questions are used, designed to capture confidence in social skills, loading on to a single factor in factor analysis (Eigen factor: 2.16; minimum loading: 0.69; alpha coefficient: 0.83) (Jessiman and Drever, 2010) (see Table 1 for question details). Second, the data contain questions from psychometric scales designed to measure young people’s ‘sense of control over their lives’, variously defined as locus of control, fatalism, or perceived control (e.g. Lefcourt, 1991; Dahlberg et al., 2005). These measures are applied in government-administered surveys measuring youth perceived control, for example, the UK Longitudinal Study of Young People. Prior work subdivides these questions into two dimensions of perceived control (e.g. Lessof et al., 2016). First, ‘Even if I do well at school, I’ll have a hard time getting the right kind of job’ (reversed) and ‘working hard now will help me get on later in life’, tap a belief that one’s future success is determined by one’s own effort. Second, ‘People like me don’t have much of a chance in life’ (reversed) and ‘I can pretty much decide what will happen in my life’, tap more traditional concepts of perceived control. These measures are applied as four separate indicators. Unfortunately, the data do not contain explicit self-esteem measures. However, concepts of perceived control and self-esteem are related and there are overlaps between a judgment of one’s self-worth and the question: ‘People like me don’t have much of a chance in life’. Lastly, we measure formal and informal participatory behaviours: the number of civic activities and the number of helping behaviours (outside of a group/organization) undertaken in the last three months.

**Key moderators: community socioeconomic disadvantage**

Community socioeconomic (SE) disadvantage is captured using the Office for National Statistics measure of employment disadvantage: 2015 proportion of the working-age population in an area involuntarily excluded from the labour market, based on local area counts of who is in receipt of out-of-work state benefits (0–100 per cent). This measure is based on 2015 data, synchronizing with the evaluation period.

**Analytical Approach**

**Propensity score matching**

Matching variables are selected that theoretically influence both the participation decision and outcome to
Table 1. Mechanism measures

| Mechanism pathway       | Mechanism type                    | Mechanism measure                                                                                                                                                                                                 | Measurement scale |
|-------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Civic participation     | Formal prosocial engagement       | Have you given your time to help in any of the following ways outside of school or college hours in the last three months?                                                                                             | Yes/no            |
|                         |                                   | ... Helped out at a local club, group, organization, or place of worship                                                                                                                                        |                   |
|                         |                                   | ... Helped out other organizations                                                                                                                                                                               |                   |
|                         |                                   | ... Raised money for charity (including taking part in a sponsored event)                                                                                                                                          |                   |
|                         |                                   | ... Contacted someone (e.g. council, media, school) about something affecting your local area                                                                                                                    |                   |
|                         |                                   | ... Organized a petition or event to support a local or national issue                                                                                                                                              |                   |
|                         |                                   | ... Done something to help other people, or to improve a local area                                                                                                                                               |                   |
| Informal prosocial      | engagement                        | Have you helped anyone not in your family in any of these ways in the last three months? Do not include anything you were paid to do?                                                                              |                   |
|                         |                                   | ... Doing shopping, collecting pension, or paying bills for someone                                                                                                                                              |                   |
|                         |                                   | ... Cooking, cleaning, laundry, gardening, or other routine household jobs for someone                                                                                                                           |                   |
|                         |                                   | ... Decorating, or doing any kind of home or car repairs for someone                                                                                                                                              |                   |
|                         |                                   | ... Baby sitting or caring for children                                                                                                                                                                           |                   |
|                         |                                   | ... Taking care of someone who is sick or frail                                                                                                                                                                  |                   |
|                         |                                   | ... Looking after a pet for someone who is away                                                                                                                                                                   |                   |
|                         |                                   | ... Helping with a university or job application                                                                                                                                                                 |                   |
|                         |                                   | ... Writing letters or filling-in forms for someone                                                                                                                                                    |                   |
|                         |                                   | ... Helping out in some other way                                                                                                                                                                                 |                   |
| Social resources:       | Quality of support ties (bridging | Now, think about people you know who you would feel happy getting in touch with to ask for advice or a favor. How many are...                                                                                       | None to many      |
| structural              | social capital                    | ... from a different school or college to you?                                                                                                                                                                   | (four-option Likert scale) |
|                         |                                   | ... from a different race or ethnicity to you?                                                                                                                                                                  |                   |
|                         |                                   | ... from a different religious background to you?                                                                                                                                                                |                   |
|                         |                                   | ... from a richer or poorer background to you?                                                                                                                                                                  |                   |
|                         |                                   | ... gay or lesbian?                                                                                                                                                                                             |                   |
| Social resources:       | Quantity of support ties          | If I needed help there are people who would be there for me...                                                                                                                                                  |                   |
| structural              | Positive and negative social      | People report having positive and negative social contact with others from all kinds of backgrounds.                                                                                                           | Never to very     |
|                         | contact                           | Thinking of your own experiences with people from a different race or ethnicity to you, how often, if at all, would you say have...                                                                             | often (five-option Likert scale) |
|                         |                                   | ... POSITIVE or GOOD experiences. For example someone being friendly to you, or making you feel welcome?                                                                                                         |                   |

(continued)
satisfy the conditional independence assumption. Table 2 shows the full list of matching covariates (all measured at the pre-participation period). Drawing on reviews of the participation (e.g. Wilson, 2000) and SWB (e.g. Proctor, Linley and Maltby, 2009) literatures, socio-demographic characteristics are matched on, for example age, gender, and ethnicity. We match on pre-participation formal/informal engagement behaviours,

| Mechanism pathway | Mechanism type | Mechanism measure | Measurement scale |
|-------------------|----------------|-------------------|-------------------|
| ... NEGATIVE or BAD experiences. For example someone being mean to you, or making you feel unwelcome? |
| ... POSITIVE or GOOD experiences. For example someone being friendly to you, or making you feel welcome? |
| ... NEGATIVE or BAD experiences. For example someone being mean to you, or making you feel unwelcome? |
| ... My local area is a place where people from different backgrounds get on well together |
| ... I understand the organizations and people that have influence in my local area |
| ... I would know how to deal with a problem in my local area if I wanted to |
| How much do you agree or disagree with the following statements? |
| Generally speaking, would you say that most people can be trusted, or that you can’t be too careful in dealing with people? |
| How much do you agree or disagree with the following statements? |
| How much do you agree or disagree with the following statements? |
| How much do you agree or disagree with the following statements? |
| The next question is about how confident you feel about different areas of your life. How do you feel about the following things, even if you have never done them before...? |
| Not at all confident to very confident (five-option Likert scale) |
| Reversed |
| Reversed |
| ... Meeting new people |
| ... Having a go at things that are new to me |
| ... Working with other people in a team |
| ... Being the leader of a team |
Table 2. Pre-matched and post-matched descriptive statistics for participant and control-group samples (with \(t\)-tests for equality of means)

