

# Societal engagement in adolescence and future connection to education and employment in early adulthood – A follow-up-study

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## Research article

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# Abstract

**Background:** Attainment to education and employment is essential for young people to develop the skills needed to participate in society and maintain a stable connection to the labour market in adult life. This study examined associations between societal engagement, measured by leisure time activities (LTA) and part-time work (PTW), in mid (14/15 years) and late (17/18 years) adolescence and a positive connection to education and employment in early adulthood, accounting for potential gender and socioeconomic differences.

**Method:** A cohort of young people born in 1989 was followed in a prospective study with questionnaires in 2004 (n=3,054) and 2007 (n=2,400) where information on LTA and PTW was collected. Information on connection to education and employment was collected from a register of social benefits when they were 25-29 years old and divided into high and low societal connection. The associations were examined using logistic regression and stratified by gender and childhood socioeconomic groups.

**Results:** PTW was, both in mid and late adolescence, positively associated with societal connection (OR: 1.7 [95% CI 1.3; 2.2] and 1.9 [1.4;2.6]). LTA in mid adolescence was associated with societal connection (OR:1.6 [1.2;2.1]). Among the males LTA and PTW showed strongest associations with societal connection in mid adolescence (ORs up to 2.2), whereas the associations for females seemed strongest in late adolescence (ORs up to 2.8).

**Conclusion:** The study showed that adolescent societal engagement had notable positive associations with connection to later education and employment, with stronger impact of PTW compared to LTA. The study identified differences between genders and the timing of engagement. Associations were consistent across socioeconomic groups.

## Background

Around 170,000 young Danes between 15–29 years of age do not attain an education or work (1, 2), and the negative consequences of youth unemployment persist into adulthood (3). It is a significant challenge in a welfare society as Denmark to aid and support all children and adolescents to enter adulthood with an education and with the skills needed to acquire a stable job situation in the labour market (4). In 2018, Denmark spent 28% of the Gross Domestic Product (GDP) on societal expenditures (5). Due to an aging population, there is an increasing need to maximise the labour market participation, and there are several labour areas that are currently unable to get sufficient employees, thus losing revenue. If young adults do not participate in the labour market, the society is both deprived of labour and challenged with increased expenditures in terms of social and unemployment benefits (4, 6).

Young adults without education and employment are at risk of disconnection from society (2, 7). Being disconnected has negative consequences for the personal health and increases the risk of poor somatic or mental health, delinquency or premature death (8–10). Disconnection is influenced by family background, and the negative influence often persists throughout life with lower education, employment

and income as results (2, 11). Half of the disconnected 18–24 year olds in Denmark had disconnected parents (9). Disconnection varies between genders with more men being disconnected than women and often to a greater extent as well (7, 9). In order to reduce the personal and societal costs of unemployment, and improve the future demands for labour, it is imperative to investigate factors and mechanisms associated with disconnection.

Part-time work (PTW) is paid employment while the employee is enrolled in an educational program. Around 18% of Danish 13-year olds have PTW, rising to 70% by the age of 17 (12). Adolescent PTW has been found to shape life skills, work ethics, self-efficacy, career planning and aspirations (12–15). Stressors experienced in PTW have been found to buffer the effect of more severe stressors later in life (16). Danish adolescents who worked 20–30 hours per month had less school absence and better grades in Danish, Math and English when finishing 9<sup>th</sup> grade (12) and PTW between the age of 13 and 16 is found associated with a 40% increased chance of connection to education and employment by the age of 25 for young Danish adults with a non-western background, compared to non-western young adults without PTW (17). However, PTW is also found associated with lower levels of educational completion, lower grades, increase risk of dropping out, or reduce enrolment into tertiary education (18–21).

Leisure time activities (LTA) are activities chosen for enjoyment, relaxation, or other emotional reasons, typically after school hours. The specific type of LTA and its societal context affect social, educational, physical and civic development and shape young people's future lives (22). Adolescent LTA, performed alone or in unstructured settings, is associated with the risk of disconnection in early adulthood, lack of educational qualifications, unemployment, smoking, drinking, and crime (22, 23), whereas organized and adult supervised LTA tends to increase later life outcomes positively e.g. satisfaction with life and physical and mental health. Participation in activities such as scouts and church clubs has been associated with positive adult outcomes regarding economic status, family situation, health and well-being, and citizenship (23–25). Relations with peers and activity leaders improve emotions and psychological adjustment, abilities that can be carried on into later life societal connection (22, 26).

In order to reduce the number of disconnected young adults, it is important to identify tangible actions which can improve connection to society. The positive effects of PTW and LTA on later life competencies may buffer the risk of disconnection. When adolescents participate in PTW and LTA, they inevitably engage into the society surrounding them. In return, they develop new skills and traits. However, research on societal engagement and future connection to education and employment has been scarcely reported in the literature.

The primary aim of this study was to examine whether skills and traits attained through societal engagement (PTW and LTA) in mid and late adolescence were associated with connection to employment or education in early adulthood. Secondly, the study aimed to investigate to what degree the associations between societal engagement in mid or late adolescence and connection to education and employment in early adulthood varied across gender and socioeconomic groups.

