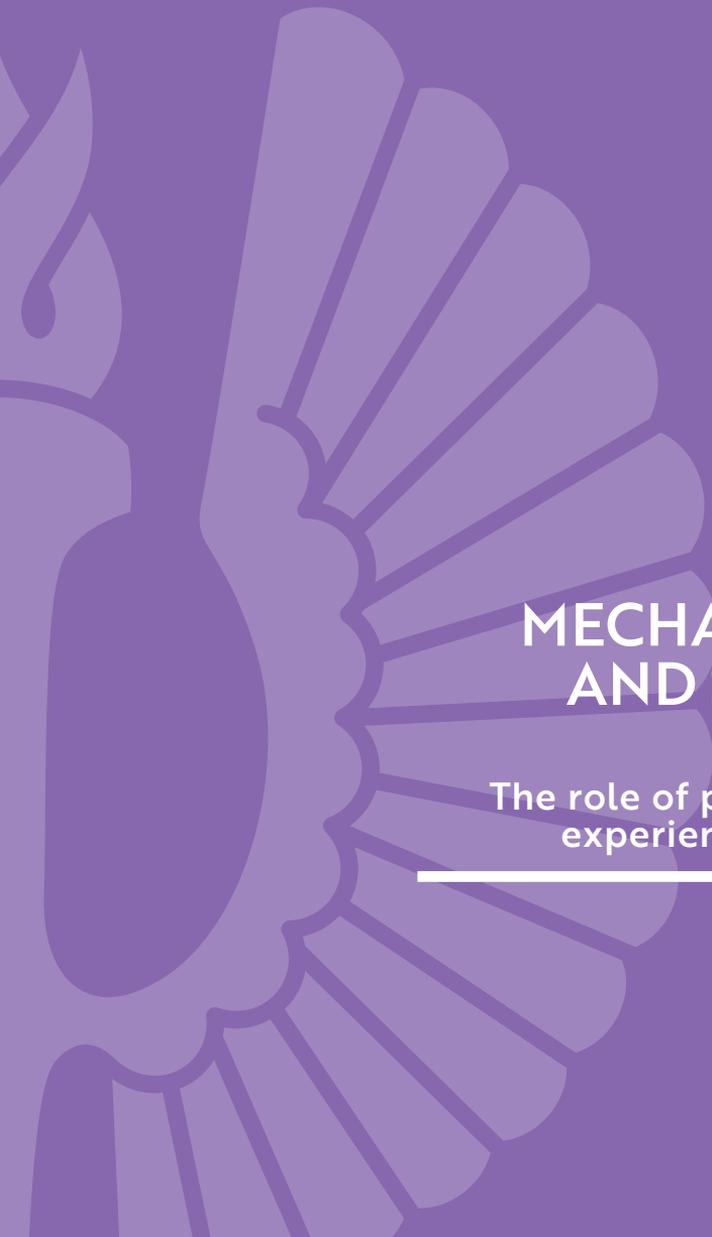




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A large, stylized sunburst or fan-like graphic in a lighter shade of purple, positioned on the left side of the cover. It has a dark purple central oval and radiating lines that form a semi-circular fan shape.

MECHANISMS IN HEALTH AND SOCIOECONOMIC WELLBEING

The role of parental resources, early-life
experiences, and their accumulation

Sanni Kotimäki



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The role of parental resources, early-life
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The role of parental resources, early-life experiences, and their
accumulation

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ABSTRACT

Wellbeing is one of the most studied topics in social sciences. Previous empirical findings suggest that particularly severe, repeated, or multiple negative exposures threaten wellbeing. Social scientific research on intergenerational inequalities, however, mostly builds on established social explanations, although using them in conjunction with psychological and biological explanations could improve the understanding of mechanisms and processes behind wellbeing.