| Variable                                                      | Range     | Treated      | Control     | \(t\)-test: \(t\) | \(t\)-test: \(P\) |
|---------------------------------------------------------------|-----------|--------------|--------------|-------------------|-------------------|
| N Civic activities in last 3 months                          | 0–6       | 1.23         | 1.11         | 2.68**            | 0.01              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| N Informal helping activities in last 3 months               | 0–6       | 1.59         | 1.57         | 0.45              | 0.65              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Currently studying for qualification (cf. no)                | 0–1       | 0.54         | 0.48         | 3.58***           | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Index of confidence in skills \((i)\)                        | −3.18–1.34| −0.18        | −0.07        | −3.39***          | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Perceived control: school = job success                       | 1–5       | 2.71         | 2.77         | −1.76             | 0.08              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Perceived control: hard work = success                        | 1–5       | 4.39         | 4.4          | −0.41             | 0.68              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Perceived control: high relative life chances                 | 1–5       | 3.85         | 3.95         | −0.34***          | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Perceived control: I decide my life                          | 1–5       | 3.33         | 3.31         | 0.37              | 0.71              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Index of perceived local social capital \((i)\)              | −2.45–1.48| 0.01         | −0.09        | 4.16***           | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Presence of support ties                                     | 1–5       | 4.11         | 4.1          | 0.27              | 0.79              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Generalized trust                                             | 0–2       | 1.01         | 0.97         | 1.56              | 0.12              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Negative social contact                                       | 1–5       | 2.41         | 2.42         | −0.54             | 0.59              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Positive social contact                                       | 1–5       | 4.15         | 4.16         | −0.51             | 0.61              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Index of bridging social capital \((i)\)                     | −2.53–1.39| 0            | −0.24        | 7.87***           | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Carer for some in home (cf. no)                              | 0–1       | 0.13         | 0.09         | 3.04***           | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Community employment disadvantage                             | 0.7–55    | 12.42        | 11.23        | 4.5***            | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| cf. Lives in major conurbation/city and town                 |           |              |              |                   |                   |
| Town and Fringe/Village                                      | 0–1       | 0.11         | 0.25         | −9.95***          | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Life satisfaction                                             | 0–10      | 7.07         | 7.14         | −1.89             | 0.07              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Free school meals eligible (cf. not)                         | 0–1       | 0.19         | 0.15         | 2.93***           | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Female (cf. male)                                             | 0–1       | 0.64         | 0.68         | −2.9***           | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Non-White (cf. white)                                        | 0–1       | 0.36         | 0.16         | 14.31***          | 0                 |
|                                                              | Unmatched | Matched      |              |                   |                   |
| cf. No illness/disability                                    |           |              |              |                   |                   |
| Yes illness/disability: not limiting                         | 0–1       | 0.08         | 0.09         | −0.98             | 0.33              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Yes illness/disability: limiting                              | 0–1       | 0.08         | 0.07         | 1.33              | 0.18              |
|                                                              | Unmatched | Matched      |              |                   |                   |
| Expect to be in 2 years’ time (cf. unemployed)               | 0–1       | 0.04         | 0.05         | −1.17             | 0.24              |
|                                                              | Unmatched | Matched      |              |                   |                   |

(continued)
and units of alcohol consumed per week (tapping health/risky behaviours, known to influence SWB/participation). Critically, we also match on all pre-participation social-/psychological-resource mechanisms (e.g. trust, support networks, etc.—see Table 1). These are important given their outlined relationship with both SWB and engagement. At the contextual level, we match on geographic region, community-level employment disadvantage, and whether a young person lives in an urban/rural community. We also match on individuals’ pre-participation life satisfaction to strengthen claims of ‘strong ignorability’ (e.g. Smith and Todd, 2005). Matching on pre-test outcome measures can potentially increase bias (e.g. Chabé-Ferret, 2017). We therefore test different matching specifications (e.g. with/without pre-participation SWB) to examine this (Lindner and McConnell, 2019).

With a somewhat larger sample of controls than participants, kernel-density matching is an optimum approach, given variance is reduced as all control units contribute to the propensity-score weights. As this can increase bias if poorly-matched controls are used, restrictions to regions of common support, using a bandwidth restriction (0.06), and trimming (5 per cent level), were applied. The kernel approach was compared to other matching approaches (see Supplementary Appendix A1 for comparison across

### Table 2. (Continued)

| Variable                                           | Range         | Treated | Control | t-test: t | t-test: P>|t| |
|----------------------------------------------------|---------------|---------|---------|-----------|-----------|
| In a full-time job                                  | 0–1           | Unmatched 0.07 | 0.09 | –2.38* | 0.02 |
|                                                    |               | Matched 0.07 | 0.07 | –0.18 | 0.85 |
| Studying for a degree/higher qualification         | 0–1           | Unmatched 0.55 | 0.6  | –2.49** | 0.01 |
|                                                    |               | Matched 0.57 | 0.57 | 0.2  | 0.84 |
| Studying full-time for another qualification        | 0–1           | Unmatched 0.2 | 0.11 | 6.58*** | 0 |
|                                                    |               | Matched 0.17 | 0.17 | –0.01 | 1 |
| Taking a break from study or work                  | 0–1           | Unmatched 0.03 | 0.04 | –1.13 | 0.26 |
|                                                    |               | Matched 0.04 | 0.04 | –0.28 | 0.78 |
| Looking after the home or children/caring for a    | 0–1           | Unmatched 0.02 | 0.01 | 1.69 *** | 0.09 |
| friend or family member                            |               | Matched 0.02 | 0.01 | 0.38 | 0.71 |
| Unpaid voluntary help or community work            | 0–1           | Unmatched 0.03 | 0.02 | 1.91   | 0.06 |
|                                                    |               | Matched 0.03 | 0.03 | –0.38 | 0.71 |
| Something else                                      | 0–1           | Unmatched 0.01 | 0.02 | –2.02* | 0.04 |
|                                                    |               | Matched 0.01 | 0.01 | –0.35 | 0.73 |
| cf. 15–16 years old                                 |               |          |         |           |          |
| 16.5 years old                                     | 0–1           | Unmatched 0.15 | 0.16 | –1.33 | 0.19 |
|                                                    |               | Matched 0.15 | 0.15 | –0.18 | 0.85 |
| 17 years old                                       | 0–1           | Unmatched 0.09 | 0.08 | 0.36 | 0.72 |
|                                                    |               | Matched 0.09 | 0.08 | 0.28 | 0.78 |
| 17.5 years old                                     | 0–1           | Unmatched 0.3  | 0.29 | 0.77 | 0.44 |
|                                                    |               | Matched 0.29 | 0.29 | 0.15 | 0.88 |
| 18 years old                                       | 0–1           | Unmatched 0.08 | 0.06 | 1.7  | 0.09 |
|                                                    |               | Matched 0.08 | 0.08 | 0.5  | 0.62 |
| cf. North East/North West/Yorks and Humber         |               |          |         |           |          |
| East Midlands/West Midlands                         | 0–1           | Unmatched 0.14 | 0.24 | –6.98*** | 0 |
|                                                    |               | Matched 0.14 | 0.16 | –1.07* | 0.29 |
| East of England/London/South East/South            | 0–1           | Unmatched 0.48 | 0.46 | 1.15   | 0.25 |
|                                                    |               | Matched 0.49 | 0.45 | 1.7  | 0.09 |
| Hours civic/informal activity per typical month    | 0–100         | Unmatched 11.81 | 9.81 | 3.12*** | 0 |
|                                                    |               | Matched 10.08 | 10.36 | –0.42 | 0.67 |
| Units of alcohol/week (grouped categories)         | 1–6           | Unmatched 1.37 | 1.53 | –5.26*** | 0 |
|                                                    |               | Matched 1.38 | 1.38 | 0.07 | 0.94 |

