25/10/2019

Slutrapport til Arbejdsmiljøforskningsfonden

PUSAM – Projekt om Unge, Sårbarhed, Arbejdsmiljø & Marginalisering
Projekt nr. 24-13-09 5253

Forsknings- og metodeudviklingsprojekt om betydningen af sårbarhed og Arbejdsforhold for unges inklusion på arbejdsmarkedet og senere arbejdsmarkedsdeltagelse

Af Thomas Lund, Johan Hviid Andersen, Claus D. Hansen, Merete Labriola

Arbejdsmiljøforskningsfonden har givet bevilling til projektet 2013.

Forord

Denne afrapportering om Unge, Sårbarhed, Arbejdsmiljø & Marginalisering belyser projektets resultater vedr. de seks hovedformål;

At foretage

1. metodeudvikling af begreberne 'stabil/ustabil arbejdsmarkedstilknytning' og 'positiv entré' på arbejdsmarkedet.

At undersøge

2. hvorvidt tidlige markører for 'ustabil arbejdsmarkedstilknytning' har betydning for sener erhvervstilknytning
3. betydningen af fysiske og psykologiske problemer for sener opfattelsen af deres arbejdsmiljø
4. om arbejds- og andre ulykker som ung påvirker senere arbejdsmarkedstilknytning.
5. hvorvidt sårbarhed er en risikofaktor for sener marginalisering på arbejdsmarkedet
6. konflikter mellem arbejde og fritid hos en sub gruppe med mellemlange og lange uddannelser og risikoen for sygefravær og marginalisering.

Projektet er baseret på tidligere indsamlede spørgeskemaer og registeroplysninger vedr. 20-årige vestjyder i 2004 og opfølgning fra spørgeskemabesvarelser i 2011, hvor de unge er 27/28 år samt registeroplysninger fra 1983 til 2018. Yderligere er der suppleret med en ungdomskohorte bestående af 3054 unge født i 1989. Spørgeskemadata er indhentet i 2004 og 2007, hvor de unge var hhv. 15 og 18 år gamle. Efterfølgende er de fulgt i register til de er 21 år.
Til metode udviklingsdelen er der suppleret med en national ungdoms kohorte (FOCA kohorten www.foca.dk). Vi anser det for en styrke at projektet, at der er udvidet med en større kohorte, I det det har givet mulighed for at udvikle brugen sekvensanalyser. Datakilden FOCA kohorten er ikke finansieret af denne bevilling, men af en tidligere AMFF bevilling nr. 20140073389

Projektet har indeholdt et ph.d. forløb som pga. 2 x barsel og orlov ikke er blevet gennemført. De problemstillinger der lå i ph.d.- projektet er blevet belyst af projektgruppen i samarbejde med andre forskere fra Arbejdsmedicinsk klinik, Herning og Institut for Folkesundhed, Aarhus Universitet.

Samlet foreligger der 5 publicerede videnskabelige artikler og 3 undervejs.
Projektet har profiteret af bidrag fra en række forskellige faggrupper indenfor medicin, psykologi, sociologi og folkesundhed i gennem Forskningscenter for unge arbejdsliv www.foca.dk. som er et murstensløst samarbejde mellem arbejdsmedicinsk klinik i Herning, Institut for Sociologi og Socialt Arbejde, Aalborg Universitet og Institut for Folkesundhed, Aarhus Universitet.

I PUSAM projektet indgår både Vestliv kohorten og FOCA kohorten og begge kohorter vil i fremtiden kunne bidrage med viden fra skole over uddannelse til arbejdsliv.

Johan Hviid Andersen

Herning d.20. august 2019

Resumé

For at forebygge fremtidig ulighed i helbred og socioøkonomisk status, er det afgørende at unge er i stand til at gennemføre en ungdomsuddannelse. Ligeledes er det vigtigt, at så mange unge som muligt får en god start på arbejdslivet.
Herværende projekt belyser betydningen af individuelle, socioøkonomiske og arbejdsmiljørelaterede faktorer for såvel en positiv 'entré' på arbejdsmarkedet såvel som en stabil arbejdsmarkedstilknytning. Endvidere er der udviklet mål der estimerer projektdeltagernes bevægelser på arbejdsmarkedet over tid.

Metode og materiale
Der er anvendt tre ungdomskohorter som datakilder; Vestliv kohorten født i 1983 (N=XXX, Vestliv kohorten født i 1989 (N=3054) og FOCA kohorten født i 2000. (N = 13.100).
For de to Vestliv kohorter gælder det at basline data er indhentet i 2004, og fulgt op med spørgeskema igen i 2007, 2010 og 2011. Data på FOCA kohorten er indhentet i 2017.
Fra spørgeskemaet bruges information om coping-strategi, sociale relationer, familiekonflikt, selvvurderet helbred, sårbarhed, oplevelse af stress, arbejdsulykker, fysiske symptomer m.m. og fra registre blev der indhentet oplysninger om forældrenes socio-økonomiske position og arbejdsmarkedsdeltagelse samt oplysninger om de unges uddannelsessituation og/eller position på arbejdsmarkedet m.m.

Resultater

Tidlige markører for senere arbejdsmarkedsmarginalisering
Resultaterne vedrørende tidlige markører for senere arbejdsmarkedsmarginalisering er baseret på 3 delstudier publiceret i 3 videnskabelige artikler "Socioeconomic differences in school dropout among young adults: the role of social relations","Somatic Complaints in Adolescence and Labour Market Participation in Young Adulthood" og "Do negative childhood conditions increase the risk of somatic symptoms in adolescence? – a prospective cohort study". Alle tre delstudier er baseret på Vestliv kohorten født i 1989.

Vi fandt, at udover forældrenes socioøkonomiske status har en række risikofaktorer der er knyttet til den unge selv, såsom evner i skolen, lavt selvvurderet helbred og manglende oplevelse af meningsfuldhed i sit liv, betydning for den unges fremtidige chance for at gennemføre en ungdomsuddannelse, ikke mindst for de unge der er i risiko for at droppe ud af en erhvervsfaglig uddannelse. Vi undersøgte øget risiko for ikke at gennemføre en ungdomsuddannelse og fandt at; en stor del af de unge oplevede problemer med sociale relationer ved 15 og 18-årsalderen, og at dårlige relationer til lærere og klassekammerater ved 18-årsalderen forklarede en stor del af sammenhængen mellem sociale opvækstvilkår og frafald fra ungdomsuddannelse for begge køn. Mangelfulde sociale relationer gav øget risiko for ikke at gennemføre en ungdomsuddannelse, specielt blandt pigerne. 18-årige piger, der oplevede, at familiekonflikter var svære at håndtere, havde mere end 2,5 gange så stor risiko for ikke at gennemføre en ungdomsuddannelse sammenlignet med piger, der ikke oplevede sådanne problemer.

Unge fra de sværest socialt stillede familier havde 3 gange så høj risiko for ikke at gennemføre en ungdomsuddannelse i forhold til unge fra bedre stillede familier.
I det sidste delstudie vedrørende tidlige markører for senere arbejdsmarkedsmarginalisering blev der fundet en markant øget tendens til at drengene var på mere end 4 ugers overførselsindkomst/år, hvis de som 18-årige havde haft en høj forekomst af uforklarlige fysiske symptomer.

Betydningen af psykologiske problemer for senere arbejdsmarkedstilknytning
To delstudier baseret henholdsvis på Vestliv kohorten født i 1983 og Vestliv kohorten født i 1989, blev gennemført og publiceret: "Perceived stress among 20-21 year-olds and their future labour market participation - an eight-year follow-up study" og "Coping strategies in adolescence and labour market participation in young adulthood - A prospective birth cohort study".

Vi fandt ingen forskelle på brugen af aktiv eller undvigende coping strategi blandt drenge og piger. Om man i større eller mindre grad havde en aktiv coping strategi, havde ingen betydning for ens fremtidige arbejdsmarkedstilknytning. Til gengæld var der en øget risiko for, at man havde en relativt stærkere arbejdsmarkedstilknytning 10 år senere, jo mindre man i 14-15 års alderen anvendte en undvigende coping-strategi, altså beskæftiger sig med noget andet, prøver at lade være med at tænke på det, giver op, og holder op med at prøve at løse problemet. Personer som scorede lavt på dette, havde en 37 % større chance for, at befinde sig i gruppen med høj arbejdsmarkedstilknytning 10 år senere.

Hvad angår effekten af oplevet stress og senere arbejdsmarkedsdeltagelse fandt vi var forskellig for mænd og kvinder. For unge mænd reducerede højere niveauer af oplevet stress risikoen for fremtiden passiv arbejdsmarkedsdeltagelse, når der blev justeret for socioøkonomiske faktorer, selvvurderet helbred og coping. Modsat fandt vi, at for unge kvinder øgede højere niveauer af oplevet stress risikoen for fremtidig passiv arbejdsmarkedsdeltagelse, når man justerer for de samme potentielle confoundere, denne sammenhæng var dog ikke signifikant.

Arbejdsulykker i relation til senere arbejdsmarkedstilknytning
Foreløbige resultater vedrørende arbejdsulykker i relation til senere arbejdsmarkedstilknytning er baseret Vestliv kohorten født i 1983. Der er udarbejdet et abstract og der arbejdes på manuskriptet "Long-term consequences of work accidents among adolescents and young adults. A longitudinal study" Her fandt vi at 10% af kohorten oplevede en arbejdsulykke i tiden mellem projektets to spørgeskemaundersøgelser ved henholdsvis 20- og 28-års alderen. Foreløbige resultater viser, at de, der oplevede en arbejdsulykke, havde en øget risiko for at rapportere lavere selvvurderet helbred. Det samme mønster blev fundet ved analyse af muskuloskeletale smerter: her var den øgede risiko på 52%. Foreløbige resultater viser en reduceret sandsynlighed for at være ansat i en alder af 28 for dem, der oplever en arbejdsulykke.

Sårbarhed og senere marginalisering på arbejdsmarkedet
Der er gennemført et delstudie baseret på Vestliv kohorten født i 1989 og et manuskript er udarbejdet: "Gender differences in psychological vulnerability in adolescence as indicator of completion of a secondary education - a cohort study"

Psykologisk sårbarhed (lav oplevelse af meningsfuldhed, lav mestringsevne samt lavt selvværd) i ungdomsårene øgede risikoen for ikke at fuldføre en ungdomsuddannelse. For piger gjaldt det at de der havde oplevelsen af lav meningsfuldhed og lav mestringsevne havde en øget risiko for ikke at fuldføre en påbegyndt videregående uddannelse. For drenge var der sammenhæng mellem lavt selvværd og øget risiko for ikke at fuldføre en påbegyndt ungdomsuddannelse. Der kan således være en forskel i virkningen af psykologisk sårbarhed for drenge og piger.

Metodeudvikling af begreberne stabil/ustabil arbejdsmarkedstilknytning.
Udvikling af sekvensanalyse til brug på data fra DREAM-registeret resulterede i en artikel "Labour market attachment among parents and self-rated health of their offspring - An intergenerational study on the Danish FOCA cohort". Her fandt vi, at 29.1% af de unge reporterede et moderat selvvurderet helbred, mens 70.9% rapporterede et højt selvvurderet helbred. En lav grad af arbejdsmarkedsintegration blandt forældre var associeret med moderat selvvurderet helbred blandt deres unge børn. Unge med moderat selvvurderet helbred havde i større grad forældre med en lavere arbejdsmarkedstilknytning, mere tid på offentlig forsørgelse og en mere ustabil arbejdsmarkedstilknytning sammenlignet med de unge, som havde et højt selvvurderet helbred. Studiet understreger vigtigheden af, hvordan marginalisering fra arbejdsmarkedet kan have negative helbredseffekter på tværs af generationer. Det peger endvidere på, at sekvensanalyse er et værdifuldt redskab til analyse af bevægelser mellem forskellige stadier i uddannelse og beskæftigelse baseret på fortløbende registerdata.

Summary

In order to prevent future inequalities in health and socio-economic status, it is essential that young people are able to complete a their education. Equally important is that, as many young people as possible get off to a good start in their working life.
This project highlights the importance of individual, socio-economic and occupational health-related factors for both a positive 'entry' into the labor market as well as a stable labor market connection. How to estimate the project participants' movements in the labor market over time have been developed.

Method and material
Three youth cohorts have been used as data sources; The Westlife cohort born in 1983 (N = XXX, the Westlife cohort born in 1989 (N = 3054) and the FOCA cohort born in 2000. (N = 13,100).
For the two Vestliv cohorts, baseline data was obtained in 2004 and followed up with a questionnaire again in 2007, 2010 and 2011. Data on the FOCA cohort was obtained in 2017.
The questionnaire uses information on coping strategy, social relationships, family conflict, self-assessed health, vulnerability, experiencing stress, work accidents, physical symptoms and more. and from the registries, information was obtained on the parents' socio-economic position and labor market participation, as well as information on the educational situation and / or position of the young people in the labor market, etc.

Results

Early markers for later labor market marginalization
The results of early markers for later labor market marginalization are based on 3 sub-studies published in 3 scientific articles “Socioeconomic differences in school dropout among young adults: the role of social relations”, “Somatic Complaints in Adolescence and Labor Market Participation in Young Adulthood” and “Do negative childhood conditions increase the risk of somatic symptoms in adolescence? - a prospective cohort study ”. All three sub-studies are based on the Vestliv cohort born in 1989.

We found that, in addition to parental socioeconomic status, a number of risk factors associated with the adolescent self, such as ability in school, low self-esteem, and lack of experience of meaningfulness in his or her life, have an impact on the young person's future chance of completing a secondary education, not at least for young people who are at risk of dropping out of vocational education. We examined increased risk of not completing a youth education and found that; a large proportion of young people experienced problems with social relations at the age of 15 and 18, and that poor relationships with teachers and classmates at age 18 explained a large part of the relationship between social conditions and youth drop-out rates for both sexes. Inadequate social relationships presented an increased risk of not completing a youth education, especially among the girls. 18-year-old girls who experienced that family conflicts were difficult to handle had more than 2.5 times the risk of failing to complete a youth education compared to girls who did not experience such problems.

Young people from the most difficult socially disadvantaged families were 3 times more likely to not attend secondary education compared to young people from disadvantaged families.
In the last partial study on early markers for later labor marginalization, a significantly increased tendency for boys to be more than 4 weeks' transfer income / year was found if, as 18-year-olds, they had a high incidence of unexplained physical symptoms.

The importance of psychological problems for later labor market attachment
Two two sub-studies based on the Vestliv cohort born in 1983 and the Vestliv cohort born in 1989, respectively, were conducted and published: “Perceived stress among 20-21 year-olds and their future labor market participation - an eight-year follow-up study” and “Coping strategies in adolescence and labor market participation in young adulthood - A prospective birth cohort study”.

We found no differences in the use of active or evasive coping strategy among boys and girls. Whether one had an active coping strategy to a greater or lesser extent did not affect one's future labor market association. On the other hand, there was an increased risk of having a relatively stronger labor market connection 10 years later, the less you used an evasive coping strategy, ie dealing with something else, at 14-15 years, try not to think on it, give up, and stop trying to solve the problem. People who scored low on this had a 37% greater chance of being in the high-unemployment group 10 years later.

Regarding the effect of perceived stress and subsequent labor market participation, we found that was different for men and women. For young men, higher levels of perceived stress reduced the risk of future passive labor market participation when adjusted for socio-economic factors, self-rated health, and coping. Conversely, we found that for young women, higher levels of perceived stress increased the risk of future passive labor market participation when adjusted for the same potential confounders, however, this correlation was not significant.

Occupational accidents in relation to later labor market attachment
Preliminary results regarding occupational accidents in relation to later labor market attachment are based on the Vestliv cohort born in 1983. An abstract has been prepared and work is being done on the manuscript "Long-term consequences of work accidents among adolescents and young adults. A longitudinal study ”Here we found that 10% of the cohort experienced a work accident in the time between the project's two questionnaire surveys at the age of 20 and 28 respectively. Preliminary results show that those who experienced a work accident had an increased risk of reporting lower self-rated health. The same pattern was found in the analysis of musculoskeletal pain: here was the increased risk of 52%. Preliminary results show a reduced likelihood of being employed at age 28 for those experiencing an occupational accident.

Vulnerability and later marginalization in the labor market
A sub-study based on the Western Life cohort was born in 1989 and a manuscript has been prepared: "Gender differences in psychological vulnerability in adolescence as an indicator of completion of a secondary education - a cohort study"

Psychological vulnerability (low experience of meaningfulness, low coping skills and low self-esteem) in adolescence increased the risk of not completing a secondary education. For girls, those who had the experience of low meaning and low coping skills had an increased risk of not completing a higher education. For boys, there was a correlation between low self-esteem and increased risk of not completing an undergraduate education. Thus, there may be a difference in the effect of psychological vulnerability on boys and girls.

Method development of the concepts of stable / unstable labor market connection. Development of sequence analysis for use on data from the DREAM register resulted in an article "Labor market attachment among parents and self-rated health of their offspring - An intergenerational study on the Danish FOCA cohort". Here we found that 29.1% of young people reported moderate self-rated health, while 70.9% reported high self-rated health. A low degree of labor market integration among parents was associated with moderately self-rated health among their young children. Young people with moderate self-rated health had a greater degree of parents with a lower labor market connection, more time on public support and a more unstable labor market connection compared to the young people who had a high self-rated health. The study emphasizes the importance of how marginalization from the labor market can have negative health effects across generations. It further points out that sequence analysis is a valuable tool for analyzing movements between different stages of education and employment based on continuous register data.

Indholdsfortegnelse

Om rapporten

Rapporten bygger på resultater, som er publiceret i 5 artikler i internationale, videnskabelige tidsskrifter, samt 2 manuskript indsendt til review i internationale videnskabelige tidsskrifter. Desuden medtages resultater fra et manuskript under udarbejdelse (abstract indgår). Der er udarbejdet 16 bachelor- og 5 specialeafhandlinger. I denne rapport indgår kun resultater fra de specialeafhandlinger der er publicerede eller under review.

Der er tale om en bred afdækning af forskellige, væsentlige aspekter af unges individuelle, socioøkonomiske og arbejdsmiljørelaterede faktorers betydning for såvel en positiv 'entré' på arbejdsmarkedet såvel som en stabil/ustabil arbejdsmarkedstilknytning som ca. 30-årige.

Rapporten er inddelt i 7 kapitler. Efter dette afsnit "om rapporten", sammenfattes i kapitel 1 projektets samlede forsknings aktivitet og produktion. I kapitlerne efterfølgende præsenteres resultaterne fra de udarbejdede videnskabelige artikler og manuskripter i henhold til de oprindelige formål, dog sat sammen i en anden rækkefølge, da det er naturligt at starte med risikofaktorer i ungdommen og slutte med metode udvikling. Kapitel 2 omhandler tidlig marginalisering. Kapitel 3 omhandler betydningen af psykiske problemer blandt unge for senere arbejdsmarkedsdeltagelse og sygefravær. Kapitel 4 omhandler konsekvenser af arbejdsulykker blandt unge og unge voksne. Kapitel 5 har fokus på sårbarhed blandt unge og sener arbejdsmarkedsdeltagelse. Kapitel 6 handler om metodeudvikling.

I alle kapitlerne er resultaterne gengivet i form af korte (1/2 sider "fakta-ark". Reprints af de bagvedliggende artikler findes i rapportens bilag 3. Dog findes resultaterne fra de tre ikke publicerede manuskripter udelukkende i form af fakta-ark. Enkelte af projektets artikler/manuskripter har resultater der går på tværs af rapportens kapitelstruktur. I disse tilfælde er resultaterne i form af fakta-ark kun gengivet i ét kapitel.

Afslutningsvist bringer kapitel 7 en perspektivering af, hvordan projektets resultater på kort og langt sigt kan bidrage til at forbedre arbejdsmiljøet.

Kapitel 1

Sammenfatning af projektets forskningsaktivitet og produktion

Videnskabelige artikler

Tidlige markører for senere arbejdsmarkeds marginalisering

1. Socioeconomic differences in school dropout among young adults: the role of social relations. Trine Nøhr Winding, Johan Hviid Andersen.
   BMC Public Health 2015

2. Somatic Complaints in Adolescence and Labour Market Participation in Young Adulthood.
   Trine Nøhr Winding, Johan Hviid Andersen
   Scandinavian Journal of Public Health 2018

3. Do negative childhood conditions increase the risk of somatic symptoms in adolescence? – a prospective cohort study.
   Trine N. Winding, Johan H. Andersen
   BMC Public Health 2019

Betydningen af psykologiske problemer for senere arbejdsmarkedstilknytning

4. Perceived stress among 20-21 year-olds and their future labour market participation - an eight-year follow-up study
   Nanna Trolle, Thomas Lund, Trine Nohr Winding, Merete Labriola
   BMC Public Health 2017

5. Coping strategies in adolescence and labour market participation in young adulthood - A prospective birth cohort study
   Lea Billeskov, Cecilie L. Stabell, Mathilde H. Dieckmann, Nanna H. Jensen, Trine N. Winding, Johan H. Andersen, Louise Lindholdt, Claus D. Hansen, Merete Labriola, Thomas Lund.
   Scandinavian Journal of Public Health 2019

Arbejdsulykker som ung og senere arbejdsmarkedstilknytning.

6. Long-term consequences of work accidents among adolescents and young adults. A longitudinal study.
   Claus D. Hansen, Merete Labriola, Johan Hviid Andersen, Thomas Lund.

Sårbarhed og senere marginalisering på arbejdsmarkedet

7. Gender differences in psychological vulnerability in adolescence as indicator of completion of a secondary education: a Danish 11-year prospective cohort study
   Cecilie Lykke Stabell, Thomas Lund, Johan Hviid Andersen, Pernille Pedersen, Mathilde Dieckmann, Lea Billeskov, Nanna Husted Jensen. Merete Labriola
   Re-submitted til BMC Psychology 2019

Metodeudvikling af begreberne stabil/ustabil arbejdsmarkedstilknytning

8. Labour market attachment among parents and self-rated health of their offspring - An intergenerational study on the Danish FOCA cohort.
   Louise Lindholdt, Thomas Lund, Johan H. Andersen, Merete Labriola
   Re-submittet oktober 2019 European Journal of Public Health.

Undervisning

Bacheloropgave 2016 Folkesundhedsvidenskab, Århus Universitet
Bacheloropgave baseret på Vestliv 1983 kohorten.

1. Mobning på arbejdspladsen og dets betydning for sygefravær over en periode på 24 måneder - Et kvantitativt follow-up studie af mobning på arbejdspladsens betydning for langtidssygefraværet, blandt unge voksne fra VestLiv, født i 1983. Mathias Tvilling Rasmussen.
2. Arbejdsløsheds betydning for unges sundhedsadfærd- Et kvantitativt tværsnitsstudie af sammenhængen mellem arbejdsløshed og sundhedsadfærd blandt 27- og 28-årige mænd og kvinder i det tidligere Ringkøbing Amt. Amanda Sandbæk
3. Kan fysisk aktivitet i fritiden føre til mindre langvarigt sygefravær? Et prospektivt kohortestudie blandt unge fra Vestjylland født i 1983. Ane Bødker
4. Toårigt follow-up studie af mobning på arbejdspladsen og risikoen for langtidssygefravær- Et kvantitativt toårigt follow-up studie af ungdomskohorten fra Projekt VestLiv født i 1983. Anne Bonde Thorsted
5. Longitudinelt studie af afbrudte uddannelsesforløb og tilknytning til arbejdsmarkedet hos unge født i det forhenværende Ringkøbing Amt. Cecilie Mølgaard
6. Balancen mellem arbejde og privatlivet og dets betydning for langtidssygefravær blandt unge født i 1993. En 24 måneders follow-up undersøgelse. Frank Kjeldsen
7. Har mængden af fysisk aktivitet blandt studerende betydning for deres fremtidige arbejdsmarkedstilknytning? Et prospektivt kohortestudie blandt studerende fra 1983-kohorten i Ringkøbing Amt. Janne Martinsen
8. Et follow-up studie om psykosocialt arbejdsmiljø og dets betydning for langtidssygefravær blandt 27-28-årige. Jeanette Birch Lauridsen.
9. Betydningen af Afbrudt Uddannelse som Prædiktor for senere Arbejdsmarkedstilknytning blandt Unge Voksne: Et Toårigt Longitudinelt Kohorte Studie. Katrine Jeppesen.