# Methods

## *Design and population*

The study was a prospective follow up study. Data was collected as part of the VestLiv Cohort, an ongoing longitudinal Danish cohort study following a complete regional cohort of young people born in 1989 who lived in the western part of Denmark when the cohort was established in 2004. The source population comprised 3,681 young people. In the first wave of questionnaires in 2004, 3,054 (83%) participated. All the potential responders in 2004 have been re-invited to participate at the later waves. To date, the VestLiv Cohort has included waves of questionnaires in 2004 (age 15), 2007 (age 18), 2010 (age 21) and 2017 (age 28) (27). In the second wave, 65% (n = 2,400) of the source population participated. Besides information from the participants, information was also obtained from the parents in the first wave. A more thorough description of recruitment and data collection in VestLiv has been presented elsewhere (28).

Participants who answered questions about PTW and/or LTA in the waves of 2004 and/or 2007 were included in the study. They formed two separate study populations representing mid and late adolescence. The number of responders varied in the two waves: 2004 (n = 3,054) and 2007 (n = 2,400). Responses to at least one question about PTW or LTA were obtained from all 3,054 participants in the first wave and from 2,366 participants in the second wave. Figure 1 illustrates the inclusion in both study populations.

Furthermore, register data was obtained from Statistics Denmark. Using the personal identification number (CPR number), which is given to every citizen in Denmark (29), a linkage between the participant and the parents was created through a unique family ID number, and subsequently between the different registers and databases using their CPR numbers.

## *Definition of outcome*

The outcome "Connection" was defined as the amount of connection to education and employment from the age of 25 to the age of 29. Lack of connection was measured using weekly registrations in the DREAM registry (Danish Register for Evaluation of Marginalization), a longitudinal database which contains weekly registration of the extent and kind of social benefits such as unemployment benefits, sickness benefits and disability benefits that Danish citizens may receive (30). All sorts of benefits were categorized as lack of connection to education and employment, except maternity leave, educational grants and supplementary unemployment benefits, which were categorized as positive connection to education and employment. The participants were followed in DREAM from 1<sup>st</sup> of January 2015 to 2<sup>nd</sup> of December 2018 (approximately 4 years). Based on the total number of weeks of received social benefits (disconnection) reported in the DREAM registry (31) over the 4 year period, participants were dichotomized into low or high connection to education and employment. Participants with  $\leq 52$  weeks of receiving social benefits were assessed as having high connection, those with  $>52$  weeks of receiving social benefits were coded as having low connection. DREAM data was not available for the last 4 weeks

of December 2018 at the time of analysis. This means that participants born in December 1989 (n = 234) potentially could lack up to 4 weeks of registered disconnection.

### *Definition of exposures*

The exposure variables contained in the term “societal engagement” were based on questionnaire information from 2004 and 2007 about adolescents’ PTW and participation in LTA. Societal engagement was both examined in mid adolescence (14/15 years) and late adolescence (17/18 years) to identify if the timing of societal engagement played a role for future connection to education and employment.

LTA is defined as activities carried out in places like after school clubs, scout troops, sports clubs, bands or voluntary activities such as church groups or theatres. Participants were categorized as having high LTA engagement if they had marked daily or weekly activities in at least two of the four categories of activities: 1) after-school classes/scout/youth club, 2) choir or orchestra/music group, 3) sports club or 4) other clubs. Otherwise they were categorized as having low engagement.

PTW was dichotomized into engaged or not engaged according to if they had a job regardless of the amount of work hours per week. In addition, PTW was recoded into a categorical variable based on the number of work hours per week “0 hours/w” “1–12 hours/w” “>12 hours/w”. The cut-off values were based on studies indicating that higher amounts of work hours whilst still at school may have a negative effect on educational completion and attainment (14, 20) and The Danish Working Environment Authority, which allows adolescents in compulsory education to work 2 hours per school day and up to 12 hours per week when attending school (32, 33).

### *Adjustment variables*

Equivalated childhood household income was generated by averaging the mean of the yearly household income if data was available for at least 3 of the 4 years, when the participants were 7–10 years old, using data from the FAIK (family income) register (34). Equivalated household income is a weighted measure taking household size and composition into account. The weighing is based upon the “OECD-modified Scale” where the first adult counts 1.0, other adults and children over 14 years count 0.5, and children (under 15 years) count 0.3 (35). Yearly household income was divided by the weighing factor each year. The mean equivalated household income was categorized at the 33.3<sup>rd</sup> and 66.7<sup>th</sup> percentile within the source population into low, medium and high childhood household income.

The highest level of completed education of the parents was assessed in 2004 to reflect the educational status of the childhood home of the participants. The educational level was categorized into 3 levels based on completed education: high (>13 years of education), medium (10–13 years) and low (<10 years) (36) equal to completing tertiary education, secondary or equivalent vocational education or compulsory school.