Notes: Matched sample is kernel-density (Epanechnikov) propensity-score weighted.

* P < 0.05,
** P < 0.01,
*** P < 0.001 (two-tailed tests); i = index.
strategies; and Supplementary Appendix B.1–B.2 for post-matching diagnostics). Reassuringly, kernel-density matching had the greatest bias reduction (we also test models using several PSM approaches, as well as coarsened exact matching—see ‘Robustness and Sensitivity’).

Table 2 provides descriptive statistics for the participant-/control-group samples, pre-/post-matching, alongside t-tests for the equality of means. Pre-matching differences exist across the groups, for example, participants report somewhat greater social capital (e.g. more civic engagement, local social capital, bridging ties). However, most differences are marginal, and critically, very small differences in pre-treatment levels of life satisfaction exist between groups.

Modelling
The second stage of a PSM-DiD approach involves regression modelling incorporating the kernel-density weights. Hierarchical models are used to account for clustering in space (LSOAs) and serial correlation in time. We employ a multi-level generalized structural equation modelling (GSEM) framework. Standard errors are calculated using clustered bootstrap procedures (1,000 replications). GSEM approaches allow us to replicate multi-level mixed-effects linear regression models (e.g. Canette, 2014), but estimate models simultaneously and combine estimation results to perform formal significance testing of multiple mediators. This testing occurs within a path-analysis framework using the bootstrap method to estimate the indirect effects with bias-corrected confidence intervals (Preacher and Hayes, 2008).

The DiD estimate is specified via an interaction term between a control/participant-group identifier and pre-/post-test identifier. The simplified equation can be stated thus:

\[
Y_{it} = \beta_0 + \beta_1 \text{Treatment}_t + \beta_2 \text{Time}_t + \beta_3 (\text{Treatment}_t \times \text{Time}_t) + \beta_4 \text{Disad}_t + \beta_5 (\text{Treatment}_t \times \text{Disad}_t) + \beta_6 (\text{Time}_t \times \text{Disad}_t) + \beta_7 (\text{Treatment}_t \times \text{Time}_t \times \text{Disad}_t) + \epsilon_{it}
\]

Where, in addition to the above: \( \beta_4 \) is the level of disadvantage in community \( c \) (at a fixed value across time); \( \beta_5 \) is an interaction between treatment identifier and level of disadvantage; \( \beta_6 \) is an interaction between time period and level of disadvantage; and \( \beta_7 \) captures the DiDiD estimator.

Results
Impact of Participation on Life Satisfaction
We first test the overall impact of participation on life satisfaction. Model 1 (Table 3) shows the parameter estimates of a multi-level linear regression, including the PSM weights, testing the impact of participating on life satisfaction. The DiD term is positive and significant. Figure 1 plots predicted pre-test/post-test life satisfaction scores for participant/control groups (derived from Model 1). Participants see a significant increase in life satisfaction over the period (FD: \( -0.21 \) points [CI: \(-0.33\), \(-0.10\)]). This small decline mirrors studies (and supplementary analysis\(^3\) showing declining secular trends in life satisfaction over adolescence (Goldbeck et al., 2007). Taken together, the difference between these two trends (the DiD score) demonstrates a significant positive

| Table 3. Impact of participation on life satisfaction |
|----------------------------------------------------|
| Dependent variable                              | Model 1 |
| Pre-test period (baseline)                      | Life satisfaction |
| Post-test period                                | \(-0.215^{***}\) (0.058) |
| Control-group identifier (baseline)             | Participant identifier | \(-0.046\) (0.061) |
| Post-test * participants (DiD)                   | \(0.366^{***}\) (0.080) |
| Constant                                         | \(7.140^{***}\) (0.041) |
| \(N\)                                            | 5890    |

Notes: Kernel-density (Epanechnikov) propensity-score weighted; bootstrapped standard errors in parentheses (1,000 replications); includes region fixed effects although not shown; \(* P < 0.05 ** P < 0.01 *** P < 0.001\) (two-tailed tests); Model 1 fit (AIC = 18,419.14; BIC = 18,459.23).
engagement impact of 0.37 points [CI: 0.21, 0.52] on the 0–10-point scale; although, even absent of the decline in the control group, participation exerts a significant effect on life satisfaction.

Participation therefore boosts youth-SWB, both stalling a decline but also increasing life satisfaction from where young people started, evident at least 4–6 months after participation ended. The increase in life satisfaction of 0.37 point is non-trivial compared to known predictors of SWB. Looking at pre-participation life satisfaction scores: across community disadvantage, youth in the most compared to the least disadvantaged communities report life satisfaction 1 point lower (on the 0–10-point scale); while youth with a disability/health problem limiting daily activities report life satisfaction 1.1 points lower. Participation also appears just as likely to move someone up the life satisfaction scale if they joined with higher or lower pre-participation life satisfaction. The exception is youth who joined reporting very low life satisfaction, who are much more likely to experience a positive impact of participation.

How Participation Affects Youth Life Satisfaction

We next investigate why participation improves life satisfaction, examining the mediating role of our putative mechanisms (see Table 1). This mediation analysis is pursued through multi-level linear regressions run simultaneously within the GSEM framework. The first stage of modelling tests the impact of participation (the DiD estimate) on each mechanism. The second stage tests the relationship between mechanisms and life satisfaction, alongside the impact of participation (DiD estimate), to explore how far the mechanisms account for participation’s overall impact. These results are summarized in Figure 2, which shows only significant paths between participation, mechanism(s), and SWB, alongside the overall, direct, and (significant) indirect effects (see Appendix 1 for full results).