10. Betydningen af fysisk aktivitet i fritiden for langtidssygefraværet blandt personer i arbejde. Line Bang Jensen
11. Et kvantitativt tværsnitsstudie af sammenhængen mellem arbejdsmarkedstilknytning og selvværd for personer der oplever læse- og skrivevanskeligheder blandt mænd og kvinder fra 1983 i det daværende Ringkøbing Amt. Line Lynge Johannesen
12. Social kapital på arbejdspladsen og dens betydning for sygefravær – Et kvantitativt follow-up studie på 24 måneder blandt 27-28 årige danskere. Mie Dall Azan
13. Sammenhæng mellem fysisk aktivitet og langvarigt sygefravær hos 30-årige dansker. Et prospektivt kohortestudie med follow-up. Natascha Hagenstjerne.
14. Sundhedsadfærds betydning for, om unge tager en videregående uddannelse. Et tværsnitsstudie af 27-28årige danske unge. Nesrin Aoud.
15. Et follow-up studie om self-efficacy og dets betydning for sygedagpengeepisoder for en kohorte på 27-28 år. Sanne Mørh Haugaard.
16. Er sygenærvær en risikofaktor for senere langtidssygefravær? Et toårigt follow-up studie af en kohorte af 27-28 årige. Sofie Emilie Pedersen

Kandidatafhandlinger i Folkesundhedsvidenskab, Aarhus universitet fra 2016 og 2017

1. Gender differences in psychological vulnerability in adolescence as indicator of completion of a secondary education: an 11-year prospective cohort study. Cecilie Lykke Stabell
2. Reading and writing difficulties among young adults and their labour market participation – a prospective four-year follow-up study. Ida Ejdrup Larsen
3. Coping strategies in adolescence and labour market participation in young adulthood: A prospective birth cohort study. Lea Billeskov
4. Changes in self-rated health from adolescence to early adulthood and associations between social relations and self-rated health – A Danish 6-year prospective cohort study. Nanna Husted Jensen
5. Secondary education attainment among adolescents in a Danish youth cohort: The role of psychosocial factors- An 11-year follow-up study. Mathilde Hyldahl Dieckmann,

Konferencebidrag: 7 konferencer 12 bidrag (alle internationale)

2014 EPICOH i Chicago 24.-27., 2 præsentationer også publicerede som konferenceabstracts i OEM juni 2014:

- Mental health in childhood as risk indicator of labour market participation in young adulthood. A prospective birth cohort study. Lund T, Hviid Andersen J, Labriola M. Occup Environ Med. 2014 Jun;71 Suppl 1:A17-8.
- Mediating effects of health on the association between negative life events in childhood on future labour market participation. A 7-year follow-up study. Labriola M, Hviid Andersen J, Lund T. Occup Environ Med. 2014 Jun;71 Suppl 1:A17.

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2014 The Third International Conference of the Work Disability Prevention and Integration (WDPI) Scientific Committee of the International Commission on Occupational Health (ICOH), Toronto

- Mental health in childhood as risk indicator of labour market participation in young adulthood. A prospective birth cohort study. Lund T, Hviid Andersen J, Labriola M.
- Mediating effects of health on the association between negative life events in childhood on future labour market participation. A 7-year follow-up study. Labriola M, Hviid Andersen J, Lund T.

2015 EUPHA "8th European Public Health Conference: Health in Europe – from global to local policies, methods and practices" Milano 14. til 17. oktober 2015:

- Mental health in childhood as risk indicator of labour market participation in young adulthood. Lund T, Lindholdt L, Hansen CD, Hviid Andersen J, Labriola M.
- Mediating effects of health on the association between negative life events in childhood on future labour market participation. Labriola M, Hviid Andersen J, Lund T.

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- Somatisation in adolescence and labour market participation in young adulthood. T.N. Winding, J.H. Andersen. Occupational and Environmental Medicine Sep 2016, 73 (Suppl 1) A183.

2017 10th European Public Health Conference EUPHA. Sustaining resilient and healthy communities. Stockholm, Sweden.

- Perceived stress among adolescents is socially determined. J.H. Andersen, M. Labriola, L. Lindholdt, T.N. Winding, T. Lund

6th International Congress of the ICOH - Work Organization and Psychosocial Factors, Mexico City, Mexico, 28. Aug til 2. Sept. 2017

- Perceived stress among adolescents is socially determined. J.H. Andersen, M. Labriola, L. Lindholdt, T.N. Winding, T. Lund.
- Somatic complaints in adolescence and labour market participation in young adulthood. T.N. Winding, J.H. Andersen.

2019 The fifth Work Disability Prevention & Integration (WDPI) conference. June 5-7, Odense

- Does labour market participation among parents affect the mental health of their children? A study of 11,267 adolescents and their parents. Lindholdt L, Labriola M, JH Andersen JH, Lund T.

Kapitel 2

Tidlige markører for senere arbejdsmarkeds marginalisering

Det er afgørende for at forebygge fremtidig ulighed i helbreds- og socioøkonomisk status, at unge er i stand til at gennemføre en ungdomsuddannelse. Ligeledes, er det vigtigt at så mange unge som muligt får en god start på arbejdslivet. Tidlige risikofaktorer som socioøkonomisk forskelle, somatiske symptomer og negative omstændigheder i ungdommen er undersøgt og publiceret i de følgende tre videnskabelige artikler:

1. Socioeconomic differences in school dropout among young adults: the role of social relations. Trine Nøhr Winding, Johan Hviid Andersen.
   BMC Public Health 2015
2. Somatic Complaints in Adolescence and Labour Market Participation in Young Adulthood.
   Trine Nøhr Winding, Johan Hviid Andersen
   Scandinavian Journal of Public Health 2018
3. Do negative childhood conditions increase the risk of somatic symptoms in adolescence? – a prospective cohort study.
   Trine N. Winding, Johan H. Andersen
   BMC Public Health 2019

Alle tre studier er baseret på oplysninger fra Vestliv kohorten, bestående af 3053 unge født i 1989 i det tidligere Ringkjøbing, indsamlet første gang i 2004 og der er anvendt spørgeskemadata og registerdata fra Danmarks Statistik.

VestLiv

FAKTAARK 9, 2016

NÅR UNGE DROPPER UD

- betydningen af socioøkonomisk baggrund og sociale relationer for unges skolefrafald

Socioeconomic differences in school dropout among young adults: the role of social relations. Af Trine Nøhr Winding og Johan Hviid Andersen (Dansk Ramazzini Center, Arbejdsmedicin, Herning, Hospitalsenheden Vest). Artiklen er publiceret i *BMC Public Health* (2015) 15:1054.

Når unge falder fra deres ungdomsuddannelse, får det stor betydning for deres fremtidige tilknytning til arbejdsmarkedet, ligesom det har betydning for deres fremtidige helbred og trivsel.

Det er en kendt sag, at forældrenes indkomst og uddannelsesniveau har betydning for unges risiko for at droppe ud af skolen.

Indtil nu har det dog ikke været tilstrækkeligt belyst i hvilket omfang denne socialt betingede forskel i uddannelsesgennemførsel kan forklares af mangelfulde sociale relationer i familien og i skolen. Det råder denne undersøgelse nu bod på.

Konklusioner og perspektiver

Resultaterne fra den foreliggende undersøgelse viser en stærk sammenhæng mellem børnenes opvækstvilkår og deres eventulle frafald fra en ungdomsuddannelse.
De unge fra de laveste sociale kår oplevede større frafald, end de unge, der var opvokset under bedre sociale kår.

"De unge fra de laveste sociale kår oplevede større frafald, end de unge der var opvokset under bedre sociale kår."

Mangelfulde sociale relationer til familie og venner ved 15- og 18-årsalderen udgjorde en øget risiko for ikke at gennemføre en ungdomsuddannelse.

Dårlige sociale relationer til lærere og klassekammerater ved 18-årsalderen var en væsentlig årsag til, at de socialt dårligt stillede unge i højere grad droppede ud af deres ungdomsuddannelse end de bedre stillede unge.

Resultaterne tyder på, at man ved at stimulere gode relationer til klassekammerater og lærere øger unges mulighed for at gennemfører en ungdomsuddannelse. Ydermere ser det ud til, at specielt unge fra socialt belastede familier kan have gavn af positive sociale relationer, idet det kan være med til at reducere deres særligt høje risiko for at droppe ud af en ungdomsuddannelse. At stimulere gode sociale relationer i skolen vil i et livsforløbsperspektiv derfor potentielt være med til at reducere social ulighed.

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UDVALGTE RESULTATER

Metode

Undersøgelsen er baseret på spørgeskema- og registerinformationer fra unge vestjyder om sociale relationer til familie, lærere og klassekammerater fra 2004 og 2007, hvor de unge var hhv. 15 og 18 år gamle.

Desuden blev der indsamlet informationer om gennemførsel af ungdomsuddannelse, samt forældrenes uddannelse og indkomst under opvæksten fra nationale registre.

Informationerne om gennemførsel af ungdomsuddannelse blev delt i to kategorier: Dem der havde: 1. gennemført en ungdomsuddannelse eller var i gang med én ved 21-årsalderen, eller 2. var droppet ud eller aldrig havde påbegyndt en ungdomsuddannelse ved 21-årsalderen. 3054 unge født i 1989 deltog i undersøgelsen.

Resultaterne viste at:

- en stor del af de unge oplevede problemer med sociale relationer ved 15 og 18-årsalderen.
- mangelfulde sociale relationer gav øget risiko for ikke at gennemføre en ungdomsuddannelse, specielt blandt pigerne.
- 18-årige piger, der oplevede, at familiekonflikter var svære at håndtere, havde mere end 2,5 gange så stor risiko for ikke at gennemføre en ungdomsuddannelse sammenlignet med piger, der ikke oplevede sådanne problemer.
- unge fra de sværest socialt stillede familier havde 3 gange så høj risiko for ikke at gennemføre en ungdomsuddannelse i forhold til unge fra bedre stillede familier.
- Dårlige relationer til lærere og klassekammerater ved 18-årsalderen forklarede en stor del af sammenhængen mellem sociale opvækstvilkår og frafald fra ungdomsuddannelse for begge køn.

af:
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FAKTAARK 11, 2018

SÅRBARE DRENGE RISIKERER USTABILT ARBEJDSLIV

Somatic Complaints in Adolescence and Labour Market Participation in Young Adulthood.
Af Trine Nøhr Winding og Johan Hviid Andersen (Dansk Ramazzini Center, Arbejdsmedicin, Regionshospitalet Herning).
Artiklen er udgivet i *Scandinavian Journal of Public Health* (Maj 2018)

Teenage-drenge med uforklarlige fysiske symptomer (f.eks. hovedpine og mavesmerter), risikerer lavere tilknytning til arbejdsmarkedet, når de bliver voksne.

Det er ikke en nyhed at unge, og især unge piger, klager over hovedpine, ondt i maven og kvalme uden nogen konkret fysisk årsag.

Imidlertid viser VestLiv-forskning, at teenage-drenge, der klager over fysiske symptomer, bliver hårdere ramt end pigerne på længere sigt. I hvert fald, når det gælder deres arbejdsliv som voksne.

Sårbare drenge i risiko-zone

Teenage-drenge, der som 18-årige klager over mange uforklarlige fysiske symptomer, klarer sig dårligere på arbejdsmarkedet som 23-årige end teenage-piger med de samme symptomer.

Der er med andre ord en betydeligt forøget risiko for, at de unge mænd er på overførselsindkomst som 23-årige, hvis de har haft uforklarlige fysiske symptomer som 18-årige.

Hvad gør vi?

Ifølge forsker Trine Nøhr Winding er det væsentligt, at fagprofessionelle i uddannelses- og sundhedssystemet holder øje med de unge drenge, der ikke trives:

"Lærere, pædagoger, socialrådgivere, læger og studievejledere er nøglepersoner, som har stor betydning for de unges overgang fra skoleliv til arbejdsliv."

"Det er vigtigt, at vi får øje på og hjælper de unge, der har det dårligt. Måske er det sværere at opdage de sårbare drenge, fordi de ikke råber op. Men det er dem, der bliver hårdest ramt på arbejdslivet, hvis de ikke får hjælp."

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UDVALGTE RESULTATER

Metode

Undersøgelsen er baseret på spørgeskemasvar fra unge vestjyder om uforklarlige fysiske symptomer (f.eks. hovedpine, mavesmerter, kvalme, svimmelhed og føleforstyrrelser.)

De unge besvarede spørgeskemaerne, da de var 15 og 18 år gamle. Desuden indsamlede forskerne registerinformationer om de unges tilknytning til arbejdsmarkedet det år, de blev 23.

Hvis de unge havde været på overførselsindkomst i mere end 4 uger/år, blev det kategoriseret som lav tilknytning til arbejdsmarkedet. SU og barselsdagpenge blev ikke regnet med som overførselsindkomst.

I analyserne justerede forskerne for de unges socio-økonomiske baggrund og trivsel. Det vil sige, at der blev taget højde for forældrenes uddannelse og indkomst under opvæksten, samt de unges forhold til familie og venner, depressive symptomer og negative livsbegivenheder.

Informationerne om de unges socio-økonomiske baggrund og trivsel blev hentet fra nationale registre og spørgeskemaer.

3223 unge (årgang 1989) deltog i undersøgelsen.

Resultater

Både ved 15 og 18 år rapporterer dobbelt så mange piger (ca 40 %) som drenge (ca. 20 %) om mange fysisk uforklarlige symptomer.

Hvis man kigger på, hvordan det går de unge senere i livet, har drengene med uforklarlige fysiske symptomer dog markant højere risiko for en ustabil tilknytning til arbejdsmarkedet sammenlignet med pigerne.

Det vil sige, at forskerne så en markant øget tendens til at drengene var på mere end 4 ugers overførselsindkomst/år, hvis de som 18-årige havde haft en høj forekomst af uforklarlige fysiske symptomer.

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FAKTAARK 2, 2012

RISIKOFAKTORER FOR FRAFALD AF UDDANNELSE

Det er afgørende for at forebygge fremtidig ulighed i helbreds- og socioøkonomisk status, at unge er i stand til at gennemføre en ungdomsuddannelse.

Men hvilke risikofaktorer blandt danske unge findes der, som er med til at vise hvorfor nogle unge ikke får en ungdomsuddannelse.

Dette er baggrunden for, at data fra Vestliv spørgeskemaundersøgelse er blevet brugt til at belyse risikofaktorer blandt danske unge for ikke at have gennemført en ungdomsuddannelse som 20/21 årig.

Undersøgelsen består af oplysninger fra 2004 og frem om 3053 unge født i 1989 i det tidligere Ringkjøbing amt og der er anvendt spørgeskemadata og registerdata fra Danmarks Statistik.

Studiet er netop blevet publiceret som et prospektivt studie, hvor informationer om personlige og familiemæssige risikofaktorer er indsamlet før informationer om uddannelsesgennemførsel.

I undersøgelsen anvendes spørgeskema informationer om selvværd, oplevelse af meningsfuldhed, BMI, depressive symptomer og generelt helbred mens der anvendes registerinformationer om matematik og dansk karakterer efter 9 klasse, forældres indkomst og uddannelse, om de unge er vokset op med 1 eller 2 forældre samt om de unger har gennemført en ungdomsuddannelse eller ej.

Konklusion

Denne undersøgelse viser af udover forældrenes socioøkonomiske status har en række risikofaktorer der er knyttet til den unge selv, såsom evner i skolen, lav selvvurderet helbred og manglende oplevelse af meningsfuldhed i sit liv betydning for den unges fremtidige chance for at gennemføre en ungdomsuddannelse ikke mindst i forhold til de unge der er i risiko for at droppe ud af en erhvervsfaglig uddannelse.

Anbefaling

Det anbefales, at fokus på og indsats for disse høj-risikogrupper øges, når ungdomsuddannelserne evalueres og udvikles, således at risikoen for frafald mindskes.

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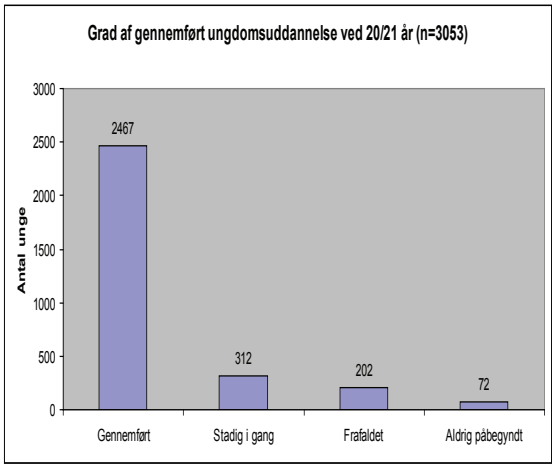
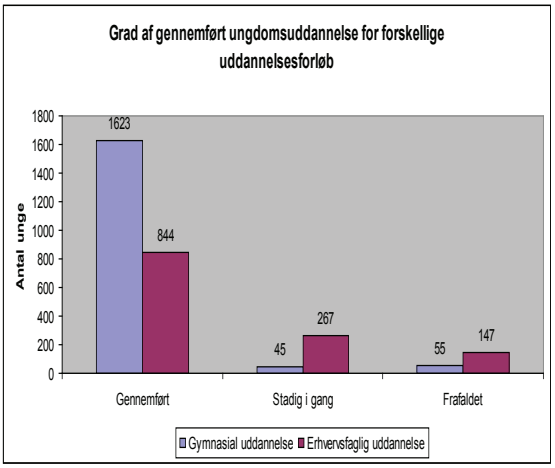
UDVALGTE RESULTATER

Sandsynlighed for at gennemføre en ungdomsuddannelse

Da de unge var 20/21 år havde 2467 (80.8%) gennemført en ungdomsuddannelse, 312 (10.2%) var stadig i gang med en ungdomsuddannelse, 202 (6.6%) var droppet ud af en ungdomsuddannelse og ikke påbegyndt en ny og 72 (2.3%) havde aldrig påbegyndt en ungdomsuddannelse.





Risikofaktorer for at falde fra en ungdomsuddannelse og ikke være påbegyndt en ny ved 20/21 års alderen

	Frafald fra ungdomsuddannelse								
	Samlet			Gymnasial uddannelse			Erhvervsfaglig uddannelse		
	Odds ratio (95%-CI)			Odds ratio (95%-CI)			Odds ratio (95%-CI)		
Karaktere, mundtlig dansk									
8 og derover	1,0			1,0			1,0		
7 og derunder	2,1	(1,5	; 3,1)	2,3	(1,1	; 4,6)	1,6	0,98	; 2,5)
Karakterer, skriftelig matematik									
8 og derover	1,0			1,0			1,0		
7 og derunder	2,5	(1,7	; 3,6)	2,4	(1,2	; 4,7)	1,9	(1,1	; 3,0)
Sense of coherence									
normal/høj	1,0			1,0			1,0		
lav	1,8	(1,2	; 2,6)	1,1	(0,5	; 2,5)	2,0	(1,2	; 3,3)
Selvvurderet helbred									
høj	1,0			1,0			1,0		
lav	2,2	(1,1	; 4,2)	2,1	(0,6	; 7,8)	1,9	(0,8	; 4,3)
Alle analyserne var justeret for køn, alder ved afsluttet 9 klasse, forældrenes socioøkonomiske status og øvrige personlige prædiktorer.									

Risikofaktorer for aldrig at påbegynde en ungdomsuddannelse ved 20/21 års alderen.

Aldrig påbegyndt en ungdomsuddannelse				
	Odds ratio (95%-CI)			
Karakterer, mundtlig dansk				
8 og derover	1,0			
7 og derunder	2,0	(0,9	;	4,2)
Karakterer, skriftlig matematik				
8 og derover	1,0			
7 og derunder	2,5	(1,1	;	5,5)
Sense of coherence				
normal/høj	1,0			
lav	1,8	(0,7	;	4,5)
Selvvurderet helbred				
høj	1,0			
lav	2,7	(0,8	;	9,3)
Body mass index (BMI)				
normal vægt	1,0			
overvægt	3,5	(1,4	;	8,6)
Alle analyserne var justeret for køn, alder ved afsluttet 9 klasse, forældrenes socioøkonomiske status og øvrige personlige prædiktorer.				

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Kapitel 3

Betydningen af mentale problemer blandt unge for senere sygefravær og marginalisering.

At forskellige stressorer og begivenheder har indflydelse på helbred og trivsel er velkendt, ligesom at disse er socialt ulige fordelt. Det er dog i høj grad individuelt hvordan man forholder sig til og tackler livets udfordringer, og det er ikke tidligere undersøgt, om de metoder og mønstre hvormed du tidligt i livet tackler udfordringer og problemer, har indflydelse på din fremtid i forhold til uddannelse og arbejde.

Til at belyse denne problemstilling er der udført to studier på henholdsvis Vestliv spørgeskemaundersøgelsen fra 2004 blandt 3053 unge født i 1989, samt på en kohorte på 1640 unge født i 1983 svarede på et spørgeskema i 2004, hvor bl.a. oplevet stress blev målt. Kohorten er efterfølgende fulgt via register over sociale ydelser i 12 måneder i 2011-2012. Arbejdsmarkedsdeltagelse i denne periode blev kategoriseret som enten aktiv og passiv eller aktiv.

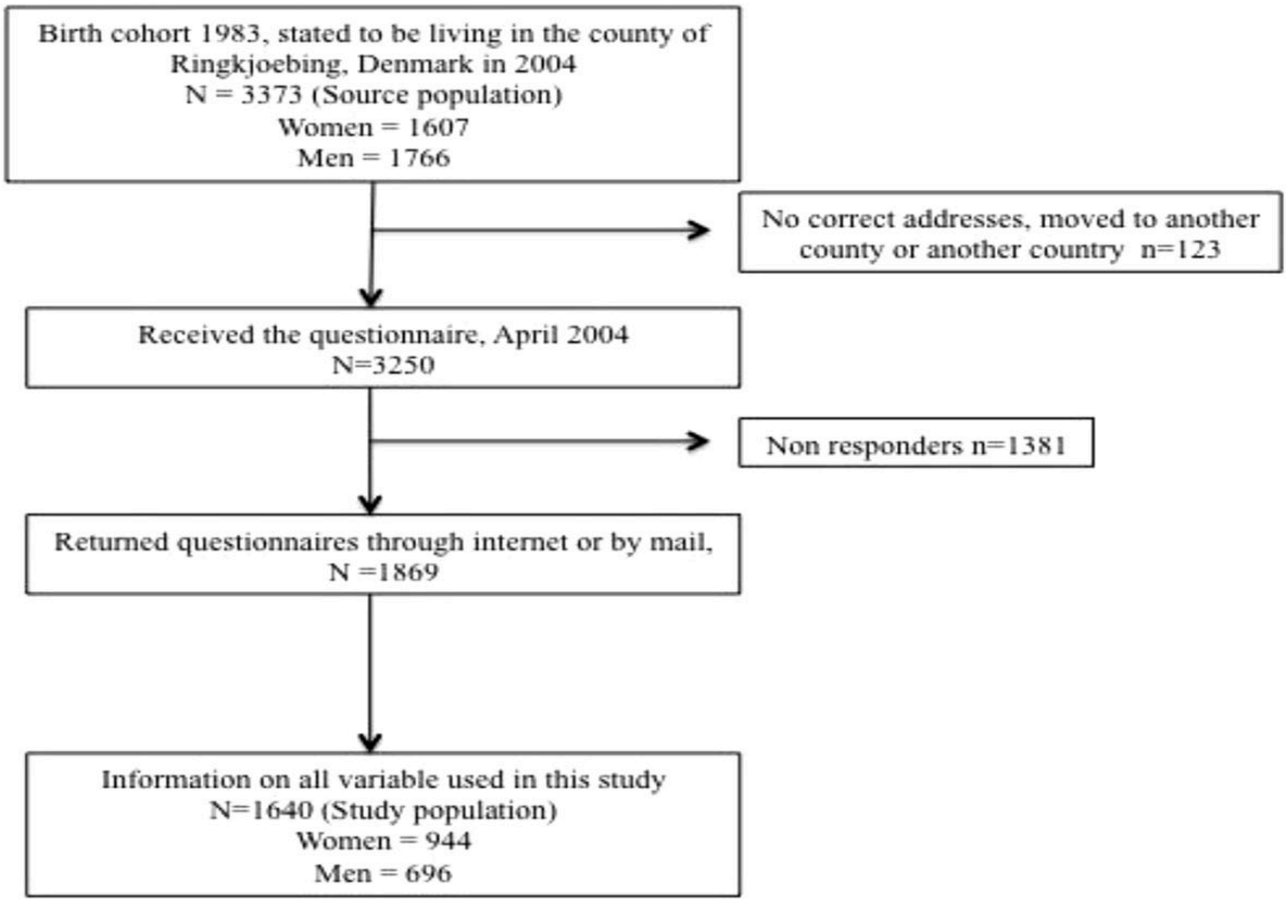
4. Perceived stress among 20-21 year-olds and their future labour market participation - an eight-year follow-up study.
   Nanna Trolle, Thomas Lund, Trine Nohr Winding, Merete Labriola.
   BMC Public Health 2017
5. Coping strategies in adolescence and labour market participation in young adulthood: A prospective birth cohort study
   Lea Billeskov, Cecilie L. Stabell, Mathilde H. Dieckmann, Nanna H. Jensen, Trine N. Winding, Johan H. Andersen, Louise Lindholdt, Claus D. Hansen, Merete Labriola, Thomas Lund.
   Accepteret Scandinavian Journal of Public Health 2019

Oplevet stress blandt 20-21-årige og deres fremtidige arbejdsmarkedsdeltagelse
- en otte års opfølgningsundersøgelse

Af: Nanna Trolle, Thomas Lund, Trine Nohr Winding, Merete Labriola

Baggrund: Arbejdsmarkedsdeltagelsen blandt unge voksne er afgørende for deres fremtidige i forhold til indtægt og helbred. Formålet med dette studie var at undersøge sammenhængen mellem oplevet stress blandt 20-21 årige og deres arbejdsmarkedsdeltagelse 8 år senere samt undersøge eventuelle potentielle kønsforskelle.