Subjective social status was measured with The MacArthur Scale of Subjective Social Status (37, 38). It was measured on a ladder of ten steps, where participants marked their family compared to other families in Denmark. A higher mark indicated a higher subjective social status. The scores were categorized at the 33.3<sup>rd</sup> and 66.7<sup>th</sup> percentile into three levels: high, medium and low. Subjective social status was measured in the 2004 wave, but as it is identified to be relatively stable during adolescence (39) the responses from mid adolescence were reapplied to participants in the 2007 wave.

The variable chronic diseases were constructed based on responses to the questionnaires. In 2004, the parents answered whether the participants had any chronic conditions. In the 2007 wave, the participants answered the same question themselves. All conditions were evaluated by the main author and dichotomized into two categories, no and yes. Chronic diseases included all conditions expected to impact the ability of societal engagement or connection to education and employment. The 'No chronic diseases' category included participants without any chronic diseases or diseases not expected to affect the outcome or exposure in the study.

Depressive symptoms were assessed with an abbreviated 4 item version of the Centre for Epidemiologic Studies Depression Scale for Children (CES-DC) (40). The CES-DC scale measures the level of current depressive symptoms. All questions were answered on a four-point Likert scale with the options: "not at all", "a little", "some" and "quite a lot". Each answer was scored between 0 and 3, with high values corresponding to having depressive symptoms. In this study, depressive symptoms were dichotomized into absent or present at a cut point of more than 3.

Self-rated health is a valid measure of current physical health status, and a strong predictor for future outcomes such as morbidity and mortality (41, 42). Self-rated health was assessed by a single question from the 36-Item Short Form Health Survey (SF-36). The participants were asked to rate their health on a five-point Likert scale. Self-rated health was dichotomized into two groups; "good" self-rated health if participants rated their health as excellent or very good or "poor" self-rated health if participants rated their health as good, less good or bad.

### *Statistical Methods*

Characteristics of the study populations and connection to education and employment in early adulthood were displayed according to gender and differences were tested applying Pearson chi-squared test (Table 1). Univariate analyses were performed to describe associations between each covariate and connection to education and employment in early adulthood (Crude analyses, Table 2 and 3).

In both study populations, correlation analyses were carried out for all covariates using Pearson's rank correlation coefficients. The tests showed no sign of multicollinearity (results not shown). The strongest correlation was between depressive symptoms and self-rated health with  $r = 0.26$  at both time points. PTW and LTA were only slightly correlated ( $r = 0.094$  (2004) and  $r = 0.064$  (2007)). Furthermore, there was no interaction between PTW and LTA in any of the study populations.

Logistic regression models were used to estimate the associations between societal engagement in mid or late adolescence and connection to education and employment at the age of 25–29 years. The adjusted analyses were additionally stratified by gender to examine a possible gender difference and to facilitate the comparison of results with other studies. Results are presented with crude and adjusted odds ratios (OR) and 95 % confidence intervals (95% CI) (Table 2 and 3, Adj. models). The adjusted models were stratified by parental educational level and subjective social status to investigate the strength of the associations across different socioeconomic groups and measures of socioeconomic position (SEP) (Table 4a and 4b).

Data analyses were performed using STATA statistical package (version 15.0; Stata, College Station, TX, USA).

### *Ethics*

Use of the data was carried out under the same conditions and with the same purpose as originally collected. The study was approved by the Danish Data Protection Agency, according to Danish law for studies using questionnaire and register data (The Act on Processing of Personal Data - Act No. 429 of 31 May 2000). Written informed consent was not required in questionnaire or register-based projects.

## **Results**

Table 1 shows that the 2004 study population consisted of an equal number of females and males, whereas the 2007 study population consisted of more females (54%). In both study populations, a larger proportion of females had low connection in early adulthood (13–15%) compared to males (11%). Compared to mid adolescence where females and males were almost equally engaged in PTW, in late adolescence, more females (66%) than males (45%) had PTW and worked more hours. Females and males were equally engaged in leisure activities throughout adolescence but with a notable decrease in total high engagement from 34% in mid adolescence to 13% in late adolescence. More females than males reported depressive symptoms, low self-rated health and low subjective social status in both study populations.

Table 2 and 3 show that all exposure variables from mid and late adolescence were associated with connection to education and employment in early adulthood. For all three SEP measures the strength of the associations increased with higher SEP (Table 2 and 3). The crude associations between SEP variables and a positive connection were more profound for males than females (crude analyses, Table 2 and 3).

Across the analyses of societal engagement in mid and late adolescence, we observed associations between PTW and positive connection to education and employment with almost twofold increases for both time points (Table 2 and 3). LTA in mid adolescence was also associated with a positive connection (OR:1.6 [1.2;2.1]) (Table 2).

Among females, we found that PTW in both mid and late adolescence was associated with an around twofold increase in positive connection to education and employment. When applying PTW as a categorical variable based on work hours in three levels, the same associations were seen for the females in both periods. However, in mid adolescence, working 1–12 hours/w was the category most strongly associated with positive connection (OR: 1.7 [1.2; 2.4]), whereas in late adolescence, the strongest association was seen for working >12 hours/w (OR: 2.8 [1.5;5.5]).