First, Figure 2 demonstrates that participation leads to: a negative change (reduction) in negative interactions, and positive changes in positive interactions, support ties, informal helping activities, bridging support networks, perceived local social capital, two indicators of perceived control (locus of control), and confidence in social skills. Young people’s generalized trust, civic activities, and indicators of perceived control capturing ‘hard work = success’ do not respond to participation.

Second, all mechanisms are significant predictors of SWB in the expected direction except civic activities, informal helping activities, and bridging networks (which are non-significant when tested alongside the other mechanisms). Formal testing of all indirect effects demonstrates that participation has significant impacts through reducing negative interactions, and improving positive interactions, support ties, local social capital, social efficacy, and perceived control.
This analysis demonstrates several points. First, both social and psychological resources act as complementary pathways through which participation affects life satisfaction. Second, different mechanisms account for varying amounts of the participation–SWB relationship. Social efficacy (32 per cent) and support ties (15 per cent) account for the largest proportion of the impact of participation. While indicators of perceived-control (13 per cent) and perceived-local social capital (7 per cent) account for medium amounts, and positive (2 per cent) and negative (4 per cent) interactions account for the least. Third, when taken together, these mediators account for 73 per cent of the overall impact of participation on SWB, after which participation has no significant direct effect on life satisfaction ($a^\prime$: 0.08 [CI: $-0.05, 0.22$]).

Interestingly, if we replicate this mediation analysis using only social-resource mechanisms, the significant indirect effects account for 55 per cent of the overall effect of participation. If we replicate using only psychological-resource mechanisms, the significant indirect effects account for 59 per cent of the overall effect. However, when modelled together (as above), social-resource pathways account for 28 per cent while psychological-resource pathways account for 45 per cent. Therefore, while both social- and psychological-resource pathways operate alongside one another, a larger part of the indirect effect via social resources comes through their association with psychological resources (potentially suggesting greater social resources may, in turn, trigger greater psychological resources; although we cannot further test this here). In sum, the overall impact of participation comes through compounded improvements across multiple social- and psychological-resource pathways.

**Heterogeneous Impacts of Participation across Community Socioeconomic Disadvantage**

We next investigate whether participation can reduce inequalities in SWB by testing whether participation exerts heterogeneous effects on life satisfaction depending on levels of disadvantage in a young person’s community. As outlined, we take a DiDiD approach via a three-way interaction between the pre-/post-test
First, Model 1 (Table 4) replicates the impact of participation on SWB (from Model 1, Table 3) but includes the measure of community disadvantage. The coefficient for community disadvantage is significant and negative. Calculating pre-participation life satisfaction across disadvantage, young people at high-community disadvantage (55 per cent on employment-related benefits) report an average life satisfaction of 6.39 points, compared to those at low disadvantage (0.7 per cent on employment-related benefits), who report 7.32 points.

Model 2 then includes the DiDiD term. This is positive and significant, suggesting participation has more positive impacts on well-being among those from more disadvantaged communities. Figure 3 plots predicted pre-test/post-test life satisfaction scores for the participant/control groups among youth from the most and least disadvantaged communities (derived from Model 2). Pre-participation, young people from more disadvantaged communities report lower SWB than their peers in less disadvantaged communities. However, they also experience a stronger impact of participation: the DiD estimate for young people from the most disadvantaged communities is 1.31 [CI: 0.41, 2.25]: an increase in 1.31 points (on the 0–10-point SWB scale). For youth from the least disadvantaged communities, participation has a small but non-significant positive impact on their SWB: DiD is 0.12 [CI: −0.155, 0.38]. The result is that, post-participation, participants from disadvantaged communities have closed the gap in life satisfaction with their peers from the least disadvantaged communities.8 This represents a very strong effect, appearing at least as strong as the impact of living in the most compared to the least disadvantaged communities, or having a disability/health problem limiting daily activities9.

Why does participation have a stronger positive effect among disadvantaged youth? Potentially, participation may also have more positive impacts on social/psychological resources among youth from disadvantaged areas. To examine this, we perform a moderated mediation analysis within the GSEM framework. The first stage tests whether participation also demonstrates heterogeneous impacts on social/psychological resources across different levels of community disadvantage, testing the DiDiD estimates of participation on each mechanism. The second stage shows the relationship between each mechanism and life satisfaction alongside the

| Table 4. Heterogeneity in the impact of participation on life satisfaction across levels of community disadvantage |
|---------------------------------------------------|------------------|------------------|
| Dependent variable                               | Model 1 Life satisfaction | Model 2 Life satisfaction |
| Pre-test period (baseline)                        | −0.215*** (0.058)  | −0.126 (0.101)    |
| Post-test period                                 | 0.366*** (0.078)  | 0.100 (0.146)     |
| Control-group identifier (baseline)              | −0.039 (0.072)    | −0.051 (0.114)    |
| Participant identifier                           | −0.015*** (0.005) | −0.017** (0.005)  |
| Post-test * participants (DiD)                   | 0.017** (0.005)   | 0.007 (0.007)     |
| Area disadvantage                                | 0.017** (0.005)   | 0.001 (0.008)     |
| Post-test * area disadvantage                    | 0.022* (0.010)    |                  |
| Participants * area disadvantage                 |                   |                  |
| Post-test * participants * area disadvantange (DiDiD) | 0.017** (0.005)   | 0.007 (0.007)     |
| Constant                                          | 7.315*** (0.071)  | 7.336*** (0.074)  |
| N                                                 | 5890             | 5890             |

Notes: Kernel-density (Epanechnikov) propensity-score weighted; bootstrapped standard errors in parentheses (1,000 replications); includes region fixed effects although not shown; * P < 0.05 ** P < 0.01 *** P < 0.001 (two-tailed tests); model 1 fit (AIC = 18,409.45; BIC = 18,456.22), model 2 fit (AIC = 18,409.36; BIC = 18,446.17).
community-disadvantaged moderated impact of participation on life satisfaction (the DiDiD estimate), to test how far our identified mechanisms can account for the heterogeneity in participation’s impact across different levels of community disadvantage. These results are summarized in Figure 4, showing only significant moderated pathways between participation and each mechanism, and only significant pathways between mechanisms and SWB, alongside the conditional-overall effects, -direct effects, and (significant) -indirect effects of participation at low and high levels of community disadvantage (see Appendix 2 for full results).