This dissertation examines the role of parental resources and early-life exposures in two interrelated indicators of wellbeing: socioeconomic resources and health. The focus is on the exposures in utero, childhood, and youth and their accumulation as mechanisms that may drive intergenerational processes. The four research articles examine: (I) the role of parental resources (education, occupational class, and income) at different ages during childhood and youth in adult socioeconomic position, (II) various educational outcomes and health (early disability pension) after parental death, focusing on variation in child outcomes by cause of death and parental resources, (III) educational differences in prenatal mental health and the role of childhood circumstances (parental mental health, occupational class, and child maltreatment), and (IV) how maternal education is related to early language development (vocabulary) alone and together with maternal depressive symptoms during and after pregnancy. School performance and language development are analysed as parts of the wellbeing processes over a life course. The articles use different linear regression models to examine longitudinal population registers with representative samples of the Finnish population and the FinnBrain Cohort Study linked to the Finnish registers.

The results show that parental resources during childhood and youth are moderately positively related to adult socioeconomic position. Parental resources do not have significantly higher importance at any specific age, but particularly parental education seems to play an important role, although the ‘effects’ of different resources are mostly inseparable. Further, the results suggest that the positive role of parental resources (education) is already visible in early language development.

In addition, the role of early stressful experiences shows in lower education of children who have lost a parent early in life and in lower early language ability if the

mother reported elevated depressive symptoms postnatally. Furthermore, it shows in lower education and poorer prenatal mental health (distress symptoms) of individuals with a history of child maltreatment, suggesting that early experiences may contribute to health disparities.

The results also indicate that the role of negative early-life exposures in child outcomes is more pronounced in less educated families and vice versa. The educational and health outcomes are generally less negative after parental death in families with more educational resources. Low maternal education also appears to be stronger related to a child's lower language ability if it coincides with high maternal postnatal depressive symptoms. However, the latter interaction remains less clear, possibly due to power issues, although both low education and postnatal depressive symptoms are related to child language, showing a potential cumulative risk in early language development.

These findings suggest the role of cumulative processes in wellbeing. However, these can reflect multiplicative accumulation, where negative exposures strengthen each other's effects, or cumulative risk, where multiple negative exposures add to each other's risks, or mediating pathway, where exposures often lead to later similar exposures and only matter through them, but do not strengthen effects or add to their risks, or the compensatory mechanisms in the more advantaged families, which might explain the gap in wellbeing between children from different social backgrounds. Regardless of these many potential interpretations, investing in both socioeconomic and psychosocial family circumstances might help to protect children's wellbeing also later in life.

The results are based on high-quality register data in combination with birth cohort data that were analysed using advanced statistical methods to disentangle mechanisms in wellbeing across disciplinary boundaries, at different life course stages, and with multiple different outcomes. To further elucidate these questions, using more causal designs as well as formal mediation analysis methods are highly encouraged.

The findings of this dissertation provide useful insights into the processes across generations and life courses that shape wellbeing, including the potential protective elements involved. The results reflect the interplay of health and socioeconomic resources over the life course and underline the need of interdisciplinary research and policies targeted particularly at the most vulnerable families, to reduce social inequalities and health disparities and to protect wellbeing.

KEYWORDS: wellbeing, health, socioeconomic resources, parental resources, childhood experiences, intergenerational processes

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TIIVISTELMÄ

Hyvinvointi on yksi tutkituimpia aihepiirejä sosiaalitieteissä. Aiempi tutkimusnäyttö viittaa siihen, että erityisesti vaikeat, pitkittyneet tai muutoin kasautuneet haitallisia pidetyt kokemukset heikentävät hyvinvointia. Ylisukupolvisten prosessien sosiaalitieteellisestä tutkimuksesta kuitenkin valtaosa perustuu vakiintuneisiin sosiaalisiin selitysmalleihin, vaikka hyödyntämällä ohessa psykologisia ja biologisia selityksiä voisi ymmärtää tarkemmin hyvinvoinnin taustalla olevia prosesseja ja mekanismeja.