Among males, PTW was associated with a positive connection in both mid and late adolescence with a 70% increased risk in both periods. When applying PTW as a categorical variable the strongest association among the males was between PTW >12 hours/w in mid adolescence and connection to later education and employment (OR: 2.21.0;4.9]).

When stratifying the analyses on childhood SEP, we found varying but positive associations between societal engagement and positive connection to education and employment for all strata in both mid adolescence (Table 4a) and late adolescence (Table 4b). Participants who in mid adolescence considered themselves to have a low social status appeared to benefit the most from societal engagement. In late adolescence, the estimates were strongest for participants from homes with low educational level. However, the number of participants with high engagement in LTA was small (n = 297) resulting in small strata and thus imprecise estimates.

## Discussion

In this prospective study, we found that societal engagement in adolescence increased the connection to education and employment in early adulthood. The strongest and most consistent associations were seen between PTW and connection to future education and employment. The timing of societal engagement seemed to have different impacts for females and males. LTA and PTW in mid adolescence were associated with a positive connection for both genders, but with somewhat stronger estimates for males. For females, LTA and PTW in late adolescence appeared to increase a positive connection in early adulthood as compared to males.

The findings in this study are in line with the findings from Lesner et al.(12) who found adolescent PTW associated with positive outcomes. In their study, students who had 20–30 hours of PTW per month during the school year achieved better exam grades and were faster to enrol into secondary education (12). These outcomes were measured as more immediate effects of PTW compared to our study, and they did not investigate if it eventually prevented disconnection from education and employment. The results are likewise in agreement with the results of a study of young non-western Danish adults, that found PTW was associated with an increase of 40% in positive connection at the age of 25 (17).

In contrast to Lesner et al. (12), who showed a positive outcome of a moderate number of work hours, the present study observed the strongest associations for participants working more than 12 hours/w. A cut point of 15–20 hours work per week during the school year has been proposed in several studies (14, 18, 20) as the threshold where the negative consequences of PTW outweigh the positive. Mortimer (14)

identified that those working steadily a few hours per week most of a school year compared to those only working sporadically and/or working >20 hours per week had the most beneficial outcomes such as improved time management skills (14). Due to the a priori decision about the categorization of work hours, it was not possible to examine if participants working a very high number of hours had lower societal connection later in life.

The strong association between working >12 hours/week, and a positive societal connection in early adulthood is interesting in the light of recent Danish educational policies. Since 2014, the public Danish primary and lower secondary school has gone through a large reform. Pupils in mid adolescence must have 35 lessons per week and now have the longest school days in Europe (43). This study uses data from 2004 and 2007, prior to the reform in 2014, so the positive results found here comes from a period in time where adolescents had more spare time. The longer school days can make it difficult for adolescents to have enough time for both obligatory homework, LTA and PTW, particularly because the Working Environment authorities only allow adolescents to work 2 hours per school day and 7–8 hours on non-school days (32). The results from this study are relevant for policy makers when discussing future educational policies.

In both study populations, more females than males were disconnected in early adulthood. This is in contrast to Benjaminsen et al.(9) who identified more disconnected males. This discrepancy is interesting as females in this study worked more in late adolescence and the association between PTW and positive connection was strongest for females. The different results of the two studies can partly be explained by the fact that in Denmark (44), more males in late adolescence work in apprenticeships or vocational education. Therefore, fewer males are likely to have PTW during upper secondary education compared to females.

Another possible explanation for the difference can be related to the period where connection is measured, since many young people establish families at the ages of 25–29. Although our data has taken maternity leave into account, it was not possible to identify pregnancy-related sickness leave in the DREAM database (31). Absenteeism due to pregnancy complications are registered as ordinary sickness, and it is possible that some women were not truly disconnected, but rather on sick leave because of complications due to pregnancy. As a sensitivity analysis, register information about all childbirths from the female participants were collected between age 25 and 28, to which we had data. All recorded sickness benefits six months prior to childbirth were subtracted the total number of weeks of received social benefits. A total of 10 females had been categorized with low connection to education and employment instead of high. These females were recoded, and all analyses were repeated. The results only showed minor changes to the estimates (results not shown).

The univariate analyses indicated a social gradient, with participants from higher SEP having a higher connection to education and employment. Studies within the same cohort have previously identified a social gradient in dropout from secondary high school (45) and in levels of perceived stress (46). However, the multivariate analyses stratified by SEP measures showed that the associations between

both LTA and PTW and positive connection to education and employment varied within strata depending on the type of engagement, timing and measure of SEP. Some of the strata in the analyses were small, making the associations ambiguous and caution is advised in relation to interpretation.

The present findings indicate that societal engagement is associated with a positive connection across different socioeconomic groups. However, in line with previous research this study did not find a compelling social gradient when exploring the association between societal engagement and connection to education and employment.(47). Thus, if LTA or PTW are used as promotional strategies to improve connection to education and employment, considerations should include the definition of the target group and the timing of implementation.