This analysis demonstrates that, for most mechanisms, participation exerts the same impact as identified above, at both low and high disadvantage. However, at higher community disadvantage, participation exerts a stronger negative impact on negative interactions (i.e. leads to a greater reduction in their frequency) and has a stronger positive impact on confidence in social skills and perceptions that ‘people like me have a chance in life’ (perceived control). Formal significance testing of all conditional-indirect effects show significantly stronger impacts of participation on life satisfaction at high levels of disadvantage via reducing negative one’s interactions, and improving social efficacy and perceived control. At low levels of disadvantage, the indirect effects via perceived control and negative interactions are not significant, while the positive indirect effect via social-efficacy is smaller but remains significant.

These findings show a large part of why disadvantaged participants experience additional gains in life satisfaction is that they also experience additional gains in perceived control and social efficacy, and stronger reductions in negative interactions. Of these mediators, psychological resources (social efficacy (21 per cent) and perceived control (16 per cent)) account for the largest part of the stronger impact of participation at high disadvantage, with negative interactions accounting for less (7 per cent). Collectively, these pathways account for 44 per cent of the stronger impact of participation at high disadvantage, and, after adjusting for these mediators, participation no longer has a significant direct effect on life satisfaction at high disadvantage ($d' = 0.697$ [CI: $-0.2, 1.5$]).

**Robustness and Sensitivity**

The strength of the DiD approach rests on the assumption that, absent of participation, participants would see...
a similar trend in SWB as the control group. However, given selection on to the scheme was not random, young people choosing to participate may have already had increasing life satisfaction prior to engagement, accounting for the participation effect. For example, unobserved differences may exist between participants/controls, associated with different secular trends in SWB. More worryingly, youth who became participants may have already had increasing SWB prior to participating, contributing to their selection into participation (a form of reverse causality). For example, those choosing to participate may have had particularly unhappy months prior to joining (relative to non-participants), which encouraged self-selection on to the scheme. Thus, the apparent participation effect may instead be driven by SWB returning to one’s average levels. To try and gain some purchase on this, we examine whether participants who selected on to the scheme, but who reported that they did not gain anything from their experience, have similar pre-/post-test SWB trends as the control group, that is, if participants did not find the experience rewarding it should be as if they had not participated. If, regardless of their experience, all young people who participated saw an improvement in life satisfaction, this may suggest the participation effect could be an artefact of different pre-participation SWB trends between participant/control groups.

To test this, we use a measure of whether participants found the scheme worthwhile:

**Thinking about your NCS experience overall...On a scale from 0–10, where 0 is not at all worthwhile and 10 is completely worthwhile, how worthwhile did you find this experience?**

Most young people reported their experiences as 10, ‘completely worthwhile’ (49 per cent) and 83 per cent reported 8 or above for how worthwhile it was. We therefore divide participants into two categories: those who found the scheme less worthwhile (rated 0–7) and more worthwhile (8–10), and perform kernel-density matching to create two matched samples of controls for the more worthwhile and the less worthwhile participant groups.

The findings (see Supplementary Appendix G1) show that among participants who found the scheme ‘more worthwhile’, the FD estimate is: 0.20 [CI: 0.087, 0.314], while the FD estimate among their matched control
group is: \(-0.21 \text{ [CI: } -0.33, -0.11]\). However, for those who found it ‘less worthwhile’, the FD estimate is: \(-0.15 \text{ [CI } -0.39, 0.13]\). The FD estimate of their matched control group is: \(-0.18 \text{ [CI } -0.4, -0.053]\). Therefore, despite selecting on to the scheme, participants who did not find engagement worthwhile see similar SWB trends as the control group. While this does not demonstrate evidence for the parallel-trends assumption per se, it suggests that participation’s impact is not simply a result of a general positive SWB trend among all participants, resulting from selection differences between participants and the control group; instead, something about the participation experience itself mattered for their gains (although such heterogeneity could also reflect differences in selection on to scheme, affecting participation’s role in closing SWB inequalities in SWB. Participants from low-disadvantage communities experience only a marginal improvement in life satisfaction, joining and leaving the scheme with the same, relatively high, life satisfaction. However, while young people from high-disadvantage communities join with lower life satisfaction, they experience a much stronger impact from participating, and, post-participation, report life satisfaction akin to their peers from the least disadvantaged communities. The third contribution is to debates into the mechanisms linking engagement to SWB. We demonstrate that participation’s impact needs to be understood through both social- and psychological-resource models, with positive indirect effects observed via structural/cognitive elements of social capital as well as perceived control/social efficacy. Importantly, these social and psychological resources operate as complementary pathways, and it is the cumulative gains across both sets that, when compounded, drive the positive impact of participation.

However, youth from disadvantaged backgrounds also experience greater SWB gains through particular improvements in psychological resources. Engagement therefore affects SWB through both social- and psychological-resource pathways, with the latter increasingly important for youth from disadvantaged environments.

This raises the question of why participation is especially effective at boosting life satisfaction via psychological resources for disadvantaged youth; particularly those resources related to youth perceptions of their abilities (social efficacy) and perceived control (‘people like me don’t have much of a chance in life’). Collectively, these resources account for 37 per cent of the additional SWB gains among disadvantaged youth. As suggested, youth in disadvantaged communities may develop identities and self-concepts, through experiences and socialization, which can heighten a sense of powerlessness and weaken self-worth (Wheaton, 1980; Zimmerman and Rappaport, 1988). However, participation is posited to empower individuals, during which ‘people become more self-assured...they change their perceptions of themselves and their abilities, [and] gain in confidence’ (Musick and Wilson, 2003: p. 260, Mellor et al., 2008). These processes may be particularly beneficial for disadvantaged youth through providing a source of experiences (and social ties), outside of their

**Discussion and Conclusions**

This study addressed three questions regarding how youth engagement affects SWB: how far participation effects may be artefacts of endogeneity; debate surrounding mechanisms; and participation’s role in closing SWB inequalities. We demonstrate that discrete periods of youth engagement can positively impact young people’s life satisfaction, evident at least 4–6 months after participation ended. This impact is partly conditional on how disadvantaged the communities are in which young people live, with stronger impacts observed among those from more disadvantaged areas. The observed impact of participation on SWB is driven by improvements across both social- and psychological-resource pathways. However, young people from more disadvantaged communities experience additional improvements in their perceived control, social efficacy, and reductions in their negative interactions, driving much of their additional gains in life satisfaction.