Väitöskirjassa tarkastellaan miten vanhempien resurssit ja varhaiset kokemukset ovat yhteydessä kahteen toisiinsa kytkeytyvään hyvinvoinnin ulottuvuuteen: sosioekonomisiin resursseihin ja terveyteen. Tutkimuksen keskiössä ovat sikiöajan, lapsuuden ja nuoruuden altisteiden ja niiden kasautumisen merkitys ylisukupolvisten prosessien mekanismeina. Neljässä osatutkimuksessa tarkastellaan: (I) miten vanhempien resurssit (koulutus, ammattiasema ja tulot) lapsuus- ja nuoruusiällä selittävät sosioekonomista asemaa aikuisena, (II) erilaisia koulutus-lopputulemia ja terveyttä (varhainen työkyvyttömyyseläke) vanhemman kuoleman jälkeen, keskittyen siihen vaihtelevatko yhteydet vanhemman kuolinsyyin ja resurssien mukaan, (III) koulutuseroja raskausajan stressioireilussa sekä lapsuudenolosuhteiden (vanhemman mielenterveys, luokka-asema, koettu kaltoinkohtelu) merkitystä näissä eroissa, (IV) miten äidin koulutus on yhteydessä lapsen varhaiseen kielenkehitykseen (sanasto) yksin ja yhdessä äidin raskauden aikaisen ja raskauden jälkeisen masennusoireilun kanssa. Lasten koulumenestystä sekä varhaista kielenkehitystä tutkitaan osana hyvinvointiin johtavia elinkaariprosesseja. Artikkelit pohjautuvat Tilastokeskuksen pitkittäisrekistereistä koottuihin edustaviin otosaineistoihin Suomen väestöstä ja Suomen väestörekistereihin linkitettyyn FinnBrain-syntymäkohorttiaineistoon. Menetelminä hyödynnetään erilaisia lineaarisia regressiomalleja.

Tulokset osoittavat, että vanhempien sosioekonomiset resurssit lapsuudessa ja nuoruudessa selittävät kohtalaisen vahvasti omaa sosioekonomista asemaa aikuisena. Vanhempien resurssien merkitys ei korostu tiettyssä ikävaiheessa, mutta erityisesti vanhempien koulutuksen rooli nousee tutkimuksista esille, vaikka eri resurssien itsenäisiä 'vaikutuksia' ei pääosin kyetä erottelamaan. Vanhempien resurssien (koulutus) positiivinen merkitys näkyy jo varhaisessa kielenkehityksessä.

Tulosten mukaan myös varhaisten kuormittavien kokemusten merkitys näkyy negatiivisesti lapsena tai nuorena vanhemman menettäneiden koulutuspolulla sekä varhaisessa kielenkehityksessä lapsilla, joiden äiti raportoi raskauden jälkeistä masennusoireilua. Lisäksi niiden haitallisuus näkyy lapsena tai nuorena kaltoinkohtelua kokeneiden koulutuksessa ja mielenterveydessä raskausaikana. Varhaiset kokemukset saattavat siten kasvattaa sosioekonomisia terveyseroja.

Osa näistä yhteyksistä ilmenee tai on vahvempi matalammin koulutetuissa perheissä ja päinvastoin. Vanhemman kuoleman yhteys koulutukseen ja terveyteen on yleisesti heikompi koulutetuissa perheissä. Äidin matala koulutus näyttää myös heijastuvan negatiivisemmin kielenkehitykseen, jos äiti kokee merkittäviä masennusoireita raskauden jälkeen. Äidin matalan koulutuksen ja masennusoireilun yhteisvaikutus jää tutkimuksessa kuitenkin epäselväksi, mahdollisesti tilastollisen voiman vuoksi, vaikka kumpikin tekijä on yhteydessä kielenkehitykseen. Nämä riskitekijät voivat siis summautua ja siten kumuloitua.