### *Strengths and limitations*

A strength of the study was the use of a cohort with a relatively high initial participation rate in combination with high-quality register data. The register data was almost complete for all participants. The design was prospective, which allowed an evaluation of temporal associations. Furthermore, the study extended over 14 years, which ensured that almost all of the participants had participated in society through education and employment. Positive connection to education and employment was measured over four years to account for sporadic periods of disconnection. The use of both questionnaire and register-based data in the study is a strength, which minimises the risk of common method variance (48).

The exposures in the study were constructed from questionnaire data. The decision to participate in the original cohort was taken without the knowledge of any subsequent outcome in the study and we assume selection on participation was non-differential, which should not bias the estimates. In this study, information about non-participants' societal engagement and their connection to education and employment in early adulthood was unavailable. Based on the available register information, an analysis of non-participation in the two study populations showed that in both waves, more females than males responded, and a higher proportion of the responders came from families with high income and educational levels. Nevertheless, a previous study in the same cohort has shown that neither non-participation nor loss to follow up influenced the size or directions of a number of exposure-outcome associations significantly (28).

Self-reported data is prone to information bias if some participants intentionally or accidentally respond incorrectly resulting in misclassification of variables. Questions on PTW and LTA were rather harmless and not personal such as questions on weight or unhealthy behaviours (49). Also, we do not expect any misclassification to be associated with the outcome, thus any bias would most likely lead to an attenuation of the association estimates. Most adolescents in Denmark are employed on hourly basis, which increases the chance that the reported work hours were true. Yet, the number of hours adolescents work is likely to fluctuate during the school year, which the questionnaires were unable to identify. This is anticipated to cause non-differential information bias.

Overall, the limitations identified were not considered to cause serious bias in relation to the associations found in the study. However, caution about causal interpretation is important since other factors may have confounded the associations, such as ambition, self-confidence, indomitability or “believing”, which have been found to impact both societal engagement and positive connection to education and employment (50, 51).

Previous research by Glasscock et al. has shown that the socio-demographical characteristics of the participants of the Vestliv Cohort are comparable to young people in the rest of Denmark (46). Many participants in Vestliv have moved and they are now living in different parts of Denmark reflecting various possibilities for education and employment. Therefore, the findings from this study are generalisable to young people in Denmark and other countries with similar environmental and social conditions, taking into consideration that Danish adolescents today have longer school days making the balance between school and leisure time different than for participants in this study.

## Conclusion

The study showed a notable association between adolescent societal engagement and a positive connection to education and employment in early adulthood, with stronger effects of PTW compared to LTA. Furthermore, the study identified both a gender difference in the association between societal engagement on positive connection and in the timing of adolescent engagement. The associations between societal engagement and positive connection varied across socioeconomic groups and depended on the chosen indicator for SEP. Municipalities, social workers and public health workers need to be more attentive to the positive effects of adolescent societal engagement in order to reduce the risk of disconnection in the transition into adulthood.

From a public health perspective, it is important to understand the factors associated with positive connection to education and employment in order to develop effective preventive strategies to match the needs of different groups. Based on the findings in this study, both establishment of easier access to leisure time activities and increase the amount of part-time job positions for adolescents appear to be relevant and feasible preventive strategies.

## Declarations

*Ethics approval and consent to participate:* The study was approved by the Danish Data Protection Agency. According to Danish law (Act on Research Ethics Review of Health Research Projects), available at: [www.nvk.dk/english/act-on-research](http://www.nvk.dk/english/act-on-research), questionnaire and register-based studies require neither approval by ethical or scientific committees nor written informed consent.

*Consent for publication:* Not applicable

*Availability of data and materials:* The datasets used and/or analysed during the current study are available from the authors on reasonable request.

*Competing interests:* The authors declare that they have no competing interests.

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*Authors' contributions:* JHA initiated the study. VJN designed and performed the analyses and wrote the main paper. TNW, JHA, JMV and EAN helped analyse and interpret the data and commented on the manuscript at all stages. All authors read and approved the final manuscript.

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## List Of Abbreviations

*CES-DC:* Center for Epidemiologic Studies Depression Scale for Children

*CI:* Confidence interval

*CPR:* Civil Registration Number

*DREAM:* Danish Register for Evaluation of Marginalization

*E.g.:* Exempli gratia

*EUR:* Euro

*FAIK:* Family income register

*GDP:* Gross Domestic Product

*LTA:* Leisure time activities

*OECD:* Organisation for Economic Co-operation and Development

*OR:* Odds ratio

*PTW:* Part-time work

*SEP:* Socioeconomic position

## References

1. Jensen T, Pihl M. [In parts of Denmark every 5th young person is not employed or in education] [Internet]. Copenhagen: Arbejderbevægelsens Erhvervsråd; 2018 [cited 2018 Oct 29]. Available from: <https://www.ae.dk/analyser/i-dele-af-danmark-er-hver-5-ung-ikke-i-job-eller-under-uddannelse>. [Danish].