Metoder: En kohorte på 1640 unge født i 1983 svarede på et spørgeskema i 2004, hvor bla. oplevet stress blev målt. Kohorten efterfølgende fulgt via register over sociale ydelser i 12 måneder i 2011-2012. Arbejdsmarkedsdeltagelse i denne periode blev kategoriseret som enten aktiv og passiv eller aktiv.
Logistisk regression blev brugt til at analysere sammenhængen mellem oplevet stress og fremtidig arbejdsmarkedsdeltagelse, stratificeret på køn.



Resultater: Effekten af oplevet stress på sener arbejdsmarkedsdeltagelse var forskellig for mænd og kvinder. For unge mænd reducerede højere niveauer af oplevet stress risikoen for fremtiden passiv arbejdsmarkedsdeltagelse, når der blev justerer for socioøkonomiske faktorer, selvvurderet helbred og coping (p = 0,045).
For unge kvinder øgede højere niveauer af oplevet stress risikoen for fremtidig passiv arbejdsmarkedsdeltagelse, når man justerer for de samme potentielle confoundere, denne sammenhæng var ikke signifikant (p = 0.335).

Konklusion: Højere niveau af oplevet stress øger ikke risikoen for fremtiden passiv arbejdsmarkedsdeltagelse blandt unge mænd, faktisk har den det omvendte effekt. Modsat, højere niveauer af oplevet stress har tendens til at øge risikoen for fremtidig passiv arbejdsmarkedsdeltagelse blandt unge kvinder. Den observerede kønsforskel kan med fordel tages med i overvejelserne i sundhedskommunikation, forskning og udvikling af forebyggende strategier i forhold til betydningen af oplevet stress.

Copingstrategier hos 14-15 årige, og arbejdsmarkedsdeltagelse 10 år senere.

Af: Lea Billeskov, Merete Labriola, Cecilie L. Stabell, Mathilde H. Dieckmann, Nanna H. Jensen, Trine N. Winding, Johan H. Andersen, Louise Lindholdt, Claus D. Hansen, Thomas Lund

At forskellige stressorer og begivenheder har indflydelse på helbred og trivsel er velkendt, ligesom at disse er socialt ulige fordelt. Det er dog i høj grad individuelt hvordan man forholder sig til og tackler livets udfordringer, og det er ikke tidligere undersøgt, om de metoder og mønstre hvormed du tidligt i livet tackler udfordringer og problemer, har indflydelse på din fremtid i forhold til uddannelse og arbejde.
For at komme nærmere på dette, igangsatte vi et studie hvor vi ser på, hvordan forskellige coping-strategier i 14-15 års alderen påvirker mål for arbejdsmarkedstilknytning 10 år senere, når deltagerne er midt i 20'erne og må forventes at være under uddannelse eller i arbejde.

Metode: Undersøgelsen er baseret på Vestliv spørgeskemaundersøgelsen fra 2004 blandt 3053 unge født i 1989, som er koblet med registerdata om uddannelse og arbejdsmarkedstilknytning på Danmarks Statistik.
Der er tale om et prospektivt studie, hvor data om coping er indsamlet før data om arbejdsmarkedstilknytning. Fra spørgeskemaet bruges information om coping-strategi og selvvurderet helbred, og fra registre bruges oplysninger forældrenes socio-økonomiske position og om den unges position på arbejdsmarkedet i 2014. Coping-strategi er opgjort i to overordnede kategorier: Den ene kaldes "Aktiv coping", hvor man handler for at forbedre situationen, fokuserer på at gøre noget ved den situation der giver problemer, lægger en strategi for næste skridt for at løse problemet, prøver at se lyst på det der sker, og forsøger at se problemet fra en positiv vinkel. Den anden kaldes "Avoidant coping", eller undvigende, coping, hvor man beskæftiger sig med noget andet, og prøver at lade være med at tænke på problemet og opgiver, og holder op med at forsøge at tackle problemet.

Resultater og konklusion:
Undersøgelsen fandt ingen statistisk signifikante forskelle på brugen af de to forskellige coping-strategier blandt drenge og piger. Om man i større eller mindre grad havde en aktiv coping strategi, havde ingen betydning for ens fremtidige arbejdsmarkedstilknytning. Til gengæld var der en signifikant øget risiko for, at man havde en relativt stærkere arbejdsmarkedstilknytning 10 år senere, jo mindre man i 14-15 års alderen anvendte en undvigende coping-strategi, altså beskæftiger sig med noget andet, prøver at lade være med at tænke på det, giver op, og holder op med at prøve at løse problemet. Personer som scorede lavt på dette, havde en 37 % større chance for, at befinde sig i gruppen med høj arbejdsmarkedstilknytning 10 år senere.

Kapitel 4

Arbejdsulykker i relation til senere arbejdsmarkedstilknytning

Langsigtede konsekvenser af arbejdsulykker blandt unge og unge voksne.
- Et longitudinelt studie

Af Claus D. Hansen, Merete Labriola, Johan Hviid Andersen, Thomas Lund

Manuskript under udarbejdelse og eftersendes.

Baggrund:
Arbejdsrelaterede ulykker forbliver et vigtigt folkesundhedsproblem trods en faldende tendens i mange europæiske lande i de seneste år. Kun få undersøgelser har undersøgt de mulige langsigtede konsekvenser af at opleve en arbejdsulykke blandt unge og unge voksne. Formålet med dette studie er at undersøge effekten af arbejdsulykker på selvvurderet helbred og arbejdsmarkedsdeltagelse i en 7-årig opfølgningsperiode.

Metoder: Studiepopulationen består af unge voksne født i 1983 (n = 1.859), i Ringkøbing Amt, Danmark. Data blev indsamlet over to spørgerunder ved alder 20 og 28 år. Spørgeskemadata indeholder mål på selvvurderet helbred og muskuloskeletale smerter. Oplysninger om arbejdsmarkedsdeltagelse blev hentet fra DREAM registeret og informationer om arbejdsulykker der fandt sted mellem de to spørgeskemaundersøgelser blev hentet fra det nationale arbejdsulykkesregister, og blev anvendt som prædiktor for selvrapporteret sundhed og arbejdsmarkedsdeltagelse.

Resultater: 10% af kohorten oplevede en arbejdsulykke i tiden mellem de to spørgeskemaundersøgelser. Foreløbige resultater viser, at de, der oplevede en arbejdsulykke, havde en øget risiko for at rapportere laver selvvurderet helbred (OR: 1.66). Det samme mønster blev fundet ved analyse af muskuloskeletale smerter: her var den øgede risiko på 52%. Foreløbige resultater viser en reduceret sandsynlighed (OR: 0,45) for at være ansat i en alder af 28 for dem, der oplever en arbejdsulykke.

Konklusioner: Denne undersøgelse tilføjer nyt til den meget lille litteratur der omhandler de langsigtede konsekvenser af arbejdsulykker for unge og unge voksne. Resultaterne viser, at arbejdsulykker har konsekvenser for de unge voksne sundhedsstatus samt deres deltagelse på arbejdsmarkedet. Dette understreger behovet for at fokusere på forebyggelse af arbejdsulykker blandt unge arbejdstagere.

Hovedbudskaber: Arbejdsulykker har langsigtede konsekvenser selv blandt unge arbejdstagere og bør være fokus for forebyggende handlinger

Kapitel 5.

Sårbarhed og senere marginalisering på arbejdsmarkedet

Kønsforskel i psykologiske ressourcer og færdiggørelse af uddannelse

Af: Cecilie Lykke Stabell, Thomas Lund,' Louise Lindholdt, Mathilde Dieckmann, Lea Billeskov, Nanna Husted Jensen, Johan Hviid Andersen, Pernille Pedersen, Merete Labriola

Manuskriptet udarbejdet og eftersendes.

Baggrund: Gennemførelse af videregående uddannelse er afgørende for at forhindre fremtidig social ulighed i sundheden. De, der ikke gennemfører videregående uddannelse, har større risiko for at udvikle sundhedsproblemer senere i livet og har fattige arbejdsmarkedsvedhæftninger. For at undgå nogle af de negative konsekvenser fra lave uddannelsesniveauer er det vigtigt at undersøge determinanterne herfor.
Formålet med denne undersøgelse var at undersøge kønsforskelle i sammenhængen mellem psykologisk sårbarhed i ungdomsårene og færdiggørelse af en ungdomsuddannelse.

Metoder: Data om psykologisk sårbarhed blev indsamlet i 2004 fra et spørgeskema, mens udførelsen af uddannelsen blev indsamlet i 2015 fra et nationalt register. Psykologisk sårbarhed blev målt som følelse af meningsfuldhed, selvværd og personlig mesterskab. Studiepopulationen bestod af 2.733 personer født i 1989. Logistisk regression blev brugt til at undersøge sammenhænge mellem psykologisk sårbarhed og færdiggørelse af videregående uddannelse.

Resultater: Resultaterne for begge køn viste, at psykologisk sårbarhed i ungdomsårene øgede risikoen for ikke at fuldføre en videregående uddannelse. Kvinder med lav meningsfuldhed (OR 2,0, CI: 1,3-3,1) og lav mesterskab (OR 2,9, CI: 1,8-4,6) og mænd med lavt selvværd (OR 1.5, CI: 1.0-2.21). Der var ingen kønsforskelle for nogen af de psykologiske sårbarhedsforanstaltninger, men kvinder med ringe følelse af meningsfuldhed eller beherskelse havde en to gange øget risiko for ikke at fuldføre en sekundær uddannelse sammenlignet med mænd.

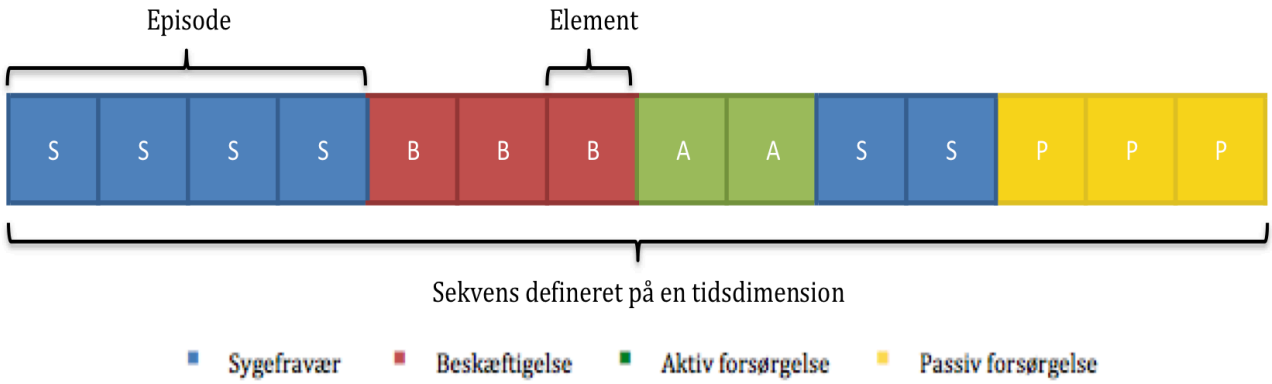
Konklusion: De tre foranstaltninger med psykologisk sårbarhed havde forskellige virkninger for mænd og kvinder. Den stærkeste faktor for ikke at fuldføre ungdomsuddannelse blandt kvinder var lav meningsfuld og beherskelse, mens det blandt andet var lavt selvværd. Der kan således være en forskel i virkningen af psykologisk sårbarhed for mænd og kvinder.

Kapitel 6

Metodeudvikling af begreberne stabil/ustabil arbejdsmarkedstilknytning

Som en del af projektet er der foretaget metodeudvikling. Udgangspunktet var behov for udvikling af nye metoder til anvendelse af eksisterende registerdata om arbejdsmarkedstilknytning. Formålet var, at udvikle mål der estimerer projektdeltagernes bevægelser på arbejdsmarkedet over tid, frem for de ofte anvendte punktestimater for arbejdsmarkedsstatus. Ulempen ved sidstnævnte er, at disse ikke giver information om hvor svarpersonen er umiddelbart før og efter det målte punktestimat, og derved øger risikoen for usystematisk misklassifikation.
Projektet har fokuseret på anvendelse af sekvensanalyse på data fra DREAM-registeret. En sekvens består således af en række elementer bestående af grupperinger af koder fra DREAM, som illustreret i figur 1, hvor der er konstrueret 4 grupperinger (sygefravær, beskæftigelse, aktiv og passiv forsørgelse).

Figur 1. Eksempel på sekvens baseret på DREAM-koder



Sekvenserne udgør et stærkt deskriptivt værktøj, der tydeligt illustrerer forløb over tid, og eventuelle forskelle i disse mellem forskellige grupper. Sekvenserne kan imidlertid også bearbejdes, således at de kan indgå i regressionsanalyser. I forbindelse med PUSAM er der udviklet og arbejdet med to primære indikatorer for bevægelser på og tilknytning til arbejdsmarkedet:

1. **"Volatility"**. Denne indikator måler volatiliteten / omskifteligheden i tilknytningen. Den er udregnet som andelen af episoder inden for beskæftigelse og aktiv forsørgelse i forhold til det samlede antal episoder, og går således fra 0-1. Hyppige skift mellem beskæftigelse og aktiv forsørgelse er et udtryk for høj kvalitet i forhold til omskiftelighed, og idéen bag den er, at ikke kun beskæftigelse angiver positive stadier, men også aktiv forsørgelse.

2. **"Integration"**. Denne indikator måler hvor hurtigt, og i hvilket omfang, svarpersonerne kommer i fx beskæftigelse. Den udregnes som summen af episoder hvor status er beskæftigelse i forhold til summen af den totale tidsdimension (den fulde sekvenslængde), hvilken vægtes efter positionen i den totale sekvens. Også denne indikator går fra 0-1, hvor jo længere og flere episoder med beskæftigelse des bedre.

Der er udviklet en omfattende syntax i STATA, er anvendt i artiklerne af Lindholdt et al. 2019 (se faktaark herunder). De har derudover fundet anvendelse i en række projekter udenfor PUSAM, og finder i stigende grad anvendelse hvor DREAM data er udgangspunkt for måling af arbejdsmarkedstilknytning. Projektgruppen bag PUSAM organiserede i december 2014 en Masterclass i anvendt sekvensanalyse på Aarhus Universitet, som var medvirkende til denne udbredelse til andre projekter. Konklusionen er, at med de højkvalitets registerdata man i Danmark kan have til rådighed i forskningssammenhæng, er sekvensanalyse et stærkt analytisk værktøj, som giver et bedre billede af svarpersonernes forløb på arbejdsmarkedet over tid, end de mål og teknikker der oftest anvendes på de registerdata, som er brugt i PUSAM. Her et eksempel på et studie hvor sekvensanalyse på data fra DREAM-registeret er anvendt.

Labour market attachment among parents and self-rated health of their offspring – An intergenerational study

Af Louise Lindholdt , Thomas Lund, Johan Hviid Andersen, Merete Labriola

Manuskriptet er re-submittet til 'European Journal of Public Health' (oktober 2019) og eftersendes.

Formål: Formålet med studiet er at undersøge hvorvidt forældres arbejdsmarkedstilknytning er associeret med deres unge børns selvvurderet helbred i 15-års alderen.

Metode: Studiet er baseret på spørgeskemasvar om generelt selvvurderet helbred fra 11.267 unge koblet med registeroplysninger om arbejdsmarkedstilknytning blandt deres forældre. Forældrene blev fulgt i en femårig periode forinden de unge udfyldte spørgeskemaet, hvor oplysninger om arbejdsmarkedsstatus blev analyseret på ugentlig basis ved hjælp af data indhentet fra DREAM-registret. Et samlet mål for forældrenes arbejdsmarkedsintegration blev konstrueret til analysebrug.

Studiet gør brug af kvantitative metoder; en logistisk regressionsanalyse, som tager højde for de unges køn, forældrenes uddannelsesniveau samt hvorvidt de unge er registreret med en eller to forældre. Disse informationer er indhentet via registre fra Danmarks Statistik. Desuden anvendes sekvensanalyse til en mere nuanceret analyse af betydningen af forældres arbejdsmarkedsstatus på deres unge børns selvvurderet helbred.

Resultater:

- 29.1% af de unge reporterede et moderat selvvurderet helbred, mens 70.9% rapporterede et højt selvvurderet helbred.

- En lav grad af arbejdsmarkedsintegration blandt forældre var associeret med moderat selvvurderet helbred blandt deres unge børn.

- Unge med moderat selvvurderet helbred havde i større grad forældre med en lavere arbejdsmarkedstilknytning, mere tid på offentlig forsørgelse og en mere ustabil arbejdsmarkedstilknytning sammenlignet med de unge, som havde et højt selvvurderet helbred.

- Studiet understreger vigtigheden af, hvordan marginalisering fra arbejdsmarkedet kan have negative helbredseffekter på tværs af generationer.

Konklusion: Studiet viser, at det at have en lav arbejdsmarkedsintegration kan have negative konsekvenser ud over individet. En lav arbejdsmarkedsintegration og en ustabil arbejdsmarkedstilknytning blandt forældre påvirkede deres unge børns selvvurderede helbred, hvilket indikerer en negativ effekt af marginalisering på arbejdsmarkedet på tværs af generationer

Kapitel 7

En perspektivering af, hvordan projektets resultater på kort og langt sigt kan bidrage til at forbedre arbejdsmiljøet.

Der er ikke mange videnskabelige undersøgelser om arbejdsmiljø blandt unge, som begynder på arbejdsmarkedet. Det er i disse og de kommende år vigtigt at fokusere på de unges indgang på arbejdsmarkedet, undersøge hvordan arbejdsmiljøet påvirker de unges integration på arbejdspladsen samt belyse i hvilken omfang arbejdsmiljøet påvirker unges sygefravær og udstødelse fra arbejdsmarkedet.
Samlet set er den centrale udfordring at de unges udfordringer sjældent kan tilskrives en enkelt årsag, årsagen rækker helt fra forælderens arbejdsmarkedstilknytning til de unges arbejdsulykker i fritidsjobs og at den manglende trivsel de unge oplever kommer til udtryk på ret forskellige måder. Det kan komme til udtryk i form af oplevet stress, lav oplevelse af meningsfuldhed, lav mestringsevne samt lavt selvværd, alle faktorer der kan være afgørende for unges succesfulde integration og fastholdelse på arbejdspladsen.

Resultaterne af dette projekt peger ikke direkte på områder eller faktorer i arbejdsmiljøet, som bør ændres iht. målgruppen for projektet. Projektets sigte var at identificere faktorer før arbejdslivet, som har betydning for hvorledes det over tid går i forhold til henholdsvis uddannelse og beskæftigelse. Resultaterne kan være med til at øge forståelsen af nye arbejdstagere og deres problematikker, hvilket kan medvirke til at lette integrationen på arbejdsmarkedet. Mere direkte relateret til forbedringer af arbejdsmiljøet er resultaterne vedrørende unge arbejdstagere og arbejdsulykker. Disse understreger behovet for indsats der retter sig imod unge arbejdstagere.

Bilag 1. Publicerede videnskabelige artikler

1. Socioeconomic differences in school dropout among young adults: the role of social relations. Trine Nøhr Winding, Johan Hviid Andersen. BMC Public Health 2015
2. Somatic Complaints in Adolescence and Labour Market Participation in Young Adulthood.Trine Nøhr Winding, Johan Hviid Andersen. Scandinavian Journal of Public Health 2018
3. Do negative childhood conditions increase the risk of somatic symptoms in adolescence? – a prospective cohort study. Trine N. Winding, Johan H. Andersen BMC Pblic Health 2019
4. Perceived stress among 20-21 year-olds and their future labour market participation - an eight-year follow-up study Nanna Trolle, Thomas Lund, Trine Nohr Winding, Merete Labriola BMC Public Health 2017
5. Coping strategies in adolescence and labour market participation in young adulthood - A prospective birth cohort study Lea Billeskov, Cecilie L. Stabell, Mathilde H. Dieckmann, Nanna H. Jensen, Trine N. Winding, Johan H. Andersen, Louise Lindholdt, Claus D. Hansen, Merete Labriola, Thomas Lund. Scandinavian Journal of Public Health 2019

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Socioeconomic differences in school dropout among young adults: the role of social relations

Trine Nøhr Winding* and Johan Hviid Andersen

Abstract

Background: School dropout in adolescence is an important social determinant of health inequality in a lifetime perspective. It is commonly accepted that parental background factors are associated with later dropout, but to what extent social relations mediate this association is not yet fully understood.
Aim: To investigate the effect of social relations on the association between parental socioeconomic position and school dropout in the Danish youth cohort Vestliv.

Methods: This prospective study used data from questionnaires in 2004 and 2007 and register data in 2004 and 2010. The study population consisted of 3,054 persons born in 1989. Information on dropout was dichotomised into those who had completed a secondary education/were still attending one and those who had dropped out/had never attended a secondary education. Logistic regression analyses were used to investigate associations between parental socioeconomic position and dropout at age 21, taking into account effects of social relations at age 15 and 18.

Results: A large proportion of young people were having problems with social relations at age 15 and 18. In general, social relations were strongly related to not completing a secondary education, especially among girls. For instance, 18-year-old girls finding family conflicts difficult to handle had a 2.6-fold increased risk of not completing a secondary education. Young people from low socioeconomic position families had approximately a 3-fold higher risk of not completing a secondary education compared to young people from high position families, and the estimates did not change greatly after adjustment for social relations with family or friends. Poor relations with teachers and classmates at age 18 explained a substantial part of the association between income and dropout among both girls and boys.

Conclusions: The study confirmed a social gradient in completion of secondary education. Despite the fact that poor social relations at age 15 and 18 were related to dropout at age 21, social relations with family and friends only explained a minor part of the socioeconomic differences in dropout.
However, poor social relations with teachers and classmates at age 18 explain a substantial part of the socioeconomic difference in dropout from secondary education.

Keywords: Dropout, Socioeconomic position, Social relations, Young people

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Background

Some of the strongest determinants of health are structural factors such as national wealth, income inequality, and access to education [1]. A Danish report on determinants of health inequality in a lifetime perspective points out poor educational outcome in adolescence as one of the most important of these determinants [2]. In Denmark, approximately 25 % of the 25-year-olds had not completed a secondary education in 2013 [3]. Those who do not complete a secondary education are at greater risk of developing health problems later in life [4], and across OECD countries, people with poor educational outcome are less likely to be participants in the work force [5] and are at greater risk of sickness and disability in young adulthood [6]. Furthermore, a widening of social inequality in life expectancy between those who obtained a secondary education and those who did not has been reported in Denmark in the recent years [7], indicating that dropout is indirectly related to the development of health inequality during life [2, 4].

One of the strongest risk factors of dropout is parental socioeconomic position [8–11]. Parents' educational level, occupational prestige, and family income have been shown to have direct and indirect relationships with youths' later educational outcome [8, 12]. Academic achievement during compulsory school has also been found to be strongly associated with dropout from secondary school [13, 14]. Previous studies have shown that parental involvement in their offspring's schooling is an important determinant of both later academic achievement and dropout [15–17]. However, a study by Blondal et al. showed that parenting style more strongly predicts school dropout than parental involvement in school activities [18]. Apart from family relations, a good teacher-student relationship was found to be associated with lower student dropout rates [19], and close friendships were found to stimulate a sense of school belonging and academic performance among high school students [20–22], and a positive atmosphere at school increases the educational aspirations of young people [23].

Although there is some indication that adolescents' social relations with family, friends, teachers, and classmates influence later academic achievement, the influence on school dropout has not been adequately investigated. In order to reduce social inequality, it is important to identify potential conditions that early in life mediate the relation between parental background factors and later school dropout. Identification of such mediators potentially offers important implications for prevention and intervention.

The purpose of this prospective study was to investigate the effect of social relations on the association between parental socioeconomic position and dropout from secondary education in a Danish youth cohort. Gender differences appear to play a role in the way socioeconomic measures and health are related [24]. A previous study within the Vestliv cohort showed that stress levels in girls were most strongly associated with lower parental education and that stress levels in boys were most strongly associated with parental income [24]. To evaluate the impact of the two different measures of socioeconomic position on social relations and the risk of school dropout, results were presented for each gender separately. Social relations were grouped into three different dimensions: social relations in the family, social relations with friends, and social relations at school (with classmates and teachers). To investigate the independent impact of different social environments in early and late adolescence, information about social relations was collected when the participants were 15 and 18 years old. The time between these two age points represents a very important stage of the life course, with a transition from a more family centred environment to a broader environment more open to the influence of peers and non-family members.

The following research questions were addressed: 1) Are social relations at age 15 and 18 related to dropout at age 21? 2) Is a social gradient in dropout present among 21-year-olds in Denmark? 3) Do social relations at age 15 and 18 mediate the association between parental socioeconomic position and dropout? 4) Are the relations affected by the choice of socioeconomic measure? 5) Are there gender differences in the associations between social relations, socioeconomic position and dropout from secondary education?