These findings make several contributions to the literature. First, they contribute to enduring debates into whether the impact of participation is a product of unobserved heterogeneity or reverse causality. The quasi-experimental, intervention analysis of a nationally implemented engagement scheme provides greater suggestive evidence that youth engagement can lead to improvements in life satisfaction, alongside somewhat more scope to generalize outside of the study (relative to current quasi-experimental intervention studies). Second, the study speaks to how engagement can reduce inequalities in SWB. Participants from low-disadvantage communities experience only a marginal improvement in life satisfaction, joining and leaving the scheme with the same, relatively high, life satisfaction. However, while young people from high-disadvantage communities join with lower life satisfaction, they experience a much stronger impact from participating, and, post-participation, report life satisfaction akin to their peers from the least disadvantaged communities. The third contribution is to debates into the mechanisms linking engagement to SWB. We demonstrate that participation’s impact needs to be understood through both social- and psychological-resource models, with positive indirect effects observed via structural/cognitive elements of social capital as well as perceived control/social efficacy. Importantly, these social and psychological resources operate as complementary pathways, and it is the cumulative gains across both sets that, when compounded, drive the positive impact of participation.

However, youth from disadvantaged backgrounds also experience greater SWB gains through particular improvements in psychological resources. Engagement therefore affects SWB through both social- and psychological-resource pathways, with the latter increasingly important for youth from disadvantaged environments.

This raises the question of why participation is especially effective at boosting life satisfaction via psychological resources for disadvantaged youth; particularly those resources related to youth perceptions of their abilities (social efficacy) and perceived control (‘people like me don’t have much of a chance in life’). Collectively, these resources account for 37 per cent of the additional SWB gains among disadvantaged youth. As suggested, youth in disadvantaged communities may develop identities and self-concepts, through experiences and socialization, which can heighten a sense of powerlessness and weaken self-worth (Wheaton, 1980; Zimmerman and Rappaport, 1988). However, participation is posited to empower individuals, during which ‘people become more self-assured...they change their perceptions of themselves and their abilities, [and] gain in confidence’ (Musick and Wilson, 2003: p. 260, Mellor et al., 2008). These processes may be particularly beneficial for disadvantaged youth through providing a source of experiences (and social ties), outside of their...
everyday environments, on which to judge themselves and their abilities, shifting perceptions of their capacity to affect their lives, alongside their self-worth. In doing so, participation may weaken the influence of their social environments as a key determinant of how they perceive themselves. Those from less disadvantaged communities may not experience these additional improvements given their environments likely already socialize them into more positive self-perceptions.

Can the findings from this scheme be generalized to more common forms of weekly/monthly participation? On one hand, the scheme’s activities closely align with more general forms of engagement, yet the intensity of the program may suggest caution be taken in generalizing to all forms of engagement (although see Supplementary Appendix: J1–J2 for a replication test on a less-intense form of NCS). However, studies of general youth engagement activities demonstrate more frequent participation, and engaging in more activities, are associated with even greater SWB (Maton, 1990; Gilman, 2001; Morgan and Haglund, 2009). This similarity suggests the study’s observed participation effect might be applicable to youth engagement in general, while the effect size of the scheme might depend on its intensity.

Notwithstanding the insights gleaned, limitations exist. First, lacking fuller scales of psychological resources weakens the precision of the current survey instruments (e.g. perceived control), and further work will benefit from fully validated instrument scales. Second, while the study provides insights into how participation impacts life satisfaction (tapping more cognitive elements of SWB), it provides less insight into its role for SWB dimensions of positive/negative affect.

The third key limitation regards the internal validity of the findings and threats to causal-identification. Our claim to have identified an impact of participation via a DiD approach rests on the validity of the parallel trends assumption. However, with only one wave of pre-participation data, we cannot provide robust evidence to support this assumption. This may be particularly problematic in the current setting given (as discussed above) allocation to the participant/non-participant group is not based on exogenous variation but individuals’ own decisions to participate or not. With such non-random assignment, differences may exist between participants/controls, which invalidates the parallel trends assumption. The present study was only able to conduct ‘selection-on-observables’ to strengthen the causal identification, including selecting an ‘expression of interest’ control group, and taking a PSM approach. Yet, such approaches are only as effective as the covariates matched on, and unobservable differences between groups might still lead to different secular trends. We examined possible alternative sources of evidence to support the causal claim of the study; for example, we observed that the positive impact of participation depended on how worthwhile young people found their experience. In other words, the participatory experience itself appeared to matter for improvements in SWB, and individuals who selected into the participant group but did not find the experience worthwhile exhibited pre-test/post-test trends in SWB comparable to the control group (although this raises questions for future analysis into potential drivers of such effect heterogeneity). Still, we cannot robustly validate the parallel trends assumption here, which remains a key limitation to claiming the identified effect reflects a causal relationship. Future research which is able to better validate the parallel trends assumption, or apply randomized allocation approaches, is necessary to test the causality further.

The fourth limitation regards the study’s external validity. First, non-response can bias our ability to generalize findings to the whole scheme (although extensive weighting/multiple-imputation analysis demonstrated consistent findings with those reported here). However, if participants who did not enjoy the scheme were both less likely to complete the post-test survey and not experience a positive impact on their SWB, this could result in positively biased estimates. There are also limitations to generalizing the findings to all young people, that is, how far would the same impacts emerge if a random-sample of young people participated. Given selection into participation was non-random, certain groups of young people may be more likely to select on to the scheme, for example, prosocial young people. Potentially, such groups may respond more positively to participating. Similarly, youth averse to meeting new people, for whom participating may have weaker effects, may be less likely to select on to the scheme.

Despite these limitations, we believe the quasi-experimental, intervention design, in particular its ability to finely isolate the timing of the pre-test/post-test outcome measurements relative to young people’s participation, does help provide further insights into the directionality of the participation–SWB relationship. However, ultimately, the approach taken here still suffers from risks that self-selection may be driving the relationship. Despite being a quasi-experimental design, the causal identification relies largely on controlling for observables (e.g. via matching). This must be kept in mind as limiting claims of causal identification. In this way, the study hopes to complement the evidence emerging from longitudinal observational studies and
instrumental variable analysis to provide additional evidence that participation does indeed affect SWB.

Overall, this study makes a compelling case for the positive impact of youth engagement on SWB. Such engagement schemes can only be as effective for society as the people who take part and some form of selection is always at work when considering participation. However, at least on available sociodemographic measures, young people from disadvantaged backgrounds tend to be overrepresented on this program. This nationally implemented, subsidized scheme may thus create opportunities for those who normally have few (particularly marginalized groups), proving particularly effective for closing SWB inequalities among youth in society.

Supplementary Data
Supplementary data are available at ESR online.