- 2.Andersen SH. Disconnected youth: Past, present & future. Study Paper No 116. Copenhagen: Rockwool Foundation Research Unit; 2017. p. 1–43.
- 3.Danmarks Statistik [Statistics Denmark]. [Vulnerable young people have difficulties to achieve employment] [Internet]. Copenhagen: Danmarks Statistik; 2016 [cited 2019 May 2]. Available from: <https://www.dst.dk/da/Statistik/nyt/NytHtml?cid = 30249>. [Danish].
- 4.OECD. Off to a Good Start? Jobs for Youth. Paris: OECD Publishing; 2010. p. 160.
- 5.OECD. Social Expenditure Update 2019, Public social spending is high in many OECD countries. Paris: OECD Publishing; 2019.
- 6.Reneflot A, Evensen M. Unemployment and psychological distress among young adults in the Nordic countries: A review of the literature. *Int J Soc Welf*. 2014;23(1):3–15.
- 7.Andersen SH, Jensen B, Nielsen BW, Skaksen JR. [What we know about vulnerable people - History, scope and causes]. Copenhagen: Gyldendal; 2017. 240 p.
- 8.Commission on Social Determinants of Health, World Health Organization. Closing the gap in a generation: Health equity through action on the social determinants of health. Geneva: World Health Organization; 2008. p. 256.
- 9.Benjaminson L, Andrade SB, Andersen D, Enemark MH, Birkelund JF. [Family background and social marginalization in Denmark]. Copenhagen: SFI - Det Nationale Forskningscenter for Velfærd; 2015.
- 10.Mackenbach JP. Health Inequalities: Europe in Profile. Independent, expert report commissioned by the UK presidency of the EU. London: European Union; 2006 Feb 2006. p. 1–46.
- 11.Rockwool Foundation Research Unit. [The social heritage has consequences throughout life] [Internet]. Copenhagen 2017 [cited 2018 Dec 16]. Available from: <https://www.rockwoolfonden.dk/artikler/den-sociale-arv-har-konsekvenser-hele-livet/>. [Danish].
- 12.Lesner RV, Damm AP, Bertelsen P, Pedersen MU. Life Skills Development of Teenagers through Spare-Time Jobs. Aarhus: TrykFonden's Centre for Child Research; 2018. p. 1–60
- 13.Cunnie KA, Martinrogers N, Mortimer JT. Adolescent Work Experience and Self-efficacy. *Int J Sociol Soc Policy*. 2009;29(3/4):164–75.
- 14.Mortimer JT. The Benefits and Risks of Adolescent Employment. *Prev Res*. 2010;17(2):1–9.
- 15.Patton W, Smith E. Part-Time Work of High School Students: Impact on Employability, Employment Outcomes and Career Development. *Aust J Career Dev*. 2010;19(1):54–62.
- 16.Mortimer JT, Staff J. Early work as a source of developmental discontinuity during the transition to adulthood. *Dev Psychopathol*. 2004;16(4):1047–70.

- 17.Den Sociale Kapitalfond. [Part time work for vulnerable young people are a good investment for the society]. 2017 [cited 2019 May 12]. Available from: <https://densocialekapitalfond.dk/nyheder/ny-analyse-unge-med-fritidsjob-er-god-forretning-samfundet>. [Danish].
- 18.Bachman JG, Safron DJ, Sy SR, Schulenberg JE. Wishing to work: New perspectives on how adolescents' part-time work intensity is linked to educational disengagement, substance use, and other problem behaviours. *Int J Behav Dev*. 2003;27(4):301–15.
- 19.Neyt B, Omeij E, Verhaest D, Baert S. Does Student Work Really Affect Educational Outcomes? A Review Of The Literature. *J Econ Surv*. 2018:1–26.
- 20.Staff J, Schulenberg JE, Bachman JG. Adolescent Work Intensity, School Performance, and Academic Engagement. *Sociol Educ*. 2010;83(3):183–200.
- 21.Baert S, Neyt B, Omeij E, Verhaest D. Student Work, Educational Achievement, and Later Employment: A Dynamic Approach. IZA—Institute of Labor Economics; 2017
- 22.Mahoney JL, Vandell DL, Simpkins S, Zarrett N. Adolescent out of School activities. In: Lerner RM, Steinberg L, editors. *Handbook of adolescent psychology: Contextual influences on adolescent development*. 2. 3rd ed. Hoboken: John Wiley & Sons Inc; 2009. p. 1–91.
- 23.Feinstein L, Bynner J, Duckworth K. Young People's Leisure Contexts and their Relation to Adult Outcomes. *J Youth Stud*. 2006;9(3):305–27.
- 24.Dibben C, Playford C, Mitchell R. Be(ing) prepared: Guide and Scout participation, childhood social position and mental health at age 50—a prospective birth cohort study. *J Epidemiol Community Health*. 2017;71(3):275–81.
- 25.Jang SJ, Johnson B, Kim Y-I, C. Polson E, Smith B. Structured Voluntary Youth Activities and Positive Outcomes in Adulthood: An Exploratory Study of Involvement in Scouting and Subjective Well-Being. *Sociological Focus*. 2014;47:238–67.
- 26.Breslin FC, Mustard C. Factors influencing the impact of unemployment on mental health among young and older adults in a longitudinal, population-based survey. *Scand J Work Environ Health*. 2003;29(1):5–14.
- 27.Department of Occupational Medicine- University Research Clinic- Hospital West Jutland. VestLiv Project. [cited 2019 Feb 16]. Available from: <http://www.vestliv.dk/dk/om-vestliv>  
<http://www.vestliv.dk/dk/sprgeskema/tidligere-sprgeskemaer>. [Danish].
- 28.Winding TN, Andersen JH, Labriola M, Nohr EA. Initial non-participation and loss to follow-up in a Danish youth cohort: implications for relative risk estimates. *J Epidemiol Community Health*. 2014;68(2):137–44.