Methods

Sample

The source population of the prospective cohort study Vestliv consisted of all individuals born in 1989 and living in the county of Ringkjoebing, Denmark, in early April 2004. A total of 3,681 fulfilled these criteria, and contact information was retrieved from the Central Office of Civil Registration and from public schools in the county of Ringkjoebing. All 3,681 individuals were contacted and asked to fill out an initial questionnaire during school hours when they were 15 years of age. Those not at school on the day of collection received the questionnaire by post, resulting in a participation rate of 83 % (n = 3,054). Altogether 1,399 children received the questionnaire by post and 58 % completed it. A follow-up survey was conducted in 2007 when the participants were aged 18 using both e-mailed and postal questionnaires. This resulted in 2,181 participants (71 % of initial). To gather information on family socioeconomic position and dropout from secondary education, respondents were linked to their parents or guardians by using their personal identification number (CPR number), which is given to every inhabitant in Denmark at birth (or upon entry for immigrants) [25]. The study sample of the present report was defined by the 3,054 participants who answered the initial questionnaire

and with available information on outcome and at least one of the exposure variables. The study was approved by the Danish Data Protection Agency.

Measures

Outcome

Completion of secondary education In Denmark education beyond compulsory school (secondary education) consists primarily of a high school academic track of 3 years, or vocational education, which lasts between 2 and 4 years. The outcome of the present study was completion of a secondary education after compulsory school in October 2010 when the participants were 21 years old, which allowed a follow-up of 6.5 years. Data on secondary education were based on register information derived from Statistics Denmark [26]. The Danish Education Registers collect information on all individuals attending education in Denmark and link information within and across years through the CPR number. Generally, the registers are considered of high quality [26]. The participants were categorised into those who (1) Completed/were attending: consisting of participants who had completed a secondary education or were still attending one, and (2) Dropped out/never attended: if they had dropped out of their last secondary education and never attended another or if they had never attended a secondary education.

Exposures variables

Socioeconomic position

Information from registers about highest attained education in the household and household income in year 2003 was chosen as measures of socioeconomic position. Based on the source population ($N = 3{,}681$), yearly household income was recoded into tertiles corresponding to lowest (<61,770 EUR), middle (61,770-80,531 EUR), and highest (>80,531 EUR) [27]. Highest attained education in the household was recoded into three categories: < 10 years, 10–12 years, >12 years [26]. If the participants' parents were divorced, information stemmed from the household at which the participants' address was listed.

Social relations with parents, friends, teachers and classmates

Social relations were conceived in a general framework as having three different dimensions: 1. Social relations in the family, 2. Social relations with friends, 3. Social relations with teachers and classmates. Information about social relations was based on questionnaire information collected at age 15 and age 18. At age 15 the General Functioning Scale was used as a measure of the social climate in the family. It is made up of twelve items that assess the overall health/pathology of the family and is one of seven scales from the Family Assessment Device (FAD) [28]. Low scores indicate healthier functioning than higher scores. In this sample the mean score was 1.75, SD 0.52 and Cronbach' alpha was 0.85. A cut-off at the 75 %-percentile (2.08) divided the scores into good/poor family functioning. As a measure of the social climate in the family at age 18, a question was asked about whether it is difficult to handle conflicts in the family (yes, sometimes or often vs. no).

Social relations with friends were measured by questions at age 15 and 18 about (1) having at least one friend to be confidential with (yes vs. no); (2) talking to friends about personal worries (very often, often or sometimes vs. not so often or rarely); (3) being satisfied with the help and support they get from friends (very often, often or sometimes vs. not so often or rarely); and (4) whether handling conflicts with friends or partner is difficult (no vs. yes, sometimes or often) [29, 30].

Social relations with teachers and classmates at age 15 and 18 were measured by questions on whether (1) teachers help with school work when it is needed (strongly agree or agree vs. disagree or strongly disagree); (2) classmates are doing well together (always, mostly or sometimes vs. rarely or never); (3) they feel left out by the other pupils in the class (always, mostly or sometimes vs. rarely or never); (4) feel attached to the classmates (strongly agree, partially agree or neither agree nor disagree vs. partially disagree or strongly disagree); or if (5) teachers help with personal problems if it is needed (strongly agree, partially agree or neither agree nor disagree vs. partially disagree or strongly disagree) [30, 31].

Statistical analyses

A correlation analysis between measures of social relations from each time point was performed initially and no correlation exceeded 0.30 (2004) or 0.35 (2007).

Some indication of effect modification between social relations and gender was seen. Of the 13 measures of social relations 5 showed significant interactions with gender. At age 15 it was: talking to friends about personal worries, $p = 0.001$; being satisfied with the help and support they get from friends, $p = 0.04$; feeling left out by other pupils in the class, $p = 0.02$, and at age 18 it was: finding it difficult to handle conflicts with friends or partner, $p = 0.02$; feeling attached to classmates, $p = 0.04$. Gender-specific descriptive data are presented for dropout, socioeconomic position and social relations at age 15 and 18. Chi-square-tests were performed to test for gender differences.

Multiple logistic regression analyses were performed to examine gender-specific associations between socioeconomic position, different aspects of social relations and school dropout [32]. The risk estimates were odds ratios and because the prevalence's of the social problems were

high the odds ratios would tend to be skewed to a higher level compared to relative risks [33].

We first modelled how aspects of social relations were associated with not completing a secondary education (Table 2). Then we modelled the simultaneous effects of socioeconomic position and social relations on completion of secondary education after adjusting for age on completion of 9th grade (Table 3). Adjustments for social relations were done for age 15 and age 18 separately because observations at the two time points were correlated.

All analyses were carried out in STATA statistical package (V.12.0; State, College Station, TX,USA).

Results

Interactions between measures of socioeconomic position and measures of social relations were tested, but none of the tests showed a significant contribution of the interaction terms.

Table 1 shows the prevalence of aspects of completion of secondary education, social relations, and the distribution of family socioeconomic position, all together and for girls and boys, separately. Nine percent of the young people had never attended or had dropped-out of the last attended secondary education at the age of 21. A relatively large proportion of young people had problems with relations with family, friends, teachers, or classmates at the age of 15 and 18. At age 15, more boys than girls reported not having a friend to be confidential with (13 % vs. 8 %) and 46 % of the boys reported difficulties in talking to friends about personal worries, compared to 14 % of the girls. More girls than boys felt left out by other pupils in the class (16 % vs. 11 %). At age 18, more girls than boys experienced difficulties in handling family conflicts (43 % vs. 37 %) and conflicts with friends or partner (43 % vs. 37 %). At age 18, 32 % did not feel that teachers helped with personal problems if they needed it.

Socioeconomic differences in social relations

In general, poor socioeconomic position was related to poor social relations with family, friends, teachers, and classmates. Individuals from families with low income or low educational level more often reported poor family functioning and experienced less help and support from friends than their peers at age 15 (ORs between 1.61 and 2.05). Girls from low socioeconomic position families often reported not having a friend to be confidential with, especially at age 18 (low household income: OR 3.12 (95 % CI 1.70–5.71) and low educational level in the family: OR 3.23 (95 % CI 1.417.41)) [see Additional file 1].

Social relations and not completing a secondary education

Social relations with family, friends, teachers, and classmates in general were strongly associated with not completing a secondary education, especially among girls (Table 2). For instance, not being satisfied with help and support from friends at age 15 was strongly associated with not completing a secondary education, especially among the girls (OR 3.02 (95 % CI 1.80–5.07), boys OR 1.73 (95 % CI 1.03–2.91)). Classmates not doing well together at age 15 was strongly related to not completing a secondary education in both girls and boys (girls: OR 3.82 (95 % CI 2.20–6.63), boys: OR 2.14 (95 % CI 1.02–4.48)). 18-year-old girls experiencing family conflicts difficult to handle had a 2.6-fold increased risk of not completing a secondary education (girls: OR 2.59 (95 % CI 1.57–4.27), boys: OR 1.34 (95 % CI 0.73–2.47)) compared to those not experiencing family conflicts difficult to handle.

Socioeconomic position, social relations, and not completing a secondary education

Table 3 shows that young people from the lowest socioeconomic position families had approximately a 3-fold higher risk of not completing a secondary education compared to young people from the highest socioeconomic position families (Model 1), and a significant trend was seen across socioeconomic groups. Socioeconomic differences in completion of secondary education did not change substantially after adjustment for family relations (Models 2 and 6) or relations with friends (Models 3 and 7).

Adjusting for social relations with classmates and teachers at age 18 reduced the association between family income and the chance of completing a secondary education (OR changed from 3.09 (95 % CI 2.23–4.27) to 1.51 (95 % CI 0.76–2.97)) (Model 8).

In general, the large socioeconomic differences in young people's chance of completing a secondary education remained after simultaneous adjustments for all social relations, both at age 15 (Model 5) and age 18 (Model 9). However, adjusting for all social relations at age 18 reduced the strength of the association between family income and the chance of completing a secondary education considerably. The odds ratio changed from 3.09 (95 % CI 2.23–4.27) in the crude analysis to 1.44 (95 % CI 0.72–2.90) in the fully adjusted analysis, but this was not the case when adjusting for social factors from age 15 (OR changed to 2.67 (95 % CI 1.88–3.78). The associations between family educational level and the chance of completing a secondary education remained strong after adjustment for all social relations both at age 15, Model 5 (OR 3.07 (95 % CI 2.07–4.56)) and age 18, Model 9 (OR 2.98 (95 % CI 1.37–6.47)).

Discussion

The present study showed that poor social relations with parents, friends, teachers, and classmates are common

Table 1 Completed a secondary education (age 21), socioeconomic position (age 15) and social relations (age 15 and 18) all together and by gender ($n = 3054$)

	All ($n = 3054$)		Girls ($n = 1536$)		Boys ($n = 1518$)		
	n	%	n	%	n	%	*p*-value*
Completion of secondary education	3054		1536		1518		
Completed/attending	2779	91	1398	91	1381	91	
Dropped out/never attended	275	9	138	9	137	9	0.969
Socioeconomic position							
Household income	3053		1535		1518		
high	1092	36	541	35	551	36	
medium	1060	35	521	34	539	36	
low	901	30	473	31	428	28	0.279
missing	1		1		0		
Highest education in the household	3001		1508		1493		
high	1094	36	518	34	576	39	
medium	1548	52	801	53	747	50	
low	359	12	189	13	170	11	0.053
missing	53		28		25		
Social relations (age 15)							
Family							
Family functioning	2912		1465		1447		
very good/good	2153	74	1079	74	1074	74	
less good/not good	759	26	386	26	373	26	0.726
missing	142		71		71		
Friends							
At least one friend to be confidential with	3027		1524		1503		
yes	2700	89	1396	92	1304	87	
no	327	11	128	8	199	13	<0.001
missing	27		12		15		
Talk to friends about personal worries	3018		1521		1497		
yes	2114	70	1307	86	807	54	
no	904	30	214	14	690	46	<0.001
missing							
Satisfied with help and support from friends	3021		1522		1499		
yes	2782	92	1422	93	1360	91	
no	239	8	100	7	139	9	0.006
missing	33		14		19		
Teachers and classmates							
Teachers help me with school work when I need it	3019		1519		1500		
yes	2544	84	1263	83	1281	85	
no	475	16	256	17	219	15	0.089
missing	35		17		18		
Classmates are doing well together	3015		1520		1495		
yes	2885	96	1443	95	1442	96	
no	130	4	77	5	53	4	0.040
missing	39		16		23		

Table 1 Completed a secondary education (age 21), socioeconomic position (age 15) and social relations (age 15 and 18) all together and by gender ($n = 3054$) *(Continued)*

Feel left out by the other pupils in the class	3004		1515		1489		
no	2597	86	1269	86	1328	89	
yes	407	14	246	16	161	11	<0.001
missing	50		21		29		
Social relations (age 18)							
Family							
Difficult to handle conflicts	2130		1161		969		
no	1277	60	662	57	615	63	
yes	853	40	499	43	354	37	0.002
missing	924		375		549		
Friends							
At least one friend to be confidential with	2165		1173		992		
yes	2011	93	1104	94	907	91	
no	154	7	69	6	85	9	0.015
missing	889		363		526		
Difficult to handle conflicts with friends or partner	2130		1161		969		
no	1265	59	657	57	608	63	
yes	865	41	504	43	361	37	
missing	924		375		549		0.004
Teachers and classmates							
Feel attached to my classmates	1922		1065		857		
yes	1747	91	965	91	782	91	
no	175	9	100	9	75	9	0.629
missing	1132		471		661		
Teachers help me with schoolwork when I need it	1919		1064		855		
yes	1792	93	999	94	793	93	
no	127	7	65	6	62	7	0.317
missing	1135		472		663		
Teachers help me with personal problems if I need it	1911		1059		852		
yes	1292	68	709	67	583	68	
no	619	32	350	33	269	32	
missing	1143		477		666		0.493

*chi-square-tests were used to test for differences in completion of secondary education, socioeconomic position and social relations

among 15- and 18-year-old Danish adolescents. Among both girls and boys, the risk of not having completed a secondary education at age 21 increased if an individual had experienced poor social relations, but at the same time poor social relations with family and friends only explained a minor part of the socioeconomic differences in dropout from secondary education. Poor social relations with teachers and classmates at age 18 explained a large part of the association between income and dropout among both girls and boys.

Most previous research on the influence of social relations on educational outcomes has focused on parent's investment and involvement in their children's school, and parental interest appears to facilitate the offspring's motivation for schoolwork and improve both academic achievement and adult educational outcome [8, 16, 34]. Henry et al. reported parental investment in school as a mediator of the relationship between socioeconomic status and students' expectation to graduate from high school [8], but they did not investigate whether the students succeeded in graduating or not. On the other hand, a study by Blondal et al. found that parenting style at age 14 was a stronger predictor than parental involvement in terms of having completed upper secondary school by age 22 [18]. One of

Table 2 Odds ratios for not completing a secondary education by social relations at age 15 and 18, $n = 3054$

	Not completed a secondary education					
	All		Girls		Boys	
	OR	95 %-CI	OR	95 %-CI	OR	95 %-CI
Social relations (age 15)						
Family						
Poor family functioning	1.8	1.43 ; 2.45	1.98	1.36 ; 2.88	1.77	1.21 ; 2.60
Friends						
No friend to be confidential with	1.48	1.04 ; 2.12	1.89	1.12 ; 3.18	1.23	0.75 ; 2.01
Do not talk to friends about personal worries	1.54	1.19 ; 1.99	2.41	1.60 ; 3.65	1.27	0.89 ; 1.81
Not satisfied with help and support from friends	2.24	1.55 ; 3.23	3.02	1.80 ; 5.07	1.73	1.03 ; 2.91
Teachers and classmates						
Teachers do not help me with school work when I need it	1.45	1.06 ; 1.98	1.74	1.15 ; 2.64	1.15	0.71 ; 1.87
Classmates are not doing well together	3.03	1.95 ; 4.69	3.82	2.20 ; 6.63	2.14	1.02 ; 4.48
Feel left out by the other pupils in the class	1.91	1.40 ; 2.61	2.48	1.67; 3.70	1.32	0.78 ; 2.23
Social relations (age 18)						
Family						
Difficult to handle conflicts	2.02	1.39 ; 2.96	2.59	1.57 ; 4.27	1.34	0.73 ; 2.47
Friends						
No friend to be confidential with	0.91	0.44 ; 1.90	1.43	0.60 ; 3.42	0.46	0.11 ; 1.94
Difficult to handle conflicts with friends or partner	1.83	1.26 ; 2.67	1.96	1.21 ; 3.21	1.57	0.86 ; 2.88
Teachers and classmates						
Do not feel attached to my classmates	1.92	0.93 ; 3.98	1.92	0.78 ; 4.73	1.88	0.54 ; 6.55
Teachers do not help me with schoolwork when I need it	1.37	0.54 ; 3.50	1.33	0.40 ; 4.45	1.52	0.34 ; 6.74
Teachers do not help me with personal; problems if I need it	0.61	0.33 ; 1.44	0.53	0.24 ; 1.17	0.77	0.27 ; 2.16

the strengths of the study by Blondal et al. is that it like the present study, included social relations from different social environments.

Some gender differences were found in the current study. The associations between parental socioeconomic position and dropout were strong in both genders, and especially among the boys, which is consistent with previous findings [9, 35]. At the same time, poor social relations were more strongly associated with not completing a secondary education among girls than among boys. This finding stresses the importance of parents, teachers, and other adults being in contact with adolescent girls to help stimulate positive social relations.

Other studies have confirmed strong associations between negative relations with parents [12, 36] friends, teachers, and classmates [19–22] and lack of educational outcomes in their children but only a few studies have evaluated the influence of poor social relations on the association between socioeconomic position and dropout. A previous study documented that in addition to lower socioeconomic position being related to school dropout, students from lower socioeconomic families were generally more disengaged in school than students from higher socioeconomic families [37]. In addition Melby et al. found that family income of 7th grade students has both a direct and an indirect effect on educational attainment through supportive parenting [12]. Whether the positive effect of social relations on educational outcome is due to increased school motivation and engagement among the students needs further investigation.

Test for trends overall showed a clear dose–response pattern between level of household income or highest education in the household and completion of secondary education of the young people. The only tests not being statistically significant were between income level and school completion after adjustment for social factors at age 18 (Models 8 and 9).

Previous research suggests that different measures of socioeconomic position, such as parental income and education, affect health and future social status through different pathways [38]. Bourdieu differentiates between two independent yet interrelated mechanisms: economic capital (income) and cultural capital (educational level). He argues that having low levels of economic capital could make a person more prone to living in situations that are more stressful, e.g. lack of material resources, whereas low levels of cultural capital would influence the way a person copes with stressful situations [39]. By including highest education in the household and household income as two separate exogenous variables, we

Table 3 Odds ratios for not completing a secondary education by parents socioeconomic position (Model 1), controlled for social relations with family (Model 2 and 6), friends (Model 3 and 7), and teachers and classmates (Model 4 and 8) and for all social relations (Model 5 and 9) in 2004 or 2007 ($n = 3054$)

Not completed a secondary education										
	All				Girls			Boys		
Model 1	OR	95 %-CI		*P*-value	OR	95 %-CI	*P*-value	OR	95 %-CI	*P*-value*
Income										
	high	ref			ref			ref		
	medium	1.47	1.03 ;2.09		1.54	0.93 ; 2.54		1.40	0.85 ; 2.30	
	low	3.09	2.23 ; 4.27	<0.001	2.86	1.80 ; 4.54	<0.001	3.29	2.08 ; 5.19	<0.001
Highest education										
	high	ref			ref			ref		
	medium	1.28	0.94 ; 1.75		1.02	0.66 ; 1.59		1.61	1.04 ; 2.48	
	low	3.11	2.15 ; 4.49	<0.001	2.70	1.62 ; 4.51	<0.001	3.51	2.07 ; 5.97	<0.001
Adjusted for social factors at age 15										
Model 2										
Income										
	high	ref			ref			ref		
	medium	1.39	0.97 ; 1.99		1.46	0.87 ; 2.45		1.32	0.79 ; 2.21	
	low	2.82	2.01 ; 3.94	<0.001	2.67	1.66; 4.31	<0.001	2.96	1.84 ; 4.76	<0.001
Highest education										
	high	ref			ref			ref		
	medium	1.25	0.91 ; 1.72		0.96	0.61 ; 1.51		1.62	1.03 ; 2.55	
	low	3.05	2.08 ; 4.47	<0.001	2.56	1.51 ; 4.35	<0.001	3.57	2.05 ; 6.21	<0.001
Model 3										
Income										
	high	ref			ref			ref		
	medium	1.40	0.98 ; 2.01		1.43	0.86 ; 2.37		1.35	0.81 ; 2.26	
	low	3.07	2.21 ; 4.28	<0.001	2.74	1.71 ; 4.37	<0.001	3.40	2.12 ; 5.44	<0.001
Highest education										
	high	ref			ref			ref		
	medium	1.31	0.96 ; 1.80		1.00	0.64 ; 1.56		1.71	1.09 ; 2.68	
	low	3.06	2.10 ; 4.45	<0.001	2.44	1.44 ; 4.13	<0.001	3.72	2.16 ; 6.42	<0.001
Model 4										
Income										
	high	ref			ref			ref		
	medium	1.45	1.02 ; 2.08		1.47	0.89 ; 2.44		1.44	0.87 ; 2.39	
	low	2.80	2.01 ; 3.91	<0.001	2.44	1.52 ; 3.93	<0.001	3.22	2.02 ; 5.15	<0.001
Highest education										
	high	ref			ref			ref		
	medium	1.31	0.96 ; 1.80		1.08	0.69 ; 1.71		1.60	1.03 ; 2.49	
	low	3.15	2.16 ; 4.59	<0.001	2.64	1.55 ; 4.51	<0.001	3.72	2.17 ; 6.36	<0.001
Model 5										
Income										
	high	ref			ref			ref		
	medium	1.37	0.95 ; 1.99		1.30	0.77 ; 2.21		1.41	0.83 ; 2.40	
	low	2.67	1.88 ; 3.78	<0.001	2.31	1.41 ; 3.78	0.002	3.10	1.88 ; 5.10	<0.001

Table 3 Odds ratios for not completing a secondary education by parents socioeconomic position (Model 1), controlled for social relations with family (Model 2 and 6), friends (Model 3 and 7), and teachers and classmates (Model 4 and 8) and for all social relations (Model 5 and 9) in 2004 or 2007 ($n = 3054$) *(Continued)*

Highest education										
	high	ref			ref			ref		
	medium	1.29	0.92 ; 1.79		0.94	0.59 ; 1.51		1.72	1.07 ; 2.77	
	low	3.07	2.07 ; 4.56	<0.001	2.24	1.28 ; 3.91	0.003	4.03	2.27 ; 7.14	<0.001
Adjusted for social factors at age 18										
Model 6										
Income										
	high	ref			ref				ref	
	medium	1.76	1.04 ; 2.99		1.68	1.28 ; 3.11		1.91	0.83 ; 4.39	
	low	3.42	2.06 ; 5.69	<0.001	3.56	2.01 ; 6.29	<0.001	3.31	1.46 ; 7.50	0.015
Highest education										
	high	ref			ref			ref		
	medium	1.38	0.87 ; 2.20		0.97	0.54 ; 1.73		2.80	1.19 ; 6.58	
	low	3.76	2.14 ; 6.61	<0.001	2.43	1.20 ; 4.95	0.018	8.18	3.05 ; 21.97	<0.001
Model 7										
Income										
	high	ref			ref			ref		
	medium	1.77	1.04 ; 3.01		1.70	0.85 ; 3.39		1.94	0.84 ; 4.46	
	low	3.43	2.06 ; 5.71	<0.001	3.40	1.76 ; 6.56	<0.001	3.32	1.46 ; 7.53	0.015
Highest education										
	high	ref			ref			ref		
	medium	1.40	0.88 ; 2.24		0.99	0.55 ; 1.77		2.79	1.19 ; 6.58	
	low	3.92	2.23; 6.88	<0.001	2.50	1.23 ; 5.10	0.016	8.30	3.08 ; 22.32	<0.001
Model 8										
Income										
	high	ref			ref			ref		
	medium	1.13	0.59 ; 2.18		1.23	0.54 ; 2.80		0.95	0.31 ; 2.86	
	low	1.51	0.76 ; 2.97	0.484	1.52	0.64 ; 3.61	0.640	1.42	0.46 ; 4.36	0.755
Highest education										
	high	ref			ref			ref		
	medium	0.90	0.47; 1.71		0.65	0.29 ; 1.45		1.55	0.51 ; 4.70	
	low	3.37	1.60 ; 7.10	<0.001	2.50	1.01 ; 6.14	0.014	5.28	1.34 ; 20.83	0.051
Model 9										
Income										
	high	ref			ref			ref		
	medium	1.07	0.54 ; 2.10		1.12	0.47 ; 2.67		0.90	0.29 ; 2.73	
	low	1.44	0.72 ; 2.90	0.548	1.50	0.61 ; 3.70	0.661	1.34	0.43 ; 4.15	0.785
Highest education										
	high	ref			ref			ref		
	medium	0.85	0.44 ; 1.64		0.61	0.26 ; 1.39		1.51	0.50 ; 4.61	
	low	2.98	1.37 ; 6.47	0.003	2.18	0.84 ; 5.65	0.036	6.03	1.50 ; 24.33	0.033

All models are adjusted for age when completing 9th grade
* Test for trend

were able to evaluate the contribution of each socioeconomic component. We found both measures related to dropout in young adulthood, but the results indicate that they are related in slightly different ways and that the mechanisms to some extent vary by gender. In general, parental educational level (cultural capital) appeared to have a larger influence on boys' chances of completing a secondary education than household income (economic capital) when social relations were taken into account, whereas among girls, no clear pattern was observed. This finding is in line with the results of a study in a Norwegian male population [40].

In the present study, poor social relations with teachers and classmates at age 18 seemed to explain part of the socioeconomic difference in dropout. Actually, it seemed that social relations with teachers and classmates were mediators of the association between household income and completion of a secondary education but not between parental educational level and completion of secondary education. The reason for the difference between the estimates of the two socioeconomic measures is not obvious. However, the results indicate that the importance of social relations at school increases from age 15 to 18 concurrently with the natural transition during adolescence, especially among young people from stressful environments due to low economic capital. It seems that late adolescence is an important stage of the life course, with a transition from a strong parental influence to greater influence of classmates, teachers, and other non-family members.