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Notes
1 NCS has significant exposure in raising awareness about participation. For example, in 2017, it worked with 92 per cent of all English mainstream schools (National Citizen Service Trust, 2017).
2 Although scheme providers implemented the same activities across participation sites, the nature of this field study means we cannot assume identical implementation across all sites. Differences may exist affecting the internal validity of the test and driving some site-specific heterogeneity.
3 Similar declines among young people over relatively short periods were observed in two nationally representative longitudinal datasets, increasing confidence in the presence of this decline (see Supplementary Appendix: C for details).
4 Coefficients under fixed-effects modelling are highly similar: DiD-score (coef.: 0.382***; SE: 0.079); post-test period (coef.: −0.227***; SE: 0.058). Control/participant identifier dropped under fixed-effects specification.
5 Matching on pre-test outcome (i.e. SWB) can potentially bias models. Following Lindner and McConnell (2019), we run several matching specifications (e.g., matching but limited to time-invariant demographics), and unmatched analysis, and compare the findings. Matching on baseline SWB does not significantly impact the models (see Supplementary analysis D.1).
6 This was tested by generating binary life satisfaction outcome variables with different cut-off points along the life satisfaction scale, for example, a life satisfaction of ‘0–7’ compared to ‘8–10’. Logistic regressions then explored whether participation was more/less likely to impact life satisfaction across different thresholds (see Supplementary Appendix E.1–E.2 for full analysis).
7 Applying ordered logistic regressions to categorical variables does not change the substantive findings. For parsimony, models apply linear regressions.
8 We tested whether participation has a stronger impact on young people from disadvantaged households; not communities per se. However, the stronger impact of participation among those from disadvantaged communities persists (see Supplementary Appendix F1).
9 Coefficients under fixed-effects modeling are highly similar: DiD-score (coef.: 0.112; SE: 0.144); post-test period (coef.: −0.140; SE: 0.103); post-test period * area disadvantage (coef.: −0.007; SE: 0.007); participant identifier * area disadvantage (coef.: −0.006; SE: 0.053); participant identifier * post-test period * area disadvantage (coef.: 0.022*; SE: 0.01). Control/Participant identifier and area disadvantaged measure dropped under fixed-effects specification.
10 Such heterogeneity (from how ‘worthwhile’ participants found the scheme) could stem from differences in program implementation across participation sites, or differential successes based on team characteristics, which impacts a participant’s experience of the scheme. However, if this effect heterogeneity is driven by some (unobserved) characteristic of individuals, present among some participants and not others, this could suggest evidence of unaccounted for selection bias. Future work will explore this.
11 Given the difference-in-difference estimator in the current models is essentially a fixed-effects
component, the full fixed-effects models return highly similar results.

12 For example, see footnote 8.

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### Appendix 1. Generalized structural equation modelling—mediation analysis (full model results)

| Dependent variable       | Negative social contact | Positive social contact | Civic activities | Informal helping | Support ties | Generalized Index of bridging social capital | Index of perceived local social capital | PC: School = job success | PC: Hard work = success | PC: High relative life chances | PC: I decide my life | Index of confidence in skills | Life Satisfaction |
|--------------------------|-------------------------|-------------------------|------------------|------------------|--------------|---------------------------------------------|-----------------------------------------|----------------------------|------------------------|----------------------------|---------------------|-------------------------------|------------------------|
| Pre-test period (baseline) |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |            |
| Post-test period         | 0.027                   | -0.041                  | 0.035            | 0.208***         | -0.026       | -0.080**                                    | 0.134***                                | -0.067**                   | 0.006                  | -0.103***                 | -0.213***           | -0.016                        | 0.092***               | -0.149**               |
|                          | (0.020)                 | (0.024)                 | (0.037)          | (0.050)          | (0.026)      | (0.025)                                      | (0.028)                                 | (0.021)                     | (0.034)                 | (0.024)                   | (0.028)             | (0.032)                      | (0.022)                | (0.057)                |
| Control-group identifier (baseline) |                       |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |            |
| Participant identifier   | 0.015                   | -0.002                  | 0.017            | 0.001            | -0.029       | -0.001                                      | 0.063                                   | 0.028                      | -0.006                  | 0.000                      | -0.041              | -0.005                        | -0.061                 | 0.007                  |
|                          | (0.026)                 | (0.027)                 | (0.047)          | (0.059)          | (0.032)      | (0.027)                                      | (0.032)                                 | (0.025)                     | (0.039)                 | (0.026)                   | (0.039)             | (0.038)                       | (0.034)                | (0.062)                |
| Post-test * participants (DiD) | -0.038*                 | 0.084*                  | 0.043            | 0.197**          | 0.124**      | 0.066                                        | 0.198***                                | 0.307***                    | 0.089                   | 0.061                      | 0.086*               | 0.135**                        | 0.300***              | 0.08                   |
|                          | (0.032)                 | (0.033)                 | (0.056)          | (0.074)          | (0.038)      | (0.035)                                      | (0.039)                                 | (0.030)                     | (0.047)                 | (0.033)                   | (0.043)             | (0.045)                       | (0.031)                | (0.075)                |
| Negative social contact  |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | -0.206***             |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.041)          |
| Positive social contact  |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.106**               |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.037)          |
| Civic activities         |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.000                 |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.021)          |
| Informal helping         |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | -0.010                |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.015)          |
| Support ties             |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.457***              |                      |
| Generalized trust        |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.217***              |                      |
| Index: bridging social capital |                     |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |                      -0.037              |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.028)          |
| Index: perceived local social capital |                 |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.087*                |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.040)          |
| PC: School = job success |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.155***              |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.026)          |
| PC: Hard work = success  |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.145***              |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.039)          |
| PC: High relative life chances |                 |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.295***              |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.031)          |
| PC: I decide my life     |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.169***              |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.026)          |
| Index of confidence in skills |                     |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               | 0.392***              |                      |
|                          |                         |                         |                  |                  |              |                                             |                                         |                            |                        |                          |                     |                               |           (0.035)          |
| Constant                 | -0.030                  | 0.111***                | 1.190***         | 1.556***        | 4.168***     | 1.011***                                    | -0.085***                               | -0.037*                    | 2.733***                | 4.391***                 | 3.926***            | 3.326***                      | -0.104***            | 2.292***              |
|                          | (0.016)                 | (0.019)                 | (0.032)          | (0.039)         | (0.021)      | (0.019)                                     | (0.022)                                 | (0.018)                     | (0.027)                 | (0.018)                   | (0.025)             | (0.025)                       | (0.023)               | (0.232)                |
| N                        | 5,890                   | 5,890                   | 5,890            | 5,890           | 5,890        | 5,890                                       | 5,890                                   | 5,890                      | 5,890                   | 5,890                     | 5,890               | 5,890                         | 5,890                 |                      |