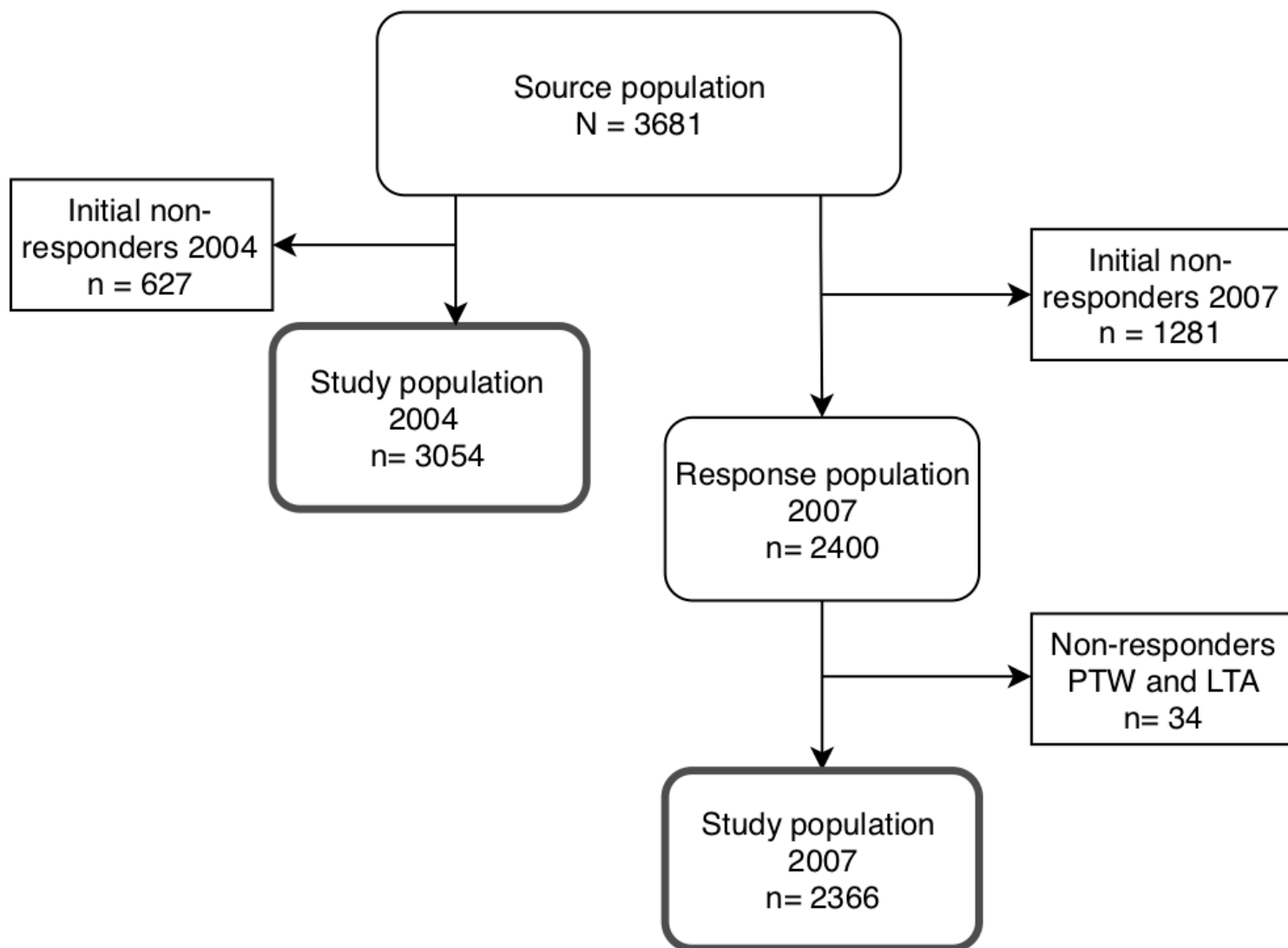
29. Pedersen CB. The Danish Civil Registration System. *Scand J Public Health*. 2011;39(7):22–5.
30. Hjollund NH, Larsen FB, Andersen JH. Register-based follow-up of social benefits and other transfer payments: accuracy and degree of completeness in a Danish interdepartmental administrative database compared with a population-based survey. *Scand J Public Health*. 2007;35(5):497–502.
31. Styrelsen for Arbejdsmarked og Rekruttering [The Danish Agency for Labour Market and Recruitment]. DREAM Version 42 v2. [Internet]. 2018. [updated 2018 Aug 22; cited 2019 Jan 28]. Available from: [http://www.dst.dk/da/TilSalg/Forskningsservice/Data/Andre\\_Styrelser.aspx](http://www.dst.dk/da/TilSalg/Forskningsservice/Data/Andre_Styrelser.aspx) [Danish].
32. Arbejdstilsynet [The Danish Working Environment Authority]. [Work regulations for adolescents in compulsory education] [Internet]. 2018 [cited 2019 Mar 20]. [AT-Vejledning]. Available from: <https://amid.dk/regler/at-vejledninger/undervisningspligtige-unges-arbejde-13-0-1/>. [Danish].
33. Arbejdstilsynet [The Danish Working Environment Authority]. [Work regulations for adolescents not in compulsory education] [Internet]. 2007 [updated Jun 2018; cited 2019 Mar 20]. [AT-vejledning]. Available from: <https://amid.dk/regler/at-vejledninger/ikke-undervisningspligtige-unges-arbejde-e-0-2/>. [Danish].
34. Danmarks Statistik [Statistics Denmark]. Family income [Internet]. 2019 [cited 2019 Mar 12]. Available from: <https://www.dst.dk/da/Statistik/dokumentation/Times/familieindkomst/famaekvivadispl>. [Danish].
35. Hagenaars AJM, Asghar Zaidi M, de Vos K, European Commission, Eurostat (European Commission). Poverty statistics in the late 1980s: research based on micro-data. Luxembourg: Statistical Office of the European Communities; 1994. p. 14–8.
36. Jensen VM, Rasmussen AW. Danish Education Registers. *Scand J Public Health*. 2011;39(7):91–4.
37. Goodman E, Huang B, Schafer-Kalkhoff T, Adler NE. Perceived socioeconomic status: a new type of identity that influences adolescents' self-rated health. *J Adolesc Health*. 2007;41(5):479–87.
38. Goodman E, Adler NE, Kawachi I, Frazier AL, Huang B, Colditz GA. Adolescents' perceptions of social status: development and evaluation of a new indicator. *Pediatrics*. 2001;108(2):1–8.
39. Goodman E, Maxwell S, Malspeis S, Adler N. Developmental Trajectories of Subjective Social Status. *Pediatrics*. 2015;136(3):633–40.
40. Fendrich M, Weissman MM, Warner V. Screening for depressive disorder in children and adolescents: validating the Center for Epidemiologic Studies Depression Scale for Children. *Am J Epidemiol*. 1990;131(3):538–51.
41. Boardman JD. Self-rated health among U.S. adolescents. *J Adolesc Health*. 2006;38(4):401–8.
42. Fayers PM, Sprangers MA. Understanding self-rated health. *Lancet*. 2002;359(9302):187–8.