This study features a relatively high initial participation rate of 83 % of whom 71 % responded again at follow-up in 2007. Additional strengths of the study are the prospective design with complete follow-up due to use of register-based data. At the same time, the use of both questionnaire and register-based data minimises the risk of common method variance [41].

It is important to emphasise that the questions asked about social relations with classmates and teachers at the two different age points are not all identical. As such, the difference between social relations' mediating role at ages 15 and 18 might be attributable to the different constructs that were measured rather than the age periods per se.

Some of the missing answers to the questions about social relations at age 18 could be due to school dropout prior to this age. Altogether 147 participants reported being out of school when they completed the first follow-up questionnaire at age 18. This selection problem could result in bias due to missing information from some of the adolescents with highest risk of negative educational outcome. However, it is not clear how this missing information may have influenced the results.

The high frequency of young people attending or having completed a secondary education (91 %) by age 21 indicates that some selection into the Vestliv cohort has occurred. A previous study on the same data material demonstrated that the participants had slightly better school abilities and more often came from homes with two adults, higher income, or higher educational level. These differences increased at subsequent follow-ups. Although certain characteristics were related to those who participate initially and at follow-ups, this did not have any large influence on the relative risk estimates measured in the study. This is reassuring for the validity of the relative estimates in the current study [42].

Social relations with family, friends, teachers, and classmates in general only explained a small part of the association between socioeconomic position and dropout. It is likely that other aspects such as major life events like death or illness in the family, divorce, or living with one parent could potentially influence the chance of completion as well. Including such variables in future studies is recommended.

The objective of this study was not to study social inequality of health per se but to address some potential determinants that eventually could lead to poor health outcome. Addressing inequality in young people's educational outcome has multiple potential benefits that extend beyond reductions in health inequalities. If this inequality could be reduced, it would enable young people to maximise their capabilities and eventually be able to participate equally with others in society. Given the relatively low social inequality in Denmark, the results can be difficult to generalise to other more unequal countries. However, the fact that the difference in life expectancy between those who complete secondary education and those who do not is increasing in Denmark [7], indicates that positive social relations that are preventing school dropout is indirectly related to the prevention of health inequality later in life [2, 4].

Conclusion

This study confirmed a social gradient in completion of secondary education among Danish students. Despite the fact that poor social relations at age 15 and 18 were related to dropout at age 21, social relations to family and friends only explained a minor part of the socioeconomic differences in dropout from secondary education. However, poor social relations with teachers and classmates at age 18 explain a substantial part of the socioeconomic difference in dropout from secondary education. The findings suggest that stimulating positive social relations with classmates and teachers may benefit all students and could potentially reduce the risk of adolescents from economically disadvantaged families not getting a secondary education, which may be a part of a number of life events that eventually could lead to social and health inequality.

Additional file

Additional file 1: Description of data: Odds ratios for poor relations with parents, friends, teachers, and classmates at ages 15 and 18 by household income or highest education in the household (high vs. low) at age 15, all together and by gender, $n = 3,054$. (PDF 19 kb)

Competing interests
All authors declare that they have no competing interests.

Authors' contributions
JHA initiated the study. TNW designed and performed the analyses and wrote the main paper. JHA helped analysing and interpreting the data and commented on the manuscript at all stages. All authors read and approved the final manuscript.

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ORIGINAL ARTICLE

Somatic Complaints in Adolescence and Labour Market Participation in Young Adulthood

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Abstract

Aims: The primary aim was to investigate the association between somatic symptoms at ages 15 or 18 and reduced labour market participation at age 23, when socioeconomic, social, and mental health risk factors were taken into account. *Methods:* The study included 3223 participants from the West Jutland Cohort Study with questionnaire information on somatic symptoms at ages 15 or 18 and with register information on labour market participation at age 23, gathered from a national register on all public transfer benefits for a 52-week period. The analyses included additional information about socioeconomic background, number of negative life events, social climate in the family, social relations with friends, and depressive symptoms. Logistic regression analyses yielded odds ratios with 95% confidence intervals. *Results:* Among the males, associations between reporting somatic symptoms at age 18 and low labour market participation was seen in both crude and adjusted analyses (odds ratio: 1.66; 95% confidence intervals: 1.01–2.75), whereas the association among the females disappeared after adjustments (odds ratio: 0.97; 95% confidence intervals: 0.63–1.52). ***Conclusions:*** **The males that reported somatic symptoms in late adolescence appeared to be the most vulnerable to future reduced labour market participation.**

Keywords: *Adolescence, labour market participation, somatic symptoms*

Introduction

A positive and stable early entry into working life improves job prospects and avoids dependency on social benefits [1]. Adversely, exclusion from the labour market can have negative social and health consequences [2]. Focusing on the early determinants facilitating labour market participation (LMP) is therefore of outmost importance.

It is well known that a low income and a low educational level in the family and the experience of negative life events during early life reduce the chances of successfully entering the labour market [3–5]. At the same time, there is some indication that individual factors such as mental health and psychological vulnerability affect the early work environment [3], but how these factors affect early LMP needs further investigation.

Increased psychological vulnerability can manifest itself in several ways during childhood and adolescence. Somatic complaints such as stomach aches and headaches are common among adolescents [6–8]. Epidemiological studies have shown that up to 40% of adolescents have experienced pains related to the neck, back, or shoulder during the last week [9], and in a population of Swedish schoolchildren, 29% reported often experiencing back pain and approximately 50% had experienced headache [10].

Somatic symptoms are found to be more prevalent in females than in males [7,10]. At the same time, a high degree of co-occurrence of somatic symptoms is common. Among adolescent girls who report headaches more than once a week, 53% report stomach pain and 74% morning fatigue as well [8].

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Somatic complaints seem to increase steadily during childhood and adolescence both in total number and severity [6,9] and are associated with negative consequences for health, education, social life, and work-related factors later in life. More than one-half of the children with abdominal symptoms still report abdominal symptoms as adults, and one-third complains of other somatic symptoms such as headache after reaching adulthood [11]. Moreover, youths with somatic symptoms tend to experience impairment in academic and social functioning, including a high level of school or work absences due to illness [12].

Socioeconomic factors like low income and low education in the family are associated with higher rates of somatic symptoms [8], and studies have documented an association between social relations and somatic complaints, but to what extent somatic symptoms explain the association between family socioeconomic factors and LMP later in life is unknown. Family conflicts and a poor relationship with peers are associated with somatic complains [13,14], whereas parent and teacher support serve as protective factors. Lower levels of social capital such as that of social participation, social influence, and social support accumulated over the course of a lifetime appear to be associated with higher levels of somatic symptoms in adulthood [15].

At the same time, somatic complaints co-occur frequently with anxiety and depression [16]. Among youths with anxiety, more than 95% report at least one somatic complaint [6], and somatic symptoms in childhood significantly predict psychopathology in adulthood [17].

Most of the earlier studies involve a relatively small number of participants, and there seems to be a lack of prospective studies. At the same time, information is also lacking about the short- and long-term consequences of somatic symptoms in adolescence on LMP in young adulthood.

The primary aim of this study was to investigate whether reports of somatic symptoms at ages 15 or 18 are associated with reduced LMP at age 23, when socioeconomic, social, and mental-health risk factors are taken into account.

The four secondary aims were:

- to investigate any potential gender differences;
- to investigate if socioeconomic, social, and mental-health risk factors are related to LMP;
- to explore whether reporting somatic symptoms at both ages 15 and 18 increases the risk of poor LMP at age 23; and
- to investigate to what extent reporting somatic symptoms at age 15 or 18 explain the association between family socioeconomic background and poor LMP at age 23.

Methods

Population

Data were gathered as part of the ongoing West Jutland Cohort Study, which is a follow-up survey of 3681 individuals born in 1989 and living in the western part of Denmark in 2004 [4,18]. Of the original source population, 3054 answered the initial questionnaire at age 15 in 2004, a response rate of 83%. A follow-up survey in 2007, when the participants were 18 years old, used both e-mailed and postal questionnaires, resulting in 2181 participants (71% of the initial cohort). Information about socioeconomic background was derived from national registers in Statistics Denmark by using information from the Central Office of Civil Registration (CPR), in which the respondents are linked to their parents or guardians by using their personal identification number (CPR number), which is given to every inhabitant in Denmark at birth (or upon entry for immigrants) [19].

The study population includes participants with questionnaire information on somatic symptoms either at age 15 and/or age 18 and with register information on LMP at age 23 (n = 3223).

Outcome

Information about LMP was derived from the Danish Register for Evaluation and Marginalization [20]. The Danish Register for Evaluation and Marginalization is a national register on all public transfer benefits, registered on a weekly basis and identified by >100 specific codes in relation to for example, health-related benefits (e.g. sickness absence compensation, disability pension), social benefits (e.g. state educational grants, maternity leave benefits), or any sort of unemployment benefits.

Information about LMP for a 52-week period from 1 March 2011 through 1 March 2012 was collected, when participants were 23 years old. The information was merged with the questionnaire data using the CPR number of each participant. From information of the amount of received benefits, the participants were divided into two categories. 'High LMP' was if the participants were not receiving any benefits at all, or if the participants were temporarily away from the labour market for example, on maternity leave (receiving maternity leave benefits), or if the participants experienced a shorter period of sickness or unemployment (defined as receiving health or unemployment benefits for a maximum of 4 weeks out of the 52-weeks period), or if the participants were preparing for the labour market by education (receiving state educational grants). 'Low LMP' was

if the participants were receiving any social, health or unemployment benefits (except for maternity leave benefits and state educational grants) for more than 4 weeks out of the 52 weeks period.

Independent variables

Somatic symptoms at ages 15 and 18 were measured by a subscale, the symptom checklist for somatization, from the original Hopkins Symptom Checklist-90 [21]. The questions derived from this subscale cover symptoms and signs commonly associated with somatoform disorders [22].

At age 15, six items were used regarding whether participants had suffered from:

- headache;
- dizziness or faintness;
- pains in heart or chest;
- pains in lower back;
- nausea or upset stomach; or
- soreness of muscles the last 4 weeks.

At age 18, 11 items were used regarding whether participants had suffered from:

- headache;
- dizziness or faintness;
- pains in heart or chest;
- nausea or upset stomach;
- soreness of muscles;
- trouble breathing;
- hot or cold spells;
- numbness or tingling in parts of the body;
- a lump in the throat;
- feeling weak in parts of the body; or
- heavy feelings in arms or legs the past 4 weeks.

The five response categories ('not at all', 'a little', 'moderately', 'quite a bit', 'extremely bothered') were generated into scales ranging from 0 to 24 (age 15) and 0–44 (age 18) and dichotomised at the 75th percentile into somatic symptoms 'no' or 'yes', with a cutoff at ≥5 and ≥8, respectively.

Socioeconomic background according to highest attained education in the household and household income was from Danish Register information in 2003. Based on the source population (N = 3681), yearly household income was recoded into tertiles corresponding to lowest (<61,931 EUR), middle (61,931–80,738 EUR), and highest (>80,738 EUR) income category [23]. The highest attained education in the household was divided into three categories: <10 years, 10–12 years, and >12 years [24]. If the participants' parents were divorced, information was from the household at which the participants had their postal address. Information about gender stems from Danish Register information [19].

The General Functioning Scale was included as a measure of the social climate in the family when the participants were 15 years of age. This scale consists of 12 items that assess the overall health/pathology of the family, and is one of seven scales from the Family Assessment Device [25]. The General Functioning Scale was included as a continuous variable, where a low score indicates better function than a high score.

Social relations with friends were measured at age 18 by a question about having at least one friend to be confidential with ('yes' versus 'no').

Depressive symptoms were measured at age 18 using the Centre for Epidemiological Studies Depression Scale for Children (CES-DC), 4-item version [26], with an individual score between 0 and 12. The CES-DC was included as a continuous variable; higher CES-DC scores indicate increasing levels of depressive symptoms.

Negative life events were assessed at age 18 by 13 items, modified from a scale developed by Newcomb et al. [27] and The Social Stress Indicator developed by Turner et al. [28]. The 13 items asked participants about, for example, divorce of parents, disease, abuse, or death in the immediate family, financial problems or loss of job/apprenticeship. The number of negative life events was on a continuous scale from 0 to 13.

Statistical analysis

Initially, somatic symptoms were included in the models as continuous or category variables (four categories) and we performed a sensitivity analysis where the cut-off points were changed. These analyses did not affect the main results and we observed no non-linear associations, thus the somatic symptom variables were dichotomised to improve comprehensibility of the results.

Logistic regression analysis were used to analyse the association between somatic symptoms at ages 15 or 18 and low LMP at age 23. The results are presented as odds ratios (ORs) with 95% confidence intervals (95% CI). Adjustments for socioeconomic, social, and mental-health factors were performed stepwise in order to evaluate the change in estimates. The variables were chosen a priori for each model, based on a literature review. Model 1 shows the crude associations of all included variables, Model 2 shows associations between somatic symptoms and socioeconomic factors mutually adjusted, and Model 3 shows estimates of all included variables mutually adjusted. The independent effects of somatic symptoms on the 'household income-LMP' association

and 'parental highest education-LMP' association were explored by making the adjustment for somatic symptoms at age 15 or 18, respectively.

To explore the effect of experiencing somatic symptoms on low LMP in early and late adolescence, the following four categories were constructed:

- 'few-few', if having no somatic symptoms either at ages 15 or 18;
- 'many-few', if having somatic symptoms at age 15 and no somatic symptoms at age 18;
- 'few-many', if having no somatic symptoms at age 15 but having symptoms at age 18; and
- 'many-many', if having somatic symptoms at both age 15 and 18.

The STATA statistical package (V.12.0; State, College Station, Texas) was used for all analyses.

Results

Of the 3018 participants who had answered all questions about somatic symptoms both at ages 15 and 18, 738 (24%) participants reported to be quite a bit or extremely bothered by one symptom and 259 (9%) participants reported to be quite a bit or extremely bothered by two or more symptoms for the past week (results not shown).

The most reported symptoms at both age 15 and age 18 were headache, nausea or upset stomach, and soreness of the muscles, with approximately 50% or more reporting symptoms (results not shown).

Table I shows the characteristics of the study population. Females experienced more somatic symptoms at ages 15 and 18, more depressive symptoms, and more negative life events compared to males. In contrast, more males than females reported not having a friend to talk to (9% vs. 6%). Altogether, 18% of the participants experienced low LMP, with more males (20%) than females (16%).

Table II shows no overall association between reporting somatic symptoms at age 15 and low LMP at age 23 in any of the three models (fully adjusted: OR 0.98; 95% CI, 0.72–1.32). However, there was a tendency toward an association among the females (fully adjusted: females OR 1.31; 95% CI, 0.86–1.99 vs. males OR 0.86; 95% CI, 0.53–1.40).

Table III shows an overall significant crude association between reporting somatic symptoms at age 18 and low LMP at age 23, but this association weakens when other independent variables are taken into account (fully adjusted: OR 1.11; 95% CI, 0.80–1.52). Among the males, associations between reporting somatic symptoms at age 18 and low LMP were seen across all three models (fully adjusted: OR 1.66; 95% CI, 1.01–2.75), whereas the association among the females disappeared when adjustments were made (fully adjusted: OR 0.97; 95% CI, 0.63–1.52).

Some of the independent variables showed strong associations with low LMP at the two ages studied. Among the females, low household income, low parental education, and negative life events were especially associated with low LMP, and these associations remained significant after adjusting for all other independent variables (Tables II and III). Among the males, low household income, low parental education, poor family functioning, and not having a friend showed the strongest associations with low LMP in the fully adjusted models (Tables II and III).

When adjusting the 'household income-LMP' association for reporting somatic symptoms at age 15 or 18, the OR estimates changed by 0.1 in the middle-income category and by 0.2 in the lowest income category at both age points. When adjusting the 'highest parental education-LMP' association for reporting somatic symptoms at age 15, the OR estimate did not change, whereas the OR estimate changed by 0.1 in the middle education category and by 0.3 in the lowest education category when adjusting for somatic symptoms at age 18.

Table IV shows the association between persistent somatic symptoms and LMP. The 'few-few' category was the reference group. The crude estimates show a trend toward increasing associations across the four groups both in females and males. After adjusting for the other independent variables, the associations decreased and were no longer statistically significant (fully adjusted estimates of the 'many-many' group: females OR 1.10; 95% CI, 0.62–1.98 and males OR 1.39; 95% CI, 0.64–2.99).

Discussion

The strengths of the associations between reporting somatic symptoms and low LMP were in general modest, and we found no strong association between persistent somatic symptoms and low LMP. However, 18-year-old males reporting somatic symptoms showed increased risk of low LMP at the age of 23. Low household income and low parental education showed the strongest associations with low LMP for both genders. In contrast, negative life events were more strongly associated with low LMP among females compared to males, whereas poor family functioning and not having a friend showed stronger associations with low LMP among males than females.

As far as we know, this study is the first to examine the relationship between self-reported somatic symptoms in early and late adolescence and low LMP in early adulthood. As previously stated, somatic symptoms could result in reduced academic

Table I. Characteristics and labour market participation of the study population, $N = 3223$.

	Age[a]	All		Females		Males	
		n / mean	% / SD	*n* / mean	% / SD	*n* / mean	% / SD
LMP (n, %)	23	3223	—	1622	—	1601	—
high		2648	82	1364	84	1284	80
low		575	18	258	16	317	20
Somatic symptoms, age 15 (n, %)	15	2963	—	1493	—	1470	—
no		2103	71	916	61	1187	81
yes		860	29	577	39	283	19
Somatic symptoms, age 18 (n, %)	18	2341	—	1262	—	1079	—
no		1748	75	837	66	911	84
yes		593	25	425	34	168	16
Household income (n, %)	14/15	3221	—	1620	—	1601	—
high income		1139	35	563	35	576	36
middle income		1109	34	545	34	564	35
low income		973	30	512	32	461	29
Highest education (n, %)	15	3166	—	1591	—	1575	—
>12 years		1136	36	542	34	594	38
10–12 years		1635	52	839	53	796	51
<10 years		395	12	210	13	185	12
Family function (mean, SD)	15	1.75	0.52	1.76	0.55	1.74	0.49
yes		2137	74	1072	74	1065	75
no		743	26	379	26	364	25
At least one friend (n, %)	18	2368	—	1273	—	1095	—
yes		2193	93	1198	94	995	91
no		175	7	75	6	100	9
Depressive symptoms (mean, SD)	18	2.86	2.30	3.23	2.41	2.42	2.09
yes		1214	51	558	44	656	60
no		1145	49	714	56	431	40
Life events (mean, SD)	18	2.02	1.70	2.10	1.68	1.92	1.71
yes		1022	44	525	42	497	47
no		1301	56	735	58	566	53

[a]Age when the variable was collected.
The '/' in the headers n/mean and %/SD means that the estimates shown in the respective column are either numbers or mean values or percent or standard variation.
LMP: labour market participation

and social functioning as well as a high level of school and work absences [12]. In this study we wanted to explore if reporting somatic symptoms are signs of psychological vulnerability that, due to the negative social and academic consequences, eventually lead to reduced LMP. Although the overall results do not show any strong associations between somatic symptoms and low LMP, it seems that boys reporting somatic symptoms in late adolescence are at increased risk of experiencing poor LMP in early adulthood. In line with previous studies, this study shows that some of the most commonly reported somatic symptoms across gender and age groups are headaches, nausea or upset stomach, or soreness of the muscles [7,8,14]. Similar to the findings in our study, a Swedish study found that 50% of schoolchildren reported that they often experience headaches [10], whereas in an American population of children aged 8–13, 67% reported headache during a period of 6 months [14]. In this study, approximately 10% more females than males reported somatic symptoms at both ages studied, which is a well-known gender difference [7,10].

As documented in previous studies [4,5], low family socioeconomic position showed strong association with low LMP, and a clear trend was seen across socioeconomic groups for both genders. Adjusting for somatic symptoms at age 15 or age 18 did not change the estimates considerably, indicating that somatic symptoms are not a strong mediator of the associations. Other aspects like negative life events and poor family functioning showed more modest, but significant, associations with future decreased LMP. Surprisingly, these associations, as mentioned earlier, differed in relation to gender. Strong associations between negative life events and both somatic symptoms and low LMP have been documented previously [4,29]. This study showed that especially among females, negative life events up to age 15 affected LMP negatively, whereas among the males poor family functioning measured at age 15 and

Table II. Somatic symptoms at age 15 and low labour market participation at age 23, $n = 2963$.

	Model 1 (crude)[a]	Model 2[b]	Model 3[c]	95% CI
	OR	OR	OR	
Total				
Somatic symptoms	1.16	1.18	0.98	0.72–1.32
Household income				
high income (baseline reference)				
middle income	1.97	1.74	1.58	1.12–2.22
low income	2.95	1.93	1.88	1.30–2.73
Highest education				
>12 years (baseline reference)				
10–12 years	2.20	1.91	1.73	1.26–2.39
<10 years	4.18	3.27	2.49	1.57–3.95
Family function	1.48	—	1.37	1.04–1.79
At least one friend				
yes (baseline reference)				
no	1.63	—	1.38	0.86–2.22
Depressive symptoms	1.06	—	0.99	0.94–1.06
Life events	1.22	—	1.17	1.08–1.26
Females				
Somatic symptoms	1.47	1.50	1.31	0.86–1.99
Household income				
high income (baseline reference)				
middle income	2.03	1.67	1.71	1.00–2.93
low income	3.62	2.20	2.33	1.32–4.10
Highest education				
>12 years (baseline reference)				
10–12 years	2.00	1.62	1.79	1.08–2.96
<10 years	4.58	3.34	2.39	1.22–4.69
Family function	1.64	—	1.17	0.80–1.70
At least one friend				
yes (baseline reference)				
no	1.43	—	1.06	0.48–2.31
Depressive symptoms	1.11	—	1.05	0.97–1.14
Life events	1.33	—	1.25	1.12–1.40
Males				
Somatic symptoms	1.05	1.09	0.86	0.53–1.40
Household income				
high income (baseline reference)				
middle income	1.94	1.78	1.51	0.96–2.36
low income	2.56	1.74	1.57	0.95–2.59
Highest education				
>12 years (baseline reference)				
10–12 years	2.40	2.24	1.88	1.23–2.87
<10 years	3.93	3.24	2.77	1.44–5.31
Family function	1.35	—	1.58	1.05–2.40
At least one friend				
yes (baseline reference)				
no	1.66	—	1.49	0.82–2.71
Depressive symptoms	1.04	—	0.98	0.89–1.07
Life events	1.13	—	1.10	0.99–1.22

[a]Model 1: crude estimates for all included variables.
[b]Model 2: somatic symptoms, household income and highest education mutually adjusted.
[c]Model 3: all included variables mutually adjusted.
CI: confidence interval; OR: odds ratio

reporting not having a friend at age 18 were associated with low LMP at age 23. Social relations in the family, at school, or among peers have previously been related to future low LMP [14,15], but to our knowledge the gender difference is demonstrated here for the first time.

Table III. Somatic symptoms at age 18 and low labour market participation at age 23, $n = 2341$.

	Model 1 (crude)[a]	Model 2[b]	Model 3[c]	95% CI
	OR	OR	OR	
Total				
Somatic symptoms	1.35	1.22	1.11	0.80–1.52
Household income				
high income (baseline reference)				
middle income	1.97	1.56	1.58	1.13–2.22
low income	2.95	2.03	1.83	1.27–2.66
Highest education				
>12 years (baseline reference)				
10–12 years	2.20	1.98	1.73	1.26–2.38
<10 years	4.18	2.88	2.30	1.44–3.68
Family function	1.48	—	1.42	1.09–1.85
At least one friend				
yes (baseline reference)				
no	1.63	—	1.53	0.96–2.44
Depressive symptoms	1.06	—	0.98	0.92–1.04
Life events	1.22	—	1.18	1.09–1.27
Females				
Somatic symptoms	1.44	1.24	0.97	0.63–1.52
Household income				
high income (baseline reference)				
middle income	2.03	2.01	1.81	1.06–3.08
low income	3.62	2.70	2.31	1.30–4.09
Highest education				
>12 years (baseline reference)				
10–12 years	2.00	1.80	1.86	1.12–3.08
<10 years	4.58	2.97	2.31	1.17–4.55
Family function	1.64	—	1.33	0.93–1.90
At least one friend				
yes (baseline reference)				
no	1.43	—	1.17	0.53–2.55
Depressive symptoms	1.11	—	1.05	0.96–1.14
Life events	1.33	—	1.29	1.15–1.45
Males				
Somatic symptoms	1.65	1.63	1.66	1.01–2.75
Household income				
high income (baseline reference)				
middle income	1.94	1.29	1.45	0.93–2.27
low income	2.56	1.64	1.56	0.94–2.58
Highest education				
>12 years (baseline reference)				
10–12 years	2.40	2.24	1.81	1.18–2.76
<10 years	3.93	2.94	2.51	1.27–4.95
Family function	1.35	—	1.54	1.03–2.31
At least one friend				
yes (baseline reference)				
no	1.66	—	1.62	0.90–2.91
Depressive symptoms	1.04	—	0.94	0.85–1.03
Life events	1.13	—	1.08	0.97–1.20

[a]Model 1: crude estimates for all included variables.
[b]Model 2: somatic symptoms, household income and, highest attained education mutually adjusted.
[c]Model 3: all included variables mutually adjusted.
CI: confidence interval; OR: odds ratio

Somatic symptoms were measured with a 3-year time interval, which allowed us to compare associations at two time points. Inclusion of more age groups would probably have increased the validity of the data, but we find the two ages, 15 and 18 years, relevant for measuring somatic symptoms in early and

Table IV. The association between somatic symptoms at ages 15 and 18 and low labour market participation at age 23 (4 categories), $n = 2081$.