*Notes: Kernel-density (Epanechnikov) propensity-score weighted; bootstrapped standard errors in parentheses (1,000 replications); includes region fixed-effects although not shown; $P < 0.05$ **$P < 0.01$ ***$P < 0.001$ (two-tailed tests); PC = perceived control.*

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## Appendix 2. Generalized structural equation modelling—moderated mediation analysis (full model results)

| Dependent variable | Negative social contact | Positive social contact | Civic activities | Informal helping | Support ties | Generalized trust | Index of bridging social capital | Index of perceived local social capital | PC: School – job success | PC: Hard work – success | PC: High relative life chances | PC: I decide my life | Index of confidence in skills | Life satisfaction |
|--------------------|-------------------------|-------------------------|-----------------|-----------------|-------------|------------------|-----------------------------------|-------------------------------------|------------------------|------------------------|-------------------------------|------------------|-----------------------------|-------------------|
| **Pre-test period (baseline)** | | | | | | | | | | | | | | | |
| Post-test period | −0.051 | −0.083 | −0.014 | 0.287** | −0.014 | −0.052 | 0.098 | −0.062 | −0.017 | −0.039 | −0.086 | −0.007 | 0.104** | −0.103 |
| | (0.042) | (0.047) | (0.067) | (0.091) | (0.051) | (0.045) | (0.052) | (0.037) | (0.058) | (0.041) | (0.057) | (0.061) | (0.039) | (0.100) |
| **Control-group identifier (baseline)** | | | | | | | | | | | | | | | |
| Participant identifier | −0.078 | −0.115* | 0.142 | −0.042 | −0.021 | 0.116 | 0.049 | −0.068 | −0.030 | −0.041 | −0.014 | −0.047 | 0.011 | | |
| | (0.047) | (0.050) | (0.091) | (0.113) | (0.057) | (0.053) | (0.062) | (0.048) | (0.073) | (0.048) | (0.068) | (0.071) | (0.064) | (0.117) |
| **Post-test * participants (DiD)** | 0.085 | 0.119 | −0.099 | −0.008 | 0.124 | 0.040 | 0.143 | 0.244*** | 0.121 | −0.027 | −0.123 | 0.167 | 0.193*** | −0.061 |
| | (0.059) | (0.067) | (0.105) | (0.142) | (0.070) | (0.067) | (0.076) | (0.058) | (0.083) | (0.059) | (0.079) | (0.086) | (0.058) | (0.138) |
| **Area disadvantage** | 0.004 | −0.014*** | −0.003 | 0.014* | −0.003 | −0.009*** | −0.005 | 0.000 | −0.010** | 0.005* | −0.012** | −0.000 | 0.000 | −0.006 | |
| | (0.002) | (0.003) | (0.004) | (0.005) | (0.003) | (0.003) | (0.003) | (0.002) | (0.003) | (0.002) | (0.004) | (0.004) | (0.003) | (0.006) |
| **Post-test * area disadvantage** | 0.005 | 0.003 | 0.004 | −0.006 | 0.003 | −0.002 | 0.003 | −0.000 | 0.002 | −0.005 | −0.008 | −0.001 | −0.001 | −0.004 | |
| | (0.003) | (0.003) | (0.005) | (0.007) | (0.004) | (0.003) | (0.003) | (0.002) | (0.003) | (0.002) | (0.004) | (0.004) | (0.003) | (0.007) |
| **Participants * area disadvantage** | 0.006 | 0.010* | −0.010 | 0.003 | 0.001 | −0.001 | −0.004 | −0.002 | 0.005 | 0.002 | 0.001 | 0.001 | −0.001 | −0.000 | |
| | (0.003) | (0.004) | (0.006) | (0.008) | (0.004) | (0.004) | (0.004) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) | (0.008) |
| **Post-test * participants * area disadvantage (DiDiD)** | −0.010* | −0.003 | 0.012 | 0.017 | −0.005 | 0.002 | 0.005 | 0.005 | −0.003 | 0.007 | 0.014* | −0.003 | 0.009* | 0.014 | | |
| | (0.004) | (0.005) | (0.008) | (0.010) | (0.005) | (0.005) | (0.006) | (0.006) | (0.005) | (0.006) | (0.006) | (0.004) | (0.010) | (continued) | |
### Appendix 2 (Continued)

| Dependent variable | Negative social contact | Positive social contact | Civic activities | Informal helping | Support ties | Index of bridging social capital | Index of perceived local social capital | PC: School = job success | PC: Hard work = success | PC: High relative life chances | PC: I decide my life | Index of confidence in skills | Life satisfaction |
|--------------------|-------------------------|-------------------------|-----------------|-----------------|-------------|---------------------------------|---------------------------------------|--------------------------|-------------------------|-----------------------------|------------------|----------------------------|-------------------|
|                    |                         |                         |                 |                 |             |                                 |                                       | 0.154***                 | 0.147***                | 0.291***                    | 0.170***          | 0.393***                   | 0.110***          |
|                    |                         |                         |                 |                 |             |                                 |                                       | (0.026)                  | (0.039)                 | (0.031)                     | (0.026)           | (0.035)                    | (0.238)           |
| PC: School = job success | 0.073*                 | 0.274***                | 1.224***        | 1.393***       | 4.175***    | 1.122***                        | 0.027                   | 0.037                   | 2.857***                   | 4.326***          | 4.041***                   | 3.327***          |
| PC: Hard work = success | (0.030)                | (0.034)                 | (0.059)         | (0.070)        | (0.040)     | (0.036)                         | (0.042)                 | (0.033)                 | (0.047)                   | (0.033)           | (0.046)                    | (0.042)           |
| PC: High relative life chances |                         |                         |                 |                 |             |                                 |                                       |                         |                         |                            |                 |                            |                   |
| PC: I decide my life |                         |                         |                 |                 |             |                                 |                                       |                         |                         |                            |                 |                            |                   |
| Index of confidence in skills |                         |                         |                 |                 |             |                                 |                                       | 0.027                   | 0.037                   | 2.857***                   | 4.326***          | 4.041***                   | 3.327***          |
| Constant            |                         |                         |                 |                 |             |                                 |                                       |                         |                         |                            |                 |                            |                   |
| N                  | 5,890                   | 5,890                   | 5,890           | 5,890          | 5,890       | 5,890                           | 5,890                   | 5,890                   | 5,890                     | 5,890            | 5,890                      | 5,890            |

Notes: Kernel-density (Epanechnikov) propensity-score weighted; bootstrapped standard errors in parentheses (1,000 replications); includes region fixed effects although not shown; *P<0.05 **P<0.01 ***P<0.001 (two-tailed tests); PC = perceived control.