43. Ministry of Education (DK). Agreement on the Danish public school [Internet]. 2013 [cited 2019 May 2]. Available from: <http://eng.uvm.dk/-/media/filer/uvm-eng/pdf/13/131007-folkeskolereformaftale-eng-red-2-.pdf?la=en>
44. Bentsen EF, Büchler JM, Lindorf M, Østergaard-Thygesen SF, Christensen SK. [Vocational educations: Status, governance and reforms]. Copenhagen: Nordea-fonden; 2018 Nov 1. p. 40. [Danish].
45. Winding TN, Andersen JH. Socioeconomic differences in school dropout among young adults: the role of social relations. *BMC Public Health*. 2015;15:1054.
46. Glasscock DJ, Andersen JH, Labriola M, Rasmussen K, Hansen CD. Can negative life events and coping style help explain socioeconomic differences in perceived stress among adolescents? A cross-sectional study based on the West Jutland cohort study. *BMC Public Health*. 2013;13:532–45.
47. Oakes JM, Rossi PH. The measurement of SES in health research: current practice and steps toward a new approach. *Soc Sci Med*. 2003;56(4):769–84.
48. Spector PE. Method variance as an artifact in self-reported affect and perceptions at work: Myth or significant problem? *J Appl Psychol*. 1987;72(3):438–43.
49. Duffy D, Ailshire J, Sastry N, Clarke P. Accuracy of Self-Reported Versus Measured Weight Over Adolescence and Young Adulthood: Findings From the National Longitudinal Study of Adolescent Health, 1996–2008. *Am J Epidemiol*. 2014;180(2):153–9.
50. Postlewaite A, Silverman D. Non-Cognitive Skills, Social Success, and Labor Market Outcomes. Philadelphia: University of Pennsylvania; 2006 Mar. p. 15.
51. Carneiro P, Crawford C, Goodman A. The Impact of Early Cognitive and Non-Cognitive Skills on Later Outcomes. London: Centre for the Economics of Education, London School of Economics; 2007.

## Tables

Due to technical limitations, the tables have been placed in the Supplementary Files section.

## Figures



**Figure 1**

Inclusion into study populations for mid and late adolescence. Participants needed to respond to either part-time work or leisure activities to be included in a study population.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Table1.png](#)
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