	All		Females		Males	
	OR	95% CI	OR	95% CI	OR	95% CI
Somatic symptoms, ages 15–18						
Few-few (baseline reference)						
many-few	0.97	0.66–1.42	1.36	0.78–2.36	0.84	0.47–1.52
few-many	1.12	0.73–1.70	0.99	0.53–1.85	1.76	0.06–3.21
many-many	1.03	0.67–1.59	1.10	0.62–1.98	1.39	0.64–2.99

Adjusted for parental household income, highest education in the household, family functioning (age 15), close friends (age 18), depressive symptoms (age 18), and negative life events (age 18).
CI: confidence interval; OR: odds ratio

late adolescence, because they represent particularly sensitive life periods. Early adolescence is characterised by high levels of hormone changes, which can affect the mood of the adolescent person and the relation to family members, whereas the greatest 'identity work' happens in late adolescence where friends and relationships play an increasing role [30]. A limitation of this study is in the slightly different items used to construct the scales measuring somatic symptoms at ages 15 and 18; however, the items used are derived from the same measurement tool [21]. Supplementary analyses using only the five items asked both at age 15 and age 18 did not change the results considerably. The estimates that changed the most were the crude estimates and when adjusted for socioeconomic status, where the ORs increased by 0.12. All other estimates changed less or not at all. To explore whether a change in cutoff would change the results considerably, we performed sensitivity analyses, which showed that a change of one point in cutoff in both directions led to a change in OR of no more than 0.3.

It could be argued that measuring LMP at age 23 was too early to study the long-term effect of somatic symptoms in adolescence on future LMP. On the other hand, we found it interesting and relevant to study a possible early effect when there is still time to intervene and to prevent vulnerable young people from being permanently excluded from the labour market.

The major strengths of this study are the prospective design, making it possible to infer the likelihood of a potential causal relation between study variables; a big sample with a relatively high initial response rate of 83%; and the possibility to study somatic symptoms at two different sensitive ages.

A previous study in the same cohort has documented that those participants had slightly better school abilities and more often came from homes with a higher income or educational level compared to the source population, and that these differences increased at subsequent follow-ups. However, although certain characteristics were different among those who participated initially and at follow-ups, the study showed that this did not have any large influence on the relative risk estimates in the study. This is reassuring for the internal validity of the relative estimates in this study [18].

Another strength of the study is the complete and valid outcome information due to use of Danish Register data.

In relation to methodological considerations, some limitations have to be addressed. A limitation of this study is that measures of somatic symptoms, negative life events, social relationships with family and friends, and depressive symptoms were gathered from participants by using self-report questionnaires. At the same time, some of the variables consisted of abbreviated scales. On the other hand, because information on socioeconomic measures and the outcome variable LMP was based on Danish Register information, the different data sources minimise the risk of common method variance and thereby the risk of bias [31].

Conclusions

This study confirms results from previous research showing that socioeconomic background is strongly associated with future LMP. Besides these socioeconomic risk factors, adolescence is a life period with many changes, which can have substantial impact on the critical transition from child to adult [30]. Because females report more frequent somatic symptoms than males, there has been a tendency to think of them as being the more vulnerable of the two genders in regard to somatic symptoms. The results of this study challenge this perspective. We found males reporting somatic symptoms in late adolescence to be the most vulnerable to future reduced LMP. The results should lead to an increased awareness among educational system professionals

and health professionals of the existence of socioeconomically disadvantaged young people (and especially adolescent males with somatic symptoms) that are at risk of losing contact with the labour market. A close and ongoing dialogue among health professionals, teachers at school, and the young people about the development of symptoms and general well-being is important. Together with such initiatives, continuous support in the process of choosing future education or workplace could probably increase the chance of a young person successfully entering the labour market.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical consideration

The Danish Data Protection Agency approved the study. According to Danish law, questionnaire and register-based studies do not need approval by ethical or scientific committees, nor informed consent.

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Do negative childhood conditions increase the risk of somatic symptoms in adolescence? – a prospective cohort study

Trine N. Winding* and Johan H. Andersen

Abstract

Background: In order to prevent health and social problems later in life, it is important to identify childhood conditions related to the development of somatic symptoms. This prospective study expands on previous research by investigating whether negative childhood conditions are related to somatization later in life, taking other risk factors into account.
This study aims to investigate whether somatic symptoms of the participants' parents, poor family functioning, or negative life events during childhood result in somatic symptoms in early or late adolescence.

Methods: The study population includes participants from the West Jutland Cohort Study who responded to the survey on their somatic symptoms at age 15 ($n = 2963$) and/or age 18 ($n = 2341$). The study also includes additional questionnaire information about the participants' poor family functioning, number of negative life events, and parental reports of somatic symptoms as well as register information about parental socioeconomic background. Generalized linear models for the binomial family were used and the results were presented as relative risks (RR) and risk differences (RD) with 95% confidence intervals (95%-CI).

Results: Experiencing poor family functioning at age 15 showed associations with somatic symptoms at age 15 (RR 1.75, 95%-CI, 1.43–2.14 and RD 18, 95%-CI, 11–25%) and 18 (RR 1.32, 95%-CI, 1.00–1.75 and RD 7, 95%-CI, 0.2–14%). The relative risks between poor family functioning and somatic symptoms were 2.5 for the boys at age 15 and 1.71 for the girls at age 18. Having experienced two or more negative life events up to the age of 15 was associated with reporting somatic symptoms at age 15 (RR 1.73, 95%-CI, 1.31–2.28 and RD 24, 95%-CI, 11–37%). No relative risks above 1.35 were found between parents reporting somatic symptoms and participants reporting somatic symptoms at ages 15 or 18.

Conclusions: An increased awareness of the association between a poor social climate in the family and somatic symptoms may help professionals in health and educational systems prevent the development of such symptoms among adolescents.

Keywords: Somatic symptoms, Childhood conditions, Adolescence

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Background

Somatic complaints are common among children and adolescents [1, 2]. Danish as well as international studies have shown that up to 40% of adolescents have experienced pain related to the neck, back, or shoulder during the previous week [2–4]. Between 20 and 30% of adolescent girls in the US experience symptoms such as headache, stomach ache, back pain and morning fatigue more than once a week [5]. Somatic complaints seem to increase steadily both in total number and severity through childhood [2, 6], and between one-third and half of children who report somatic symptoms continue to report symptoms as adults [7].

Experiencing somatic symptoms in childhood and adolescence has several negative consequences for a person's later health and social life [8, 9]. A bidirectional association between somatic symptoms and depressive symptoms or anxiety has been documented as well as the possibility that these different symptoms are variants of the same primary disorder [8, 10]. Moreover, a previous Danish study found an association between somatic symptoms in adolescence and later reduced labour market participation [11]. In order to prevent these negative consequences later in life, it is relevant to identify childhood conditions related to the development of somatic symptoms.

Previous studies have shown that low family socioeconomic position is associated with higher rates of somatic symptoms among their children [5]. Furthermore, it seems that a negative parent-child relationship can affect the psychosomatic well-being of the child. A review by Eminson et al. documented that, in clinical samples, the outcome of treatment of somatic symptoms in children and adolescents was strongly linked to the family's level of functioning [12]. Likewise, in a clinical sample of 12–17 year-olds being treated for somatic symptoms over a 12-month period, Hoffman et al. found that family functioning was strongly associated with psychosocial functioning [13]. Rhee et al. found that a lack of parental affection, involvement and control was linked to somatic complains among American adolescents in grades 7 to 12 [14]. However, an association between poor family functioning and later development of somatic symptoms has not previously been documented in a non-clinical sample of Danish adolescents.

Previous studies also demonstrate that parents' own physical and mental health complaints are associated with increased levels of physical symptoms among their children [12]. Craig et al. found that the health anxieties of somatizing mothers are reflected in their children, who are more likely to have concerns about their own health [15], but these results are based on cross-sectional data and only include information about somatic symptoms of one of the parents. A UK population-based birth cohort study confirms and expands on these findings, documenting that childhood experience of illness in parents is an independent risk factor for later somatic symptoms [16]. Other negative life events such as parental divorce, parental illness or death are likewise found to be associated with an increased level of somatic symptoms [17, 18], but these findings do not take into account other negative childhood conditions, such as poor family function or somatic symptoms of the parents.

A review from 2011 by Schultze and Petermann identified the following family risk factors for the development of somatic symptoms: somatic symptoms of parents, psychopathology or disease of a close family member, dysfunctional family climate, traumatic experiences in childhood and insecure attachment [19]. However, only one of the studies included in the review used a prospective design, while the rest of the studies used cross-sectional or retrospective designs. As such, the review identifies a lack of prospective studies that investigate negative childhood conditions in relation to somatization and that take into account other risk factors.

In this study, we expand on previous research by including prospectively collected information about somatic symptoms from both parents and negative childhood conditions as well as information about somatic symptoms of the participant at two separate age points (early and late adolescence). By doing so, we aim to provide more precise and detailed information about the intergenerational transmission of somatic symptoms in a healthy population and to help school and health professionals detect adolescents with somatic symptoms before these symptoms develop into more persistent symptoms or serious health problems.

Aim

This study aims to investigate whether somatic symptoms of the participants' parents, poor family functioning, or negative life events during childhood (up to age 15) result in somatic symptoms in early adolescence (age 15) or late adolescence (age 18).

Methods

Design and population

Data for the present study were gathered as part of the ongoing West Jutland Cohort Study, which consists of all individuals born in 1989 and living in the county of Ringkjoebing, Denmark, in early April 2004 (N = 3681). Contact information for this complete regional cohort of young people was retrieved from the Central Office of Civil Registration and from public schools in the county of Ringkjoebing. The comprehensive data material contains follow-up information about the participants' health, well-being, family, school, and work-life. Results from the West Jutland Cohort Study have previously

been published in international journals [20–22]. Of the original source population, 3054 (83%) completed the initial questionnaire at age 15 (in 2004) and 2181 participants (71% of initial respondents) completed a follow-up questionnaire at age 18 (in 2007), which was conducted via email and post.

In 2004, the parents of the initial respondents completed an additional questionnaire about the parents' self-reported somatic symptoms.

Register information about the respondents was derived from national registers in Statistics Denmark by using the personal identification number (CPR number) from the Central Office of Civil Registration. A CPR number is given to every inhabitant in Denmark at birth (or upon entry to the country for immigrants) [23]. To obtain information about family socioeconomic background, the respondents were linked to their parents or guardians using their CPR number [23].

The study population includes participants who provided questionnaire information on their somatic symptoms at age 15 ($n = 2963$) and/or age 18 ($n = 2341$).

Ethical consideration

The study was approved by the Danish Data Protection Agency. According to Danish law (Act on Research Ethics Review of Health Research Projects), questionnaire and register-based studies require neither approval by ethical or scientific committees nor informed consent [24].

Outcome

Questionnaire information about somatic symptoms of the participants at ages 15 and/or 18 was measured by a subscale, the symptom checklist, from the original Hopkins Symptom Checklist-90 [25, 26]. The items were chosen according to their relevance for the two age groups. At age 15, six items with a Chronbach's alpha of 0.69 were used: whether the participants had experienced any of the following in the past 4 weeks: 1) headaches, 2) dizziness or faintness, 3) pains in heart or chest, 4) pains in lower back, 5) nausea or upset stomach, or 6) soreness of muscles. At age 18, 11 items with a Chronbach's alpha of 0.78 were used: whether the participants had experienced any of the following in the past 4 weeks 1) headaches, 2) dizziness or faintness, 3) pains in heart or chest, 4) nausea or upset stomach, 5) soreness of muscles, 6) trouble breathing, 7) hot or cold spells, 8) numbness or tingling in parts of the body, 9) a lump in the throat, 10) feeling weak in parts of the body, or 11) heavy feeling in arms or legs. The response categories (not at all, a little, moderately, quite a bit, extremely bothered) were generated into scales ranging from 0 to 24 (age 15) and 0–44 (age 18) and dichotomized at the 75th percentile into low/high somatization, with a cut-off at ≥5 and ≥ 8, respectively. We made the pragmatic decision to dichotomize at the 75th percentile so that we could explore contrasts in the material.

Exposures

Questionnaire information about the parents' somatic symptoms was measured when the participants were 15 years of age using five items from the subscale described above [25] whether the parents had experienced any of the following in the past 4 weeks: 1) headaches, 2) pains in lower back, 3) soreness of muscles, 4) numbness or tingling in parts of the body, or 5) feeling weak in parts of the body. Information was gathered about both the mother and father. The Chronbach's alphas of the somatic symptoms scale for the mother and father were 0.76 and 0.71 respectively. The five response categories were generated into scales ranging from 0 to 20 and dichotomized at the 75th percentile into low/high somatization, with a cut-off at ≥3, for both mothers and fathers.

The social climate in the family was measured by questionnaire when the participants were 15 years of age using the General Functioning Scale, which is one of seven scales from the Family Assessment Device [27]. The General Functioning Scale is made up of 12 items with an alpha of 0.85 and measures the overall health/pathology of the family, where low scores indicate healthier functioning than higher scores. The General Functioning Scale was dichotomized at the 75th percentile into good/poor family functioning, with a cut-off at 2.08 [27].

Negative life events up to age 15 were assessed using six items, partly from a scale developed by Newcomb, Huba, and Bentler [28] and partly from The Social Stress Indicator developed by Turner, Wheaton, and Lloyd [29]. The six questionnaire items asked participants at age 15 about negative life events such as divorce of parents, parental drug or alcohol abuse, disease or death in the immediate family, violent events or physical abuse. The number of negative life events was dichotomized into '0–1 events' and '2 or more events'.

Socioeconomic background was defined according to highest attained education in the household and household income in the year 2003. Based on the source population ($N = 3681$), yearly household income was divided into tertiles corresponding to lowest (< 61,931 EUR), middle (61,931–80,738 EUR), and highest (> 80, 738 EUR) income category [30]. The highest attained education in the household was recoded into three categories: < 10 years, 10–12 years, > 12 years [31]. If the participants' parents were divorced, as was the case for 28% of the participants in 2004, information was obtained from the household at which the participants' address was listed.

Information about gender was based on register information [23].

Statistical analysis

A correlation analysis between all exposure variables was performed initially and showed a correlation of $r = 0.3$ between household income and parental highest education. All other correlations were below r = 0.16. Potential interactions between somatization of both the mother and the father and between negative life events and family functioning in relation to development of somatic symptoms in early or late adolescence were tested, but none of the interaction terms contributed to the models.

The exposure variables were initially included in the models as continuous or categorical variables. A sensitivity analysis was then performed to determine whether the main results were affected when then cut-off points were changed. Since this was not the case, the exposure variables were dichotomized to improve interpretability of the results. The prevalence's of all outcome and exposure variables were presented separately for girls and boys and chi^2-tests were performed to test for gender differences (Table 1).

Generalized linear models for the binomial family were used to analyze the association between parental somatic symptoms, family functioning or number of negative life events up to the age of 15, and somatic symptoms of the child at ages 15 (Table 2) or 18 (Table 3). The results are presented as relative risks (RR) and risk differences (RD) with 95% confidence intervals (95%-CI). Crude estimates, estimates adjusted for household income and highest education in the household (partly adjusted), and estimates adjusted for socioeconomic variables and all other independent variables (fully adjusted) were presented (Tables 2 and 3). Gender specific analyses were performed, and substantial differences in risk estimates between the two genders are mentioned in the result section. Level of significance was set at $p = 0.05$. All

Table 1 Characteristics of the participants (n,%), $N = 3223$

	All		Girls ($n = 1622$)		Boys ($n = 1601$)		*P*-value
	n	%	n	%	n	%	
Somatic symptoms (age 15)	2963		1493		1470		< 0.001
few	2103	71	916	61	1187	81	
many	860	29	577	39	283	19	
Somatic symptoms (age 18)	2341		1262		1079		< 0.001
few	1748	75	837	66	911	84	
many	593	25	425	34	168	16	
Somatic symptoms mother (age 15)	1760		885		875		0.985
few	1167	66	587	66	580	66	
many	593	34	298	34	295	34	
Somatic symptoms father (age 15)	1502		746		756		0.282
few	1070	71	522	70	548	72	
many	432	29	224	30	208	28	
Family functioning (age 15)	2880		1451		1429		0.691
good	2137	74	1072	74	1065	75	
poor	743	26	379	26	364	25	
Number of negative life events, up to age 15	2959		1483		1476		0.082
0–1	2566	87	1270	86	1296	88	
2 or more	393	13	213	14	180	12	
Parental household income (age 14)	3221		1620		1601		0.219
high	1139	35	563	35	576	36	
medium	1109	34	545	34	564	35	
low	973	30	512	32	461	29	
Highest education in the household (age 14)	3166		1591		1575		0.082
high	1136	36	542	34	594	38	
medium	1635	52	839	53	796	51	
low	395	12	210	13	185	12	

Table 2 Childhood conditions related to somatic symptoms at age 15, RR and RD with 95%-CI, $N = 2963$

	Crude			Partly adjusted[b]			Fully adjusted[c]		
	Prevalence[a] (%)	RR (95%-CI)	RD (95%-CI) (%)	Prevalence[a] (%)	RR (95%-CI)	RD (95%-CI) (%)	Prevalence[a] (%)	RR (95%-CI)	RD (95%-CI) (%)
Somatic symptoms mother age 15, $n = 1760$									
few	25	ref	ref	24	ref	ref	16	ref	ref
many	33	1.28 (1.10;1.49)	7 (3;12)	31	1.29 (1.11;1.51)	7 (3;12)	23	1.25 (1.03;1.52)	8 (2;13)
Somatic symptoms father age 15, $n = 1502$									
few	27	ref	ref	24	ref	ref	16	ref	ref
many	30	1.14 (0.95;1.35)	4 (−1;9)	27	1.12 (0.94;1.33)	3 (−2;8)	17	1.02 (0.83;1.26)	1 (−5;7)
Family functioning age 15, $n = 2880$									
good	25	ref	ref	23	ref	ref	16	ref	ref
poor	42	1.69 (1.50;1.89)	17 (13;21)	41	1.69 (1.50;1.90)	17 (13;21)	34	1.75 (1.43;2.14)	18 (11;25)
Number of negative life events up to age 15, $n = 2959$									
0–1	27	ref	ref	26	ref	ref	16	ref	ref
2 or more	40	1.50 (1.31;1.72)	13 (8;19)	40	1.51 (1.31;1.75)	14 (8;19)	40	1.73 (1.31;2.28)	24 (11;37)

[a]Prevalence of somatic symptoms at age 15 in relation to the different exposure categories
[b]Partly adjusted: adjusted for parental household income and highest education in the family
[c]Fully adjusted: adjusted for parental household income, highest education in the family, and all other childhood conditions, $n = 1073$

analyses were carried out in STATA statistical package (V.15.0; State, College Station, TX).

Results

As shown in Table 1, a higher proportion of girls reported many somatic symptoms at ages 15 and 18 (39 and 34% respectively) compared with boys (19 and 16% respectively). Approximately 13% of all participants had experienced two or more negative life events at age 15; this applied slightly more to girls than boys (14% vs. 12%), but no significant gender differences were found in relation to the distribution of any of the independent variables.

The associations between the socioeconomic variables and somatic symptoms at ages 15 or 18 were not statistically significant, including the association between parental education and somatic symptoms at age 18 (fully adjusted: RR 1.19, 95%-CI, 0.74–1.89 and RD 5, 95%-CI, − 8-17%).

As shown in Table 2, the childhood conditions showing statistically significant associations with somatic symptoms of all the participants at age 15 were poor family functioning (fully adjusted: RR 1.75, 95%-CI, 1.43–2.14 and RD 18, 95%-CI, 11–25%) and having experienced two or more negative life events (fully adjusted: RR 1.73, 95%-CI, 1.31–2.28 and RD 24, 95%-CI, 11–37%). For boys experiencing poor family function, the risk of developing somatic symptoms was approximately 2.5 times higher than boys from well-functioning families, and 33% more boys from poor-functioning families reported somatic symptoms than boys from well-functioning families (results not shown). Somatic symptoms of the mother showed an association with self-reported somatic symptoms at age 15 for the whole sample (fully adjusted: RR 1.25, 95%-CI, 1.03–1.52 and RD 8, 95%-CI, 2–13%) and in girls (fully adjusted: RR 1.45, 95%-CI, 1.21–1.74 and RD 15, 95%-CI, 6–24%).

As shown in Table 3, the childhood conditions showing significant associations with somatic symptoms of all participants at age 18 were somatic symptoms of the father (fully adjusted: RR 1.35, 95%-CI, 1.04–1.74 and RD 7, 95%-CI, 0.9–14%) and poor family functioning (fully adjusted: RR 1.32, 95%-CI, 1.00–1.75 and RD 7, 95%-CI, 0.2–14%). Family functioning showed a significant association with somatic symptoms at age 18 among the girls (fully adjusted: RR 1.71, 95%-CI, 1.32–2.21 and RD 14, 95%-CI, 3–25%).

Discussion

In this study, we found statistically significant associations between experiencing poor family functioning and reporting somatic symptoms at ages 15 or 18, when adjusted for other childhood risk factors. The relative risks were 2.5 for the boys at age 15 and 1.71 for the girls at age 18. Negative life events up to the age of 15 showed a significant association with reporting somatic symptoms at age 15, but the association was not significant at age

Table 3 Childhood conditions related to somatic symptoms at age 18, RR and RD with 95%-CI, $N = 2341$

	Crude			Partly adjusted[b]			Fully adjusted[c]		
	Prevalence[a] (%)	RR (95%-CI)	RD (95%-CI) (%)	Prevalence[a] (%)	RR (95%-CI)	RD (95%-CI) (%)	Prevalence[a] (%)	RR (95%-CI)	RD (95%-CI) (%)
Somatic symptoms mother									
age 15, $n = 1760$									
few	22	ref	ref	16	ref	ref	14	ref	ref
many	29	1.33 (1.10;1.61)	7 (2;12)	23	1.28 (1.06;1.55)	6 (2;11)	16	1.25 (0.97;1.61)	5 (−0.6;11)
Somatic symptoms father									
age 15, $n = 1502$									
few	22	ref	ref	19	ref	ref	14	ref	ref
many	29	1.32 (1.07;1.62)	7 (1;13)	25	1.29 (1.04;1.59)	6 (0.4;12)	22	1.35 (1.04;1.74)	7 (0.9;14)
Family functioning									
age 15, $n = 2880$									
good	23	ref	ref	20	ref	ref	14	ref	ref
poor	31	1.35 (1.15;1.58)	8 (3;13)	27	1.30 (1.10;1.53)	7 (2;12)	22	1.32 (1.00;1.75)	7 (0.2;14)
Number of negative life events									
up to age 15, $n = 2959$									
0–1	23	ref	ref	21	ref	ref	14	ref	ref
2 or more	37	1.61 (1.33;1.94)	14 (7;21)	34	1.54 (1.26;1.89)	14 (6;21)	23	1.25 (0.79;1.99)	9 (−5;22)

[a]Prevalence of somatic symptoms at age 15 in relation to the different exposure categories
[b]Partly adjusted: adjusted for parental household income and highest education in the family
[c]Fully adjusted: adjusted for parental household income, highest education in the family, and all other childhood conditions, $n = 895$

18. No relative risks above 1.35 were found between parents reporting somatic symptoms and the participants reporting somatic symptoms at ages 15 or 18.

To our knowledge, this is the first prospective study that examines the associations between several negative childhood conditions, including somatic symptoms of the parents and reporting of somatic symptoms in adolescence in a population-based sample.

Poor family functioning showed a significant association with somatic symptoms at age 15 and 18. These findings are in line with the results of previous studies [14, 32, 33]. In a Swedish cohort, Landstedt et al. found that poor parental and peer relationships at age 16 continued to be associated with functional somatic health symptoms for up to 26 years [32], and a cross-sectional study by Hart et al. found that family conflict was associated with clinically significant somatic complaints reported by elementary school children [33]. However, the latter study included data from a predominantly African American urban study population, which may limit the ability to generalize the findings to a Danish population. The results of this study show that social workers and teachers in contact with adolescents should be aware of the adolescents' family situation if they wish to prevent the development of somatic symptoms.

In line with earlier findings, we found that somatic symptoms of the parents was associated with somatic symptoms of the children [19, 34]. However, at both age 15 and 18, the relative risks were not above 1.35. A study by Janssens et al. found that 11–16 year-olds whose parents reported high rates of functional somatic symptoms were more than four times as likely to report persistent functional somatic symptoms [34]. Our study did not find such a strong association, which is perhaps because we did not measure persistent symptoms and thus most likely measured less chronic conditions. Another study by Craig et al. found that children of somatizing mothers were more likely to experience emotional or behavioral problems, have greater concerns about their own health, and have higher consultation rates for functional somatic symptoms [15]. In our study, we used self-reported information about somatic symptoms of both the mother and the father. To our knowledge, such detailed cross-generational information about somatic symptoms has not yet been reported. It seems that having a somatizing mother increases the risk of girls having somatic symptoms at age 15. Somatic symptoms of the father were associated with somatic symptoms of their children at age 18 and the estimates where relatively robust to adjustments.