Havaintojen tulkitaan viittaavan kasautumisprosessien merkitykseen hyvinvoinnille. Tulokset voivat kertoa altisteiden toistensa vaikutuksia vahvistavasta kasautumisesta (multiplication), tai riskien kasautumisesta (cumulative risk), jossa altisteiden vaikutukset summautuvat toisiinsa, tai tapahtumapolusta (chain-of-risks), jossa negatiiviset kokemukset johtavat usein toisiin ja vaikuttavat niiden kautta, mutta eivät vahvista vaikutuksia eivätkä lisää riskejä, tai hyväosaisten perheiden suojaavista tekijöistä (compensation), jotka lisäävät erilaisista taustoista tulevien hyvinvointieroja. Tästä monitulkintaisuudesta huolimatta panostaminen sekä sosioekonomisiin että psykososiaalisiin perheoloihin voi auttaa suojaamaan lasten hyvinvointia myös myöhemmin elämässä.

Tulokset perustuvat laadukkaisiin rekisteriaineistoihin, joita yhdistettiin syntymäkohorttiaineistoon ja analysoitiin kehittyneillä menetelmillä hyvinvoinnin mekanismien tutkimiseksi yli tieteidenvälisten rajojen, elinkaaren eri vaiheissa ja useilla erilaisilla lopputulemilla. Lisätutkimusta aiheesta kuitenkin tarvitaan, etenkin kausaalisemmilla asetelmilla ja mediaatioanalyysimenetelmiä hyödyntämällä.

Tutkimuksen tulokset tarjoavat hyödyllistä tietoa hyvinvointiin liittyvistä ylisukupolvisista prosesseista sekä mahdollisista suojaavista tekijöistä. Havainnoista välittyy terveyden ja sosioekonomisten resurssien kytkeytyminen toisiinsa läpi elinkaaren, ja ne korostavat monitieteisen tutkimuksen sekä erityisesti haavoittuviin ryhmiin kohdistettujen politiikkatoimien merkitystä eriarvoisuuden ja terveyserojen kitkemisessä sekä hyvinvoinnin tukemisessa.

ASIASANAT: hyvinvointi, terveys, sosioekonomiset resurssit, vanhempien resurssit, lapsuudenkokemukset, ylisukupolviset prosessit

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October 2021
Sanni Kotimäki

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List of Original Publications

This dissertation is based on the following original publications, which are referred to in the text by their Roman numerals:

- I Erola, Jani, Jalonen, Sanni, & Lehti, Hannu. 2016. Parental education, class and income over early life course and children's achievement. *Research on Social Stratification and Mobility*, 44, 33–43. DOI: 10.1016/j.rssm.2016.01.003
- II Kailaheimo-Lönnqvist, Sanna & Kotimäki, Sanni. 2020. Cause of parental death and child's health and education: The role of parental resources. *SSM – Population Health*, 11, 100632. DOI: 10.1016/j.ssmph.2020.100632
- III Kotimäki, Sanni, Härkönen, Juho, Karlsson, Linnea, Karlsson, Hasse & Scheinin, Noora M. 2020. Educational differences in prenatal anxiety and depressive symptoms and the role of childhood circumstances. *SSM – Population Health*, 12, 100690. DOI: 10.1016/j.ssmph.2020.100690
- IV Kotimäki, Sanni, Salonen, Laura, Nolvi, Saara, Karlsson, Linnea, Karlsson, Hasse & Mainela-Arnold, Elina. Maternal education, prenatal and postnatal depressive symptoms, and early language development. Submitted to journal.

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1 Introduction

Scientific research has across time tried to find answers to what affects the two essential pieces in the puzzle of wellbeing – health and socioeconomic resources. Existing literature using the intergenerational approach shows that the role of parents in an individual’s life course and wellbeing is extensive and operates via many pathways, including genetic, psychological or health-related, social, cultural, environmental, and economic resources. When the differences in access to resources between families or individuals are regarded as unfair or too large, they are called inequalities (Therborn, 2012). For example, in Finland, slightly over 10 % of children, on average, have been in risk of poverty during the recent years and around 5 % of children have lived in families receiving social security (Karvonen & Salmi, 2016; Statistics Finland, 2020).

In disadvantaged families, commonly described by low parental education, low income, and unemployment, different adverse exposures, such as parental loss, parental mental health problems, substance use, and child maltreatment, occur more often, and their role in development should be distinguished from the effects of socioeconomic conditions (Amso & Lynn, 2017). Understanding the underlying mechanisms is required for effective intervention programs to help children and families and reduce intergenerational inequalities, in order to increase fairness and productivity in society (Mackenbach, 2019). In general, the Nordic welfare states have succeeded in reducing the consequences of structural family disadvantages and negative life events if they are not multiple, particularly severe, or persistent. When negative exposures accumulate or coincide with other negative factors, children become more vulnerable to problems related to health or education.

This dissertation examines the role of parental resources and early-life exposures in two interrelated indicators of wellbeing – socioeconomic resources and health. The focus is on exposures during the foetal period, childhood, and youth and their accumulation as mechanisms that may foster intergenerational processes. Wellbeing is a broad concept that is difficult to conceptualise and here it is used as an umbrella term (Uhlenberg & Mueller, 2003) to refer to health and socioeconomic outcomes using a single concept.

In empirical research, different contexts, life events, and experiences can be understood as the main causes or factors that moderate the effects of other factors. The latter refers to accumulation, also called cumulative processes. Whereas disadvantageous socioeconomic family background increases the likelihood of negative experiences, it can add to their risks or modify vulnerability to them, depending on the family's coping abilities. For example, low parental resources may strengthen, or high resources may protect the individual from the harmful effects of negative life events, such as early parental loss.

Previous research in the Nordic welfare context has examined the cumulative (dis)advantages from an interdisciplinary perspective less frequently, although the literature within an individual field can be broad and the literature on intergenerational inequalities in Finland is vast (Karhula & Sirmiö, 2019). Social scientific research on intergenerational processes in wellbeing also typically builds on well-established social explanations and less often considers the role of parental health and negative events, ignoring their independent importance and potential cumulative role with socioeconomic conditions. An interdisciplinary approach combining social theories with psychological and biological explanations could improve our understanding of the complex processes underlying wellbeing.

Furthermore, despite the great deal of attention that wellbeing research has received in social sciences, the processes relating different aspects of wellbeing to each other and to early-life circumstances are not fully understood (Mayer, 2009; Uhlenberg & Mueller, 2003). Social epidemiology combines social sciences, epidemiology, demography, and economics in a life course framework to assess how the social environment affects health. It posits that negative early exposures, even before birth (Champagne, 2011; Dufty et al., 2002), threaten wellbeing, as they occur during sensitive developmental periods and are often followed by or related to other negative experiences, thus increasing their number and/or duration over time (Adler & Stewart, 2010; Ben-Shlomo & Kuh, 2002; O'Rand, 2009). However, social epidemiological research has less used longitudinal registers than survey data to measure socioeconomic position and the socioeconomic measures could also be more theoretically informed (Cable, 2014).

There is a need for more collaboration and discussion across disciplines to provide comprehensive knowledge that can help to reduce inequalities and improve health (Berkman et al., 2014; Cable, 2014). This dissertation attempts to address this need. The four studies examine how parental resources (education, occupational class, and income) and early exposures (parental mental health problems, parental loss, and child maltreatment) are related to education, occupational standing, mental health, and early disability pension. The outcomes also include school performance and early language development as part of the early life course processes affecting wellbeing. The theoretical foundation builds on social scientific and social

epidemiological explanations and adopts a life course perspective. The interplay between socioeconomic position and health over an individual's life course is strongly present in this work.