Earlier prospective studies have shown that negative life events in childhood are associated with somatic symptoms in adolescence in both genders [16–18, 35] and in girls only [36], but this has not previously been

documented in a Danish population of young people. In our study, the association between negative life events and somatic symptoms was significant at age 15, whereas the association was not significant at age 18. It is possible that the association would have been significant if some of the questions regarded negative life events of a more serious nature. For example, as mentioned above, one of the questions regarded divorce of the parents, which does not identify an uncommon life event in Denmark.

In this study, the outcome was measured at the two ages 15 and 18. We consider these ages relevant for measuring somatic symptoms in early and late adolescence, because they represent particularly sensitive life periods [37].

This study has several strengths, including its longitudinal design and relatively large sample size. Moreover, the study examines a population-based sample, which increases the generalizability of its results. Another strength is that data about somatic symptoms were available from participants at both ages 15 and/or 18 and from both of their parents, which allowed us to examine the course of somatic symptoms throughout adolescence and to differentiate between somatic symptoms of the father and the mother. Finally, the use of both register and questionnaire data minimizes the risk of common method variance and thereby the risk of bias [38].

Some limitations of the study also have to be taken into account. Despite the large sample size, the group of participants with complete information about outcome and all exposures was only $n = 1073$ (36%) and $n = 895$ (38%) at age 15 and 18 respectively. This was primarily due to missing information about father's somatic symptoms. A supplementary analysis was performed to investigate how the estimates changed if only those who had answered information about somatic symptoms at both age points were included. The most significant change in estimate was seen in relation to negative life events and somatic symptoms at age 15, where the complete case analysis increased the relative risk by 0.24 and the risk difference by 7%. All other estimates showed inconsiderable changes.

Another limitation was the use of different items when generating the somatic symptoms scales at age 15 and 18. Although the two scales contained five of the same items, it is a limitation of the study that the number of items, and thus symptoms asked about, was different at the two age collection points. Supplementary analyses showed that when using only the five identical items both at age 15 and 18 only minor changes were seen. The biggest change in estimate was a decrease of 0.25 in relative risk.

It would have been possible to use another instrument to measure negative life events, such as the ACE questionnaire, though many of the items in the ACE questionnaire are similar to those used in this study [39].

Since information about family functioning and somatic symptoms at age 15 was collected at the same time point, it is possible that negative affectivity could have played a role. In other words, it is possible that poor family functioning influences the way an individual perceives and reports his/her current symptoms, meaning that those adolescents in our study who reported poor family functioning could have automatically reported more somatic symptoms. This problem could potentially have led to differential misclassification and an overestimation of the association between family functioning and somatic symptoms. However, since this study shows associations between family functioning at age 15 and the reporting of somatic symptoms both at age 15 and 18, this potential bias is most likely limited. Another limitation of the study is that it was not possible to adjust for chronic illness among the participants. It is possible that the reported symptoms were caused by some kind of chronic illness. However, chronic illness would most likely be associated with the outcome and not the exposures and would therefore not lead to differential misclassification [40].

In prospective cohort studies, there will always be some selection based on participation, but, when comparing parental income and educational level of the source population and the study population, only small differences were seen. The prevalence of families from the lowest percentile decreased from 33 to 30%, and families with less than 10 years of education decreased from 14 to 12.5%. Information about somatic symptoms was only available for approximately half of the fathers. If the father's participation was related to both his own somatization and the degree of somatic symptoms of the child, this could potentially have biased the risk estimates. When comparing the prevalence of somatic symptoms among those children whose fathers responded and those children whose fathers did not respond, we only found minor differences in the two groups corresponding to 28 and 30%, respectively.

A previous study on the Vestliv Cohort found that selection due to participation does not necessarily significantly influence the risk estimates measured [41]. Therefore, the potential selection bias is most likely minor.

Conclusions

Our findings indicate that early negative childhood conditions, especially poor family functioning and negative life events, are associated with somatic symptoms at ages 15 and/or 18. This emphasizes the importance of professionals in health and educational system paying more attention to emotional conditions in the family, family dynamic and negative events in order to prevent adolescents from developing somatizing tendencies.

Abbreviations
CI: Confidence interval; RD: Risk difference; RR: Relative risk

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Authors' contributions
JHA initiated the study. TNW designed and performed the analyses and wrote the main paper. JHA helped analyse and interpret the data and commented on the manuscript at all stages. Both authors read and approved the final manuscript.

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

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., questionnaire and register-based studies require neither approval by ethical or scientific committees nor informed consent.

Consent for publication
Not applicable.

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

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Perceived stress among 20-21 year-olds and their future labour market participation – an eight-year follow-up study

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Abstract

Background: Labour market participation among young adults is essential for their future socioeconomic status and health. The aim of this study was to investigate the association between perceived stress among 20–21 year-olds and their labour market participation 8 years later as well as investigate any potential gender differences.

Methods: A cohort of 1640 young adults born in 1983 completed a questionnaire in 2004 in which perceived stress was measured. The cohort was followed in a register of social benefits for 12 months in 2011–2012 and was categorized into active and passive labour market participation. Logistic regression was used to analyse the association between perceived stress and future labour market participation, taking into account effects of potential confounders. The analyses were stratified by gender.

Results: The effects of perceived stress on future labour market participation differed significantly among young women and young men ($p = 0.029$). For young men, higher levels of perceived stress reduced the risk of future passive labour market participation, when adjusting for socioeconomic factors, self-rated health and copings strategies ($p = 0.045$). For young women, higher levels of perceived stress increased the risk of future passive labour market participation, when adjusting for the same potential confounding factors, although unlike the men, this association was not statistically significant ($p = 0.335$).

Conclusion: The observed gender difference has important implications from a public health point of view. Healthcare professionals might need to differentiate between the genders in terms of health communication, research and when developing preventive strategies.

Keywords: Register data, Kohort, Health, Young adults, Gender difference

Background

Labour market participation among young adults is crucial for their future socioeconomic status, working life, sense of social identity, health and well-being [1–3].

Furthermore, labour market participation among young adults is important to the society, especially Western societies facing persistent youth unemployment and an ageing labour force. If young adults do not participate in the labour market, the society is deprived of labour, leading to increased public expenditures in terms of social benefits [2]. Labour market participation in young adulthood is therefore of major interest within Western countries [2].

In order to reduce individual and societal costs, and to ensure that future demands for labour will be met, it is important to investigate factors and mechanisms associated with lack of participation in the labour market.

Previous studies have shown that factors present early in life can have substantial impact on labour market participation later in life [4–7].

A Danish longitudinal study from 2013 found that negative life events before age 14–15 increased the risk of receiving social benefits at the age of 21–22, especially among girls [4]. An American longitudinal study

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from 2013 found that young people with depressive symptoms had a higher risk of less employment and lower income later in life [6]. A Swedish study including nearly all Swedish men born between 1950 and 1970 showed that the health of the young men had long-term effects on the future labour market performance, and that the strongest negative effects were due to psychological illnesses [5].

Recently there has been an increased awareness that perceived stress among young adults is related to both mental and physical health [8–11]. There is persuasive evidence that the experience of stress among young adults is related to a poorer mental health, including depression and suicide attempts [8, 10, 12]. A high level of perceived stress is also related to poor self-rated health and an unhealthy lifestyle [8, 9, 13]. Young women typically report significant higher levels of perceived stress than young men [13–15] and there is evidence suggesting that women respond to and handle stress differently than their male counterparts [16, 17].

Due to the fact that perceived stress in young adulthood is related to an unhealthy lifestyle as well as poor health and well-being, it is likely that perceived stress also affects future labour market participation. To the knowledge of the authors, no study has yet examined this potential association.

The aim of this study was therefore to examine the association between perceived stress in young adulthood and the future labour market participation as well as investigate any potential gender differences.

Methods

Data and population

The data was taken from a questionnaire survey – the West Jutland Cohort Study [4, 14], consisting of a cohort of young adults born in 1983 and living in the county of Ringkøbing, Denmark, in the spring of 2004.

Initial data was collected in April 2004, when the participants were 20–21 years old.

The source population comprised 3373 individuals, of which 123 were excluded due to missing addresses or because they had moved to another county or another country. A total of 3250 received the initial questionnaire, of whom1869 participated and 1640 answered all questions used in this study (see the flowchart, Fig. 1). The study population of 1640 individuals thus correspond to a total response rate of 49%, 59% for women and 39% for men.

Outcome

Data on labour market participation (LMP) was obtained from the DREAM register. DREAM is a national register of all public transfer payments from mid-1991 to date. DREAM includes transfers in relation to state educational grants, unemployment benefits, sickness absence compensation, disability pension, immigration and death [18].

LMP was defined according to the amount of social benefits received in a 52-week period from week nine in year 2011 to week eight in year 2012, when the participants were 27–29 years old.

LMP was divided into two categories; *active* and *passive*, depending on the amount of received social benefits. *Active* LMP includes participants who did not

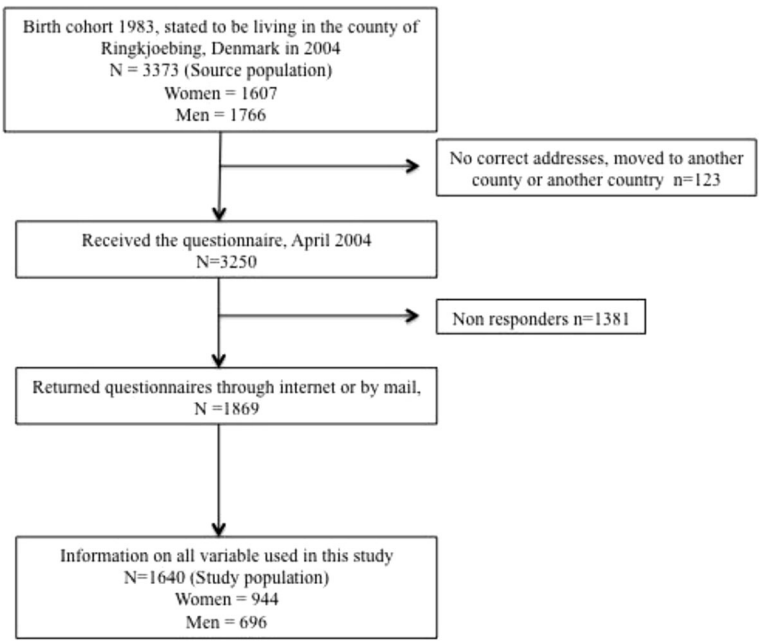

Fig. 1 Flowchart of the participants in the study

receive any social benefits, those who received maternity leave benefits, senior trainee benefits or state educational grants. *Passive* LMP includes participants who received any other benefits. These were either health related benefits (sickness absence compensation, vocational rehabilitation benefits, permanent disability benefits) or unemployment benefits of any sort.

Exposure

Data on perceived stress was obtained from the questionnaire survey in 2004. The information was merged with the information on social benefits using a unique identifier for each participating individual.

Perceived stress was assessed using a Danish four item version of *the Perceived Stress Scale* (PSS), developed by Cohen et al. and based on Lazarus's cognitive stress model [19]. According to Lazarus (and Folkman), perceived stress is "(…) a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" [20].

PSS is a global measurement tool, which is simple to use, and studies have confirmed the reliability and validity of the scale [19, 21].

The four items were: In the last month, how often have you felt; 1) no influence on the essential things in your life? 2) confident about your ability to handle your personal problems? 3) that things were going your way? 4) difficulties were piling up so high that you could not overcome them?

For each item, the participants could score between zero and four points. Item 1) and 4) were scored; *never = 0, almost never =1, occasionally = 2, often = 3* and *very often =4*. Item 2) and 3) were scored reversed. The total scale ranged from 0 to 16 points.

PSS has no clinical cut points, but with regards to the interpretation of the study the perceived stress was divided into three levels according to the number of points. *Low* level of perceived stress was defined as a score between zero and four points, *medium* level between five and nine points and *high* level between 10 and 16 points.

Perceived stress was categorised in order to get a more nuanced picture of the meaning of stress and to have the opportunity to study a possible dose-response relationship.

Potential confounders

Demographic factors Data on gender and ethnicity was obtained from DREAM. Ethnicity was divided into three categories: *Danish, Western* and *non-Western*. Due to few numbers in the Western and non-Western category, ethnicity was not included in the analysis.

Socioeconomic (SE) factors

Household (parents') income Information on household income was obtained from Statistics Denmark, from the year of 1997 [22]. The variable was divided into three categories: *lowest* (0–36.913 EUR), *medium* (36.913–74.059 EUR) and *highest* (>74.059 EUR) income. The cut points were defined after the tertiles of the household income distribution in the source population.

Secondary education completion in 2004 Data on secondary education completion was collected from Statistics Denmark [23], and the variable was divided into two categories; *completed secondary education* and *not completed secondary education*.

LMP in 2004 The variable was constructed in the same way as the outcome variable. The information was gathered from week 18 in 2003 to week 17 in 2004.

Self-assessed socioeconomic status Self-assessed socioeconomic status was measured using the MacArthur Scale of Subjective Social Status [24]. The participants were asked to place an *X* on a ladder representing their perceived socioeconomic status (in relation to income, education and prestigious jobs) in the Danish society. The ladder had ten steps, which were coded into points ranging from 1 to 10 points. The higher points the higher socioeconomic status.

Individual factors

Self-rated health Self-rated health was measured using a single item from SF-36 on general health [25]. In this study, the four response categories were dichotomised into two groups: *Excellent/very good* or *good/less good/poor.*

Coping Coping was measured using six subscales of two items each from the Brief COPE Scale [26]. Each item had four response categories with a possible score between one and four. To simplify the analyses, the items from the subscales *active coping, planning and positive reframing* were grouped into the *active* coping scale. The items from the subscales *self-distraction*, *substance use* and *behavioural disengagement* were used to form the *avoidance* coping scale. Both scales were created by taking the mean of the item scores, corresponding to scores between one and six. Higher scores indicated higher levels of the coping type.

Statistics

Initial analyses Descriptive analyses were conducted to identify the main initial characteristics of the participants

($N = 1640$). Univariate analyses were performed to describe the association between the potential confounders and perceived stress (Table 2) and LMP (Table 3, Model I). The associations were tested using Fisher's exact test (categorical variables) and the Kruskal-Wallis equality-of-populations rank test (continuous and ordinal variables).

Main analyses Crude and adjusted associations between levels of perceived stress and future passive LMP were estimated using logistic regression analysis, stratified on gender, and reported as odds ratios (OR) with 95% confidence intervals (CI). The associations were tested using test for trend. Gender differences were tested by comparing the slopes from the test for trend analysis. P-values less than 0.05 were defined as statistically significant.
The adjusted analyses were carried out in two steps: First SE factors were added (Table 3, Model II) and finally individual factors were included (Table 3, Model III). Calculations were performed using the STATA statistical package (version 12.0; Stata, College Station, TX, USA).

Results

Initial results

Initial characteristics of the sample and LMP at follow-up, distributed on gender, are presented in Table 1. A higher percentage of women perceiving medium (48.9%) or high (7.7%) level of stress compared to men (47.5% or 4.3%). At follow-up a total of 569 (34.7%) participants had passive LMP, significant more women (37.9%) than men (30.3%).

A statistically significant difference between each of the potential confounders and the level of perceived stress was found (Table 2). Secondary education completion, LMP in 2004, self-assessed socioeconomic status, self-rated health and avoidance coping were statistically significant associated with future passive LMP among women. Secondary education completion, self-assessed socioeconomic status and self-rated health were statistically significant associated with future passive LMP among men (Table 3, Model I).

Main results

In the crude analysis, and among women, perceived stress was significantly associated with future passive LMP ($p = 0.001$). The crude OR for passive LMP among those women perceiving medium stress was 1.34 (95% CI 1.02–1.77), and 2.33 (95% CI 1.40–3.85) among those perceiving high stress Table 3, Model I).

Among men, the crude OR for passive LMP among those perceiving medium stress was 0.94 (95% CI 0.68–1.31), and 1.52 (95% CI 0.71–3.27) among those perceiving high stress. The association was not significant ($p = 0.732$) (Table 3, Model I).

The crude association between perceived stress and future passive LMP did not differ significantly among women and men ($p = 0.075$, analysis not shown).

Among women, and after adjusting for SE factors the OR for passive LMP among those reporting medium perceived stress decreased to 1.23 (95% CI 0.92–1.65), and 1.74 (95% CI 1.01–2.99) among those reporting high perceived stress. The association remained significant ($p = 0.035$) (Table 3, Model II).

When adjusting for SE factors, the OR for passive LMP among those men reporting medium perceived stress decreased to 0.78 (95% CI 0.55–1.11), and 0.88 (95% CI 0.38–2.05) among those men reporting high perceived stress. The association was still not significant ($p = 0.252$) (Table 3, Model II).

The association between perceived stress and future passive LMP, adjusted for SE factors, differed significantly among women and men ($p = 0.029$, analysis not shown).

When adjusting for SE and individual factors, the OR for medium perceived stress decreased to 1.10 (95% CI 0.81–1.50) and for high perceived stress the OR decreased to 1.34 (95% CI 0.74–2.41) among women. The association was no longer significant ($p = 0.335$) (Table 3, Model III).

Among men, the OR for medium perceived stress decreased to 0.67 (95% CI 0.45–0.97) and for high perceived stress the OR decreased to 0.61 (95% CI 0.24–1.54) after adjusting for SE and individual factors. The association was significant ($p = 0.045$) (Table **3**, Model III).

The association between perceived stress and future passive LMP, adjusted for SE and individual factors, differed significantly among women and men ($p = 0.029$, analysis not shown).

Discussion

The principal finding in the present study was that the association between perceived stress among 20–21 year-olds and their LMP 8 years later differed significantly among women and men, when adjusting for potential confounders ($p = 0.029$).

For women, higher levels of perceived stress increased the risk of passive LMP and for men, higher levels of perceived stress reduced the risk of passive LMP. Unlike the women ($p = 0.335$), the association was significant for men ($p = 0.045$).

The higher proportion of young women who experienced higher stress compared to young men is in accordance with findings by Glasscock et al. [14], Brooks et al. [13] (and Lesage et al. [15].

Also, both psychologically and biologically women and men tend to react differently when exposed to stress. According to Shelley E. Taylor the stress response is

Table 1 Basic characteristics and labour market participation of the study population

	Women $N = 944$	Men $N = 696$	Total $N = 1640$	p, Gender difference
	n (%) or mean (SD)	*n* (%) or mean (SD)	*n* (%) or mean (SD)	
LMP[a] 2011/2012				0.001[d]
Active (%)	586 (62.1)	485 (69.7)	1071 (65.3)	
Passive (%)	358 (37.9)	211 (30.3)	569 (34.7)	
Perceived stress				0.002[d]
Low (%)	409 (43.3)	348 (50.0)	757 (46.2)	
Medium (%)	462 (48.9)	318 (45.7)	780 (47.5)	
High (%)	73 (7.7)	30 (4.3)	103 (6.3)	
Ethnicity				0.76[d]
Danish (%)	911 (96.4)	673 (96.8)	1584 (96.6)	
Western (%)	9 (1.0)	4 (0.6)	13 (0.8)	
Non-Western (%)	25 (2.6)	18 (3.6)	43 (2.6)	
Household (parents') income				0.663[d]
Lowest (%)	150 (15.9)	102 (14.7)	252 (15.4)	
Medium (%)	540 (57.2)	395 (56.7)	935 (57)	
Highest (%)	254 (26.9)	199 (28.6)	453 (27.6)	
Secondary Education				<0.001[d]
Completed (%)	743 (78.7)	464 (66.7)	1207 (73.6)	
Not completed (%)	201 (21.3)	232 (33.3)	433 (26.4)	
LMP[a] in 2004				0.758[d]
Active (%)	752 (79.7)	550 (79.0)	1302 (79.4)	
Passive (%)	192 (20.3)	146 (21.0)	338	
Self-assessed socioeconomic status[b], mean (SD)	5.6 (1.6)	5.9 (1.7)	5.7 (1.7)	<0.001[e]
Self-rated health				<0.001[d]
Excellent/very good (%)	523 (55.4)	446 (64.1)	969 (59.1)	
Good/less good/bad (%)	421 (44.6)	250 (35.9)	671 (40.9)	
Active coping strategy[c], mean (SD)	2.8 (0.5)	2.9 (0.5)	2.8 (0.5)	0.064[e]
Avoidance coping strategy[c], mean (SD)	1.6 (0.4)	1.6 (0.4)	1.6 (0.4)	0.986[e]

SD standard deviation, [a]*LMP* labour market participation, [b]Scale from 0 to 10;higher = better, [c]Scale from 0 to 6;higher = more, [d] = Fishers' exact test, [e] = Kruskal-Wallis equality-of-populations rank test

characterized by *fight-or-flight* in men and by *tend-and-befriend* in women [17].

Also Kunz-Ebrecht et al. found a larger awakening cortisol response on working days in women compared to men, indicating that women experience a high level of strain from family responsibilities on workdays [16]. This might help explain the observed gender difference.

Another explanation could be the way perceived stress is measured. It is possible that PSS only capture stress symptoms in women and not men. In the depression literature it is found that men manifest depression differently than women, and the original Depression Scale does not capture the depressed men. Therefore a Masculine Depression Scale has been developed [27]. Given the experiences from the Depression literature can be transmitted to stress, the findings of the present study might indicate a need of developing a Masculine PSS.

Strengths and limitations of the study

One of the strengths of the study is the use of high-quality register data with complete follow-up. The fact that the information on outcome was obtained through a register reduces the risk of recall- and selection bias. The design was prospective, which allows an evaluation of temporal associations. Furthermore, the study extends over 8 years, which ensures that almost all of the participants have finished their education.

As perceived stress is a subjective assessment the use of self-reported questionnaire, The Perceived Stress Scale (PSS), is a reasonable method to use. PSS is designed to tap the degree to which respondents find their lives unpredictable, uncontrollable and overloading – central components of the experience of stress, and the measure takes the individual differences regarding the perception of stress into account [19].

Table 2 Basic characteristics divided on the levels of perceived stress

	Perceived stress $N = 1640$			
	Low $N = 757$	Medium $N = 780$	High $N = 103$	p
	n (%) or mean (SD)	n (%) or mean (SD)	n (%) or mean (SD)	
Gender				0.002[d]
Female (%)	409 (54.0)	462 (59.2)	73 (70.9)	
Male (%)	348 (46.0)	318 (40.8)	30 (29.1)	
Household (parents') income				0.004[d]
Lowest (%)	95 (12.6)	130 (16.7)	27 (26.2)	
Medium (%)	437 (57.7)	447 (57.3)	51 (49.5)	
Highest (%)	225 (29.7)	203 (26.0)	25 (24.3)	
Secondary Education				<0.001[d]
Completed (%)	603 (79.7)	543 (69.6)	61 (59.2)	
Not completed (%)	154 (20.3)	237 (30.4)	42 (40.8)	
LMP[a] in 2004				<0.001[d]
Active (%)	633 (83.6)	605 (77.6)	64 (62.1)	
Passive (%)	124 (16.4)	175 (22.4)	37 (37.9)	
Self-assessed socioeconomic status[b], mean (SD)	6.2 (1.5)	5.5 (1.6)	4.3 (1.9)	<0.001[e]
Self-rated health				<0.001[d]
Excellent/very good (%)	562 (74.2)	386 (49.5)	21 (20.4)	
Good/less good/bad (%)	195 (25.8)	394 (50.5)	82 (79.6)	
Active coping strategy[c], mean (SD)	3.0 (0.5)	2.7 (0.5)	2.5 (0.5)	<0.001[e]
Avoidance coping strategy[c], mean (SD)	1.5 (0.3)	1.7 (0.4)	2 (0.5)	<0.001[e]

SD standard deviation, [a]*LMP* labour market participation, [b]Scale from 0 to 10;higher = better, [c]Scale from 0 to 6;higher = more, [d] = Fishers' exact test, [e] = Kruskal-Wallis equality-of-populations rank test

PSS is, in its original 14 items form, correlated with negative life events, cortisol level, physical and depressive symptoms and disease, and is considered to be a valid measurement tool of stress [19, 21, 28].

When interpreting the findings of the study, the potential error induced by the 8 years follow-up, with no information about stress level or LMP of the participants should be considered. Significant things, such as disease or negative life events could have occurred during the time period and may have affected the LMP. Furthermore, according to Lazarus's stress theory, the perceived level of stress is not a static condition and may change over time. The level of stress is influenced by daily hassles, major life events, and changes in the availability of coping [20].

The potential changes during the follow-up period can blur the association between perceived stress and the future LMP.

Regarding the measurement of perceived stress, it should be noted that because of the limited number of items in the PSS version used, the scale suffers in internal reliability and provides a less adequate approximation of the perceived stress levels compared to the 10-item and 14-item versions [19]. For this reason, non-differentiated misclassification cannot be excluded. In the future, it is recommended to use PSS with 10 or 14 items.