Article I compares the role of parental resources at different ages during childhood and youth in adult socioeconomic position. Article II examines health and educational outcomes after parental loss, focusing on whether the outcomes vary by cause of death and parental resources. Article III focuses on educational differences in prenatal mental health and the role of childhood circumstances in these differences. Article IV examines how maternal education is related to early language development alone and cumulatively with maternal depressive symptoms during and after pregnancy. Articles III and IV also contribute to the discussion about the prenatal environment as a mechanism of intergenerational processes, although this mediation is not directly tested.

The dissertation is divided into an introductory section, and the original publications. Chapter 2 conceptualises wellbeing and describes the role of parental resources and early-life exposures in wellbeing in light of empirical literature. It also describes different theoretical approaches to the mechanisms and processes behind wellbeing using a life course framework from intergenerational and interdisciplinary perspectives. Chapter 3 describes the research design, data and methods used and Chapter 4 summarises the results and conclusions of the four articles. Chapter 5 discusses the conclusions, and the limitations of the study and provides implications for research and policy.

2 Early Family Environment and Wellbeing

2.1 Dimensions of wellbeing

Research in social sciences typically focuses on questions and topics that are related to wellbeing. Wellbeing is a broad concept that can be defined in multiple ways from external conditions, such as economic circumstances, to internal, subjective wellbeing. Wellbeing has also been divided, for example, into physical, mental, social, economic, and environmental wellbeing. Some define wellbeing only using its subjective dimension that covers individuals' own experience and definition of wellbeing, while others regard socioeconomic conditions and health together with social relationships as its important and widely agreed indicators (Uhlenberg & Mueller, 2003). Wellbeing can also be measured subjectively or objectively in research. Subjective measures produce information on individuals' feelings about their situation, for example, subjective economic wellbeing. Conversely, objective measures are used to analyse individuals' situation using, for example, survey or register-based information on employment or health.

In a Nordic context, a commonly used theory of wellbeing has been Erik Allardt's (1976) three dimensions of wellbeing: material and impersonal resources (having), social relationships (loving), and self-fulfilment (being). Allardt (1976) has argued that both the objective level and the subjective evaluations of standards of living are important in research and pursuing public policies. Empirically, Allardt measured 'having' with education, income, housing, employment, and health. This dissertation uses the concept of wellbeing in this manner to refer to socioeconomic position and health, particularly mental health, captured using objective measurements.

The WHO (1946) defines *health* broadly as 'a state of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity'. The idea of 'complete wellbeing' has also received criticism, mostly due to its strict requirement for perfect health, and the definition has been suggested to be changed, for example, towards 'the ability to adapt and self manage in the face of social, physical, and emotional challenges' (Huber et al., 2011). Health can thus be approached and be measured in various ways, for example, by asking how a person is feeling or using

objective measures, such as medical diagnostics, reimbursements for medical expenses, days of sick leave, or disability pensions. Death is considered an ultimate measure of health.

In the same way, socioeconomic resources can be conceptualized variously. The commonly used terms socioeconomic status or SES (Weber), social class (Marx), and socioeconomic position (SEP) refer to the idea that access to resources that are valued in our society, such as money, power, prestige, and wellbeing, varies between social roles and positions (social stratification) and in so doing can generate social inequality (Grusky, 2001). This summary section refers to each socioeconomic resource directly or uses the terms *socioeconomic resources* and *socioeconomic position*, as the questions related to power and injustice are not the main focus.

Resources are generally divided, for example, in economic (material), cultural (knowledge, behaviour), social (relationships, networks, i.e., ‘social capital’), and psychological (inherited abilities, skills) resources. Socioeconomic resources are commonly measured using the level or years of education, occupational position, or income, which may vary over time and are highly correlated but reflect different aspects of social stratification. *Education* measures cognitive skills, knowledge, and learned skills; *occupational position* reflects economic standing, social status, and prestige (the level of esteem generally associated with a job); and *income* indicates material resources that enable, for example, healthier lifestyle, faster access to health care, and participation in society (social standing) (Galobardes et al., 2006a, 2006b; Hauser & Warren, 1997; Mirowsky & Ross, 2005). Wealth is also used as a measure but less often, as material assets typically accumulate later in life.