Not all participants returned the questionnaire (the response rate was 49%), and non-response could have affected the results. Due to missing data on perceived stress, it was not possible to determine the magnitude of the selection.

According to S. Taylor the stressed men need time off to de-stress [17]. and it is likely that the most stressed men tend not to participate. This could lead to selection bias.

Unpublished analyses of the data showed that a bigger proportion of the study population came from nuclear families with higher SE status, and a smaller proportion had another ethnicity than Danish, compared to the source population.

The presented limitations are not considered to cause serious bias in relation to the observed associations. However, caution about causal interpretation is warranted. It is likely that factors such as social support may also have an impact on perceived stress and LMP, which other studies have shown [29, 30].

Table 3 Logistic regressions-analysis

	Odds ratios for passive labour market participation																	
	Women									Men								
	Model I			Model II			Model III			Model I			Model II			Model III		
	Crude ($N = 944$)			Adjusted for SE factors ($N = 944$)			Adjusted for all factors ($N = 944$)			Crude ($N = 696$)			Adjusted for SE factors ($N = 696$)			Adjusted for all factors ($N = 696$)		
	OR	[95% CI]	*p*	OR	[95% CI]	*p*	OR	[95% CI]	*p*	OR	[95% CI]	*p*	OR	[95% CI]	*p*	OR	[95% CI]	*p*
Perceived stress			0.001[d]			0.035[d]			0.335[d]			0.732[d]			0.252[d]			0.045[d]
Low	1			1			1			1			1			1		
Medium	1.34	1.02–1.77		1.23	0.92–1.65		1.10	0.81–1.50		0.94	0.68–1.31		0.78	0.55–1.11		0.67	0.45–0.97	
High	2.33	1.40–3.85		1.74	1.01–2.99		1.34	0.74–2.41		1.52	0.71–3.27		0.88	0.38–2.05		0.61	0.24–1.54	
Household (parents') income			0.070			0.856			0.739			0.570			0.614			0.633
Lowest	1.48	0.98–2.24		1.04	0.67–1.62		1.07	0.68–1.66		1.07	0.63–1.82		0.78	0.44–1.38		0.79	0.44–1.40	
Medium	1.14	0.83–1.56		1.01	0.73–1.40		1.07	0.77–1.48		1.29	0.88–1.88		1.15	0.78–1.69		1.13	0.76–1.67	
Highest	1			1			1			1			1			1		
Secondary education																		
Completed	1			1			1			1			1			1		
Not completed	2.75	2.00–3.78	<0.001	2.43	1.74–3.39	<0.001	2.4	1.71–3.36	<0.001	1.6	1.14–2.24	0.006	1.47	1.02–2.11	0.4	1.43	0.99–2.07	0.056
LMP[a] in 2004																		
Active	1			1			1			1			1			1		
Passive	1.97	1.43–2.72	<0.001	1.72	1.23–2.40	0.002	1.74	1.24–2.44	0.001	1.07	0.72–1.59	0.725	0.89	0.57–1.38	0.599	0.87	0.56–1.35	0.524
Self-assessed socioeconomic status[b], pr unit	0.9	0.83–0.98	0.016	0.99	0.90–1.08	0.763	1.00	0.91–1.10	0.957	0.78	0.71–0.86	<0.001	0.78	0.70–0.86	<0.001	0.79	0.71–0.88	<0.001
Self-rated health																		
Excellent/very good	1						1			1						1		
Good/less good/bad	1.42	1.09–1.85	0.009				1.21	0.91–1.62	0.195	1.51	1.08–2.10	0.015				1.38	0.96–2.00	0.082
Active coping strategy[c], pr. unit	0.78	0.59–1.01	0.064				1.06	0.78–1.44	0.713	0.74	0.54–1.02	0.068				0.87	0.61–1.25	0.459
Avoidance coping strategy[c], pr. unit	2.04	1.40–2.95	<0.001				1.69	1.10–2.60	0.016	1.52	0.99–2.35	0.056				1.26	0.76–2.10	0.317

[a]*LMP* labour market participation, [b]Scale from 0 to 10;higher = better, [c]Scale fram 0–6;higher = more, [d] = test for trend

Nevertheless, the associations that remained after the adjustments bear witness to a gender difference in relation to perceived stress and LMP.

The study population consisted of young adults, resident in the County of Ringkøbing, Denmark, in 2004 and very few participants had a different ethnicity than Danish. One should therefore show caution when generalizing the results to populations not similar to the study population and a future national survey is recommended.

Conclusion

In conclusion, the analyses showed a significant gender difference in the effects of perceived stress on LMP. In the future, healthcare professionals might need to differentiate between the genders in terms of communication and prevention of health related issues. Furthermore, researchers should be aware of the gender difference and consider stratifying their analyses on gender.

From a public health point of view, it is important to understand the causes and predictors of passive LMP, in order to identify high-risk groups and developing preventive strategies. Based on this study a higher level of perceived stress does not increase the risk of future passive LMP among young men, actually it has the reverse effect. Contrary, higher levels of perceived stress tends to increase the risk of future passive LMP, among young women. In the future, more research on the area is required.

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Availability of data and materials
The dataset The West Jutland Cohort Study dataset analysed during the current study is available from the corresponding author on reasonable request. The DREAM dataset and the merger of The West Jutland Cohort Study dataset and the DREAM dataset are available from Statistics Denmark but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the Danish Data Protection Agency.

Authors' contributions
NT and ML made substantial contributions to conception and design, TL, ML, and TNW made the acquisition of data. NT, TNW made the analysis and all authors made the interpretation of data. NT drafted the manuscript, TL, TNW, ML was involved in revising it the manuscript critically for important intellectual content. All authors have given a final approval of the version to be published. And have agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors have read and approved the final manuscript.

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

Consent for publication
Not applicable.

Ethics approval and consent to participate
The study and use of the DREAM dataset was approved by the Danish Data Protection Agency. According to Danish law studies using questionnaire and register data (The Act on Processing of Personal Data - Act No. 429 of 31 May 2000) do not require informed consent.

Publisher's Note

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ORIGINAL ARTICLE

Coping strategies in adolescence and labour-market participation in young adulthood: A prospective birth cohort study

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Abstract

Aims: The aim of this study was to investigate whether coping strategies in adolescence (14–15 years of age) were associated with labour-market participation (LMP) in young adulthood (25–26 years of age) and whether the association differed by sex. *Methods:* A birth cohort from the former county of Ringkjoebing, Denmark, consisting of 2826 individuals, comprised the study population. In 2004, the study population completed a questionnaire from which information about coping and covariates were gathered. Coping strategies were measured using five sub-scales of the Brief COPE Scale, which were combined into two overall coping strategies: active coping and avoidant coping. Ten years later, the participants were followed for a 52-week period in a register on social benefits. Logistic regression was applied to data, with adjustment for covariates: sex, parents' socio-economic status (education and income) and self-rated health.*Results:* A total of 2203 (78%) participants were categorised as high LMP at follow-up. No significant associations were found between active coping in adolescence and LMP in 2014/2015. For avoidant coping, in the fully adjusted model, medium-level avoidant coping was associated with higher odds (odds ratio (OR)=1.02 (95% confidence interval (CI) 0.83–1.25) of high LMP. For low avoidant coping, the OR was 1.37 (95% 1.07–1.75). For both coping strategies, sex did not modify the association. ***Conclusions:*** **Findings showed that avoidant coping was significantly associated with high LMP. Further research is needed to investigate coping in relation to specific problem areas.**

Keywords: *Brief COPE, coping, adolescent, employment, unemployment, cohort studies*

Introduction

Early labour-market marginalisation among young adults is of great concern due to the related consequences. In 2015, in the Scandinavian countries, 10–12% of the population in the 20–24 age group were neither employed nor enrolled in education/training [1]. Unemployment in young adulthood is associated with poorer mental health [2], increased use of health services, deteriorated health behaviour and higher mortality [3]. Furthermore, long-term unemployment in early life is associated with higher levels of sickness absence and unemployment later in life [4–6]. Studies have also shown that psychological well-being is associated with labour-market status [7,8]. In addition, in Western societies, an individual's job is often closely related to his/her sense of identity and social status [8,9].

These consequences are not only related to the individual, but also to increased costs of health care. Moreover, when young adults do not participate in

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the labour market, it results in expenditure of social benefits [10].

Studies have shown that an adult's success in the labour market depends on factors and health status before adulthood [11–16]. Socio-economic disadvantages during childhood and negative life events are associated with decreased labour-market participation (LMP) [11–13]. In addition, both physical and mental health is related to later LMP. Chronic diseases at the ages of 7 and 16 and mental health in youth have been shown to affect labour-market attachment later in life [13–15]. Concerning psychological factors, one study showed that for boys, 'task persistence' at the age of 13 is positively associated with LMP in middle adulthood [16].

Adolescence is a development stage, in which major biological, psychological and social changes must be dealt with, which can be stressful [17]. How young people cope during this period is relevant to investigate.

Coping is a process where efforts are made to manage specific external and/or internal types of demands, according to Lazarus [18]. The coping literature mostly distinguishes between two overall coping strategies: problem-focused coping and emotion-focused coping. A problem-focused strategy is regarded as an active way of coping and involves efforts to deal with the problem or the stressful situation actively, whereas emotion-focused coping involves attempts to handle the emotions in relation to the situation or doing something else in order not to think about the problem or stressful situation [18–20].

Research on coping in adolescence is more scarce than research on adults. Studies addressing coping and employment among adults mainly focus on coping strategy as a moderator of the effect of adverse employment situation and health outcomes [21–23], but some studies have shown prospective associations between coping strategy and risk of sickness absence from work [24,25], Studies among adolescents are often conducted in relation to specific medical conditions or major life events and not on everyday hassles [26–28]. Only a few studies have investigated everyday hassles [17,29–31]. Some of these have shown that girls and boys make use of different coping strategies in adolescence [29–31]. Lazarus's work on coping shows that the use of coping strategies is partly determined by individual resources such as health, social support and material resources [18], and are thus unequally distributed across socio-economic groups. As coping resources may influence how individuals react to stressful events and conditions, it is conceivable that coping strategies can act as a mitigating or worsening factor for the educational and occupational consequences of various stressors.

To our knowledge, the association between coping strategies in adolescence and later LMP has not previously been investigated. The aims of this study were to examine whether different coping strategies in adolescence (14–15 years of age) were associated with LMP in young adulthood (25–27 years of age) and to explore potential sex differences.

Methods

Population and data

The source population was derived from the West Jutland Cohort Study and consisted of individuals born in 1989 and still living in the former county of Ringkjoebing in April 2004. A total of 3681 individuals fulfilled these criteria, and contact information was collected from the Central Office of Civil Registration, where all individuals with a Danish civil personal registration (CPR) number are registered. In 2004, when this population was 14–15 years old, they were asked to complete a baseline survey questionnaire about themselves and their health. Most questionnaire surveys were conducted during school hours. For those not present in school on that day or for those attending schools not permitted to fill in the questionnaire in class, the questionnaire was sent by mail. A total of 3054 individuals took part in the questionnaire survey, yielding a response rate of 83% [32]. Because of missing information on both exposure and covariates, the study population consisted of 2826 individuals, corresponding to 77% of the source population.

This study employs data from self-administered questionnaires and national register data held by Statistics Denmark and linked by CPR numbers. This added information about the respondents' social background, as all individuals registered in the Central Office of Civil Registration are linked to their parents via their CPR number. Information about LMP was obtained from The Danish Register for Evaluation of Marginalisation (DREAM), which is administered by The National Labour Market Authority. DREAM includes all individuals who have received any type of public transfer payments since mid-1991, registered on a weekly basis. Payments in DREAM are identified with more than 100 specific codes in relation to state education fund grants, maternity leave pay, unemployment benefits, social assistance, sickness benefits, vocational rehabilitation benefits, retirement benefits and so on[33].

Measures

LMP. Ten years after the respondents filled in the questionnaire (May–June 2014), they were followed

in DREAM for a 52-week period. At this time, respondents were 25–26 years of age. The study population was divided into two LMP categories, depending on whether they received social benefits during this 52-week period. One category, high LMP, included those not receiving any social benefits, those on maternity leave, those receiving senior trainee benefits and those receiving state educational grants for at least 48 out of the 52 weeks of follow-up. The other category, low LMP, included those receiving all other kind of social benefits for more than four out of the 52 weeks of follow-up. These benefits were either health-related benefits (sickness absence compensation, vocational rehabilitation benefits, permanent disability benefits) or any sort of unemployment benefit. This approach has been used previously [11].

Coping. Coping was measured using five sub-scales from the Brief Cope Scale of two items each [19]. The sub-scales used were 'active coping', 'planning', 'positive reframing', 'self-distraction' and 'behavioural disengagement'. Cronbach's alpha for the sub-scales has previously been shown to range from 0.49 to 0.86 on the same study population [34], which is consistent with the values originally reported by Carver [19]. Each item had four response categories, expressing the frequency of the use of the specific coping strategy, ranging from 1='never' to 4='a lot'.

The sub-scales were grouped into two overall coping strategies: 'active coping' and 'avoidant coping'. This is a similar approach to earlier research on coping in the same source population [34], as well as to studies by other researchers on other study populations [19]. Active coping reveals to what extent one actively acts to change a situation. Avoidant coping reveals the extent to which one avoids dealing with a problem or situation. In this way, it resembles the distinction between problem- and emotion-focused coping employed by Lazarus [18].

The six items from the sub-scales 'active coping', 'planning' and 'positive reframing' were combined, and they formed the active coping scale, where scores ranged from 1 to 4.

The four items from the sub-scales 'self-distraction' and 'behavioural disengagement' were combined, and they formed the avoidant coping scale, where scores also ranged from 1 to 4. The two coping categories were constructed by taking the mean values from the items in the sub-scales, with the two constructed coping categories thus containing scores between 1 and 4. Higher scores indicated more frequent use of the coping strategy.

Both active and avoidant coping were divided into three groups – low, medium and high levels of the specific coping strategy – based on the tertiles.

Covariates. Socio-economic status (SES) was measured using register data on household income and highest attained education of each respondent's parents or guardians in 2003. In cases where parents were divorced, information was from where the respondents had their place of residence. Income was divided into tertiles of household income distribution: lowest (<€66,472.5), medium (€66,472.5–84,837.6) and highest income (>€84,837.6). The mean value of income was €77,934.3 (min €10,155.7 and max €457,855.9). Information on parents' highest attained education was obtained from The Danish Educational Register and was divided into three categories: <10 years of school (11.9%), 10–12 years of school (51.3%) and >12 years of school (36.8%).

Self-rated health was measured using one single item from the SF-36 questionnaire on general health [35]. The item used was 'In general, how would you rate your health?' with five response categories, ranging from 'poor' to 'excellent'. In this study, the five categories were dichotomised, with the responses 'poor', 'less good' and 'good' being categorised as low self-rated health (25.3%), and the responses 'very good' and 'excellent' being categorised as high self-rated health (74.7%).

Statistics

Descriptive analyses were conducted to identify characteristics of the study population (n=2826) at baseline in 2004 (Tables I and II). Each coping strategy was cross-tabulated against each covariate. The Mann–Whitney test and Kruskal–Wallis test were used to test whether the distribution differed significantly.

Logistic regression was used to investigate the relationship between each coping strategy at baseline in 2004 (independent variable) and LMP in 2014/2015 (dependent variable). Associations were reported as odds ratios (OR) with 95% confidence intervals (CI). Analyses were performed in three steps for each coping strategy. Initially, a crude association between the coping strategy and LMP was estimated. In the second model, adjustments for sex and parents' SES were made. The third model was further adjusted for self-rated health. All models were tested for whether sex modified the association between coping and LMP. All analyses were performed using STATA v14.2 (StatCorp, College Station, TX).

Ethics statement

The study was approved by the Danish Data Protection Agency, according to Danish law for studies using questionnaire and register data (The Act on

Table I. Characteristics of the study population for active coping.

	Low (*n*=674)	Medium (*n*=986)	High (*n*=1166)	*p*
	n (%)	*n* (%)	*n* (%)	
Sex				
Boys	324 (48.07)	493 (50.00)	586 (50.26)	0.416[a]
Girls	350 (51.93)	493 (50.00)	580 (49.74)	
Parents' education				
<10 years	87 (12.91)	107 (10.85)	142 (12.18)	0.001[b]
10–12 years	373 (55.34)	521 (52.84)	557 (47.77)	
>12 years	214 (31.75)	358 (36.31)	467 (40.05)	
Parents' income				
Lowest	241 (35.76)	324 (32.86)	377 (32.33)	0.035[b]
Medium	239 (35.46)	325 (32.96)	378 (32.42)	
Highest	194 (28.78)	337 (34.18)	411 (35.25)	
Self-rated health				
Low	250 (37.09)	246 (24.95)	219 (18.78)	0.000[a]
High	424 (62.91)	740 (75.05)	947 (81.22)	
Labour-market participation				
Low	166 (24.63)	210 (21.30)	247 (21.18)	0.133[a]
High	508 (75.37)	776 (78.70)	919 (78.82)	

[a]Mann–Whitney test.
[b]Kruskal–Wallis test.

Table II. Characteristics of the study population for avoidant coping.

	Low (*n*=748)	Medium (*n*=1121)	High (*n*=957)	*p*
	n (%)	*n* (%)	*n* (%)	
Sex				
Boys	387 (51.74)	545 (48.62)	471 (49.22)	0.353[a]
Girls	361 (48.26)	576 (51.38)	486 (50.78)	
Parents' education				
<10 years	82 (10.96)	111 (9.90)	143 (14.94)	0.002[b]
10–12 years	372 (49.73)	578 (51.56)	501 (52.35)	
>12 years	294 (39.30)	432 (38.54)	313 (32.71)	
Parents' income				
Lowest	223 (29.81)	369 (32.92)	350 (36.57)	0.003[b]
Medium	254 (33.96)	365 (32.56)	323 (33.75)	
Highest	271 (36.23)	387 (34.52)	284 (29.68)	
Self-rated health				
Low	136 (18.18)	258 (23.02)	321 (33.54)	0.000[a]
High	612 (81.82)	863 (76.98)	636 (66.46)	
Labour-market participation				
Low	133 (17.78)	256 (22.84)	234 (24.45)	0.001[a]
High	615 (82.22)	865 (77.16)	723 (75.55)	

[a]Mann–Whitney test.
[b]Kruskal–Wallis test.

Processing of Personal Data – Act No. 429 of 31 May 2000). As data were analysed anonymously; informed consent was not required.

Results

Girls (50.4%) and boys (49.6%) were equally represented in the study population. For both coping strategies, no differences were found between girls and boys concerning their use of coping strategies (Tables I and II).

For both active coping and avoidant coping, a significant difference was found between levels of parents' education and income and the adolescents' self-rated health and use of the two coping strategies.

Table III. Odds ratios for high labour-market participation in 2014/2015.

	Model 1		Model 2		Model 3	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Active coping						
Low	1		1		1	
Medium	1.21	(0.96–1.52)	1.17	(0.92–1.47)	1.14	(0.90–1.44)
High	1.22	(0.97–1.52)	1.16	(0.92–1.45)	1.12	(0.89–1.41)

Model 1: crude model; model 2: adjusted for sex, parents' education and parents' income; model 3: adjusted for sex, parents' education and parents' income and self-rated health.
OR: odds ratio; CI: confidence interval.

Table IV. Odds ratios for high labour-market participation in 2014/2015.

	Model 1		Model 2		Model 3	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Avoidant coping						
Low	1.50	(1.18–1.90)	1.41	(1.11–1.79)	1.37	(1.07–1.75)
Medium	1.09	(0.89–1.34)	1.04	(0.85–1.28)	1.02	(0.83–1.25)
High	1		1		1	

Model 1: crude model; model 2: adjusted for sex, parents' education and parents' income; model 3: adjusted for sex, parents' education and parents' income and self-rated health.

A total of 78% (n=2203) were categorized as high LMP at follow-up, and 22% (n=623) were categorized as low LMP (Tables I and II). In the 52 weeks of follow-up, 14% (n=400) received benefits for more than 25% of the follow-up period, whereas 7.3% (n=210) received social benefits for more than 50% of the follow-up period. Further, 4.9% (n=138) received benefits for more than 75% of the follow-up period, and finally 3% (n=88) received social benefits for the whole period (data not shown).

Active coping

No significant associations were found between active coping and LMP (Table III). All three models were tested to see if sex modified the association, but no significant interactions were found (p=0.51–0.76; analysis not shown).

Avoidant coping

In model 1, avoidant coping was significantly associated with high LMP in 2014/2015 (Table IV). The crude OR for low avoidant coping was 1.50 (95% 1.18–1.90; Table IV). In model 2, the association remained significant, and the same was the case in the fully adjusted model 3, where the OR for high LMP among adolescents with low avoidant coping was 1.37 (95% CI 1.07–1.75). All models were tested to see whether sex modified the association, but no significant interactions were found (p=0.92–0.98; analysis not shown).

Discussion

No association between active coping at 14–15 years of age and future LMP was found. Low avoidant coping was associated with high LMP when adjusted for all covariates. For medium avoidant coping, the association was insignificant. For both coping strategies, sex did not modify the association.

To our knowledge, no previous studies have investigated how coping strategies in adolescence affect later LMP. One previous study found that for boys, high task persistence was associated with later occupational status [16]. This supports the findings from the present study where psychological factors are related to future LMP. Our study also points in the same direction as those studies among adults, where prospective associations between specific coping strategies and future adverse occupational outcomes have been shown [24,25].

No differences were found in the use of coping strategies between boys and girls. This is not consistent with previous studies, which have shown boys and girls using different coping strategies [29–31]. These differences could be explained by the different measures of coping in the studies. Furthermore, the previous studies all investigated situational specific coping and measured specific coping strategies rather

than overall measures of coping strategies. In two of the studies, participants were asked if they used specific coping strategies when coping with problems concerning school, parents, peers, romantic relations, self, future, leisure time and vocational goals [17,29]. Another study examined relations to friends and academic work [30]. In the present study, participants were asked to report what they usually do when they experience something stressful. Therefore, the results from this study are reported as an overall coping strategy, which makes comparisons difficult.

The descriptive analysis showed overall trends for parents' SES and use of coping (Tables I and II). For avoidant coping, adjusting for SES did not change the significance of the ORs for LMP. This indicates that avoidant coping is a relevant factor in relation to LMP. The analyses did not show any significant effect of active coping strategies in adolescence and later LMP. The degree to which 14- to 15-year-olds adhere to 'active coping', 'planning' and 'positive reframing' was less important than if the adolescent practiced 'self-distraction' and 'behavioural disengagement' when facing challenges and coping with stressors. Research has shown passive coping strategies to be associated with low self-esteem among adolescents [33]. Self-esteem can be an important and determining requisite in relation to educational and occupational success [33], and it is possible that avoidant coping can be part of a personality trait that needs support when facing the challenges of education and working life.

Strengths and limitations

A clear strength of the present study is the use of high-quality register data, which enabled full information on LMP for all participants. In addition, DREAM is shown to be a valid measure of employment [33], which ensures very low risk of misclassification.

However, there is no standard way of defining LMP. Therefore, the definition in the present study was made in the same way as another study published on the same study population [11]. Low LMP was defined as receiving social benefits for more than 4 of the 52 weeks of follow-up. This might be a rough division, which can lead to classification of participants as low LMP, even though they may have been working for most of the year. If this potential misclassification is non-differentiated, which is most likely, it can lead to an underestimation of the association.

Regarding the measurement of coping, only 5 of the 14 sub-scales from the Brief COPE Scale were included in the study. This could create potential information bias if this derived measure of coping is not a valid measure of the coping strategies they actually use. Some of the sub-scales that were not included could be associated with LMP differently, which might lead to over- or underestimating the association. Furthermore, the creation of the two overall strategies is not made in relation to a standard. The author of the Brief COPE Scale does not state anything about collapsing into overall scales, but rather focuses on each separate sub-scale [19]. In general, the different ways of defining and measuring coping in adolescence make it difficult to compare studies in this area [20].

It must be noted that during the relatively long follow-up, unmeasured events could have occurred, which may have affected LMP and thereby diluted the effects of coping.

The response rate was relatively high (83%), but no information on coping and LMP were available for the 17% who did not participate. Earlier research on the same population has shown that initial non-participants are more likely to come from homes with lower income and lower education [32]. Results from the present study showed that active coping and avoidant coping could be related to parents' education and income. This could indicate that non-participants would score differently on coping. Selection bias can only occur if the association between coping and LMP differs between respondents and non-respondents. Due to the broad exposure contrast represented for both coping strategies in the study, it is not expected that selection bias affected our analyses.

The mentioned limitations are not considered to induce serious bias to the calculated associations. However, caution must be made when interpreting the results. The calculated association are for coping in general, and odds are reported for LMP for most of the time (more than 48 weeks) for the follow-up year.

From a public-health perspective, getting more young people into the labour market would be beneficial not only for the individual, but also for society. The findings from this study indicate that coping is associated with future LMP. However, future research must focus on more specific situation coping to make it clearer in which arenas or situations there is a need to help young people to cope in a certain way. The knowledge could be important for future health-promotion practices.

Declaration of conflicting interests

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