Sociologists have typically used occupational measures, both categorical class schemas and continuous approaches, because they are relatively reliable and stable measures of socioeconomic position (Ganzeboom et al., 1992; Hauser & Warren, 1997). Education is also often considered the best overall indicator of socioeconomic position, especially in epidemiology. It is relatively easy to measure, remains quite stable in adulthood, and precedes other socioeconomic resources, but its relevance varies for different birth cohorts (Galobardes et al., 2006a).

Whereas social scientific wellbeing research focuses typically on social and socioeconomic outcomes and explanations, the focus in health sciences is, unsurprisingly, on health and less on the socioeconomic dimension. During the past two decades, there has been a steep increase in the amount of empirical research on *socioeconomic health disparities*. These refer to systematic differences in health between socioeconomic groups, commonly explained by differing health determinants (such as resources and experiences) between these groups, that is, the social determinants of health, ‘causes of causes’ (Marmot, 2015). These systematic differences have been analysed by social scientists and economists, while the role of life course and childhood circumstances was introduced to social epidemiology. One

of the most established findings in social epidemiology is the graded association between socioeconomic position and health (Kröger et al., 2015), which refers to the improvements in health by each (linear or non-linear) increase in socioeconomic position (Kawachi et al., 2010).

Each socioeconomic resource may be differently relevant for health in general, to different health outcomes, and at different ages (Galobardes et al., 2006a). In particular, low education has been associated with poor health, even in contexts with high-quality universal healthcare, such as Finland (Marmot, 2015). Income is also considered important, for example in longevity (Chetty et al., 2016). Mental health disorders have been repeatedly more prevalent among individuals with less education, those who are unemployed, and those with fewer economic resources, whereas occupational class has a weaker link to mental health (Fryers et al., 2003; Pulkki-Råback et al., 2012). Earlier, economic resources were a stronger predictor of health in European societies than education, but later this pattern reversed (Mackenbach, 2019). Furthermore, education and income are regarded as measures with health effects that best support social causation (SEP affects health, not vice versa; see p. 28) (Haushofer & Fehr, 2014; Kröger et al., 2015).

As for explaining the health disparities, the Black Report on health inequality in the Great Britain (Black, 1980) is considered historically important, as it was among the first to introduce explanations for these disparities, including: artefact (SEP-health connection is artificial or a result of measurement error), social selection (emphasises processes, where health primarily affects SEP), materialist/structural (highlights the role of economic deprivation and class structure), and cultural/behavioural (stresses the role of health-damaging behaviours). The report was important methodologically and empirically, encouraging future research on the mechanisms generating social inequalities and interventions that reduce them (Macintyre, 1997). It has inspired many later explanations, such as Mackenbach's (2019) six categories: life course models, genetics, childhood environment, material living conditions, social and psychological factors, and health behaviours.

The following sections describe processes leading to different wellbeing outcomes under two categories – socioeconomic resources and health – and how these categories are connected during the life course and between generations.

2.2 Family environment and wellbeing

Wellbeing begins to build up in childhood via different developmental processes, which continue in some form or another over the life course. Child development is described as a process from conception or birth until adolescence that involves changes in the physiology, cognition, and behaviour (APA, 2020), including physical growth and emotional, intellectual, language, and social development.

Bronfenbrenner's (1979) *bioecological model* and similar theories (e.g., Ferguson et al. 2013) have described 'ecological subsystems' that create a child's developmental environment: the microsystem (e.g., characteristics of the child, parents, and home), mesosystem (where the child functions, e.g., schools), exosystem (in which a child does not actively participate), macrosystem (culture, society, and belief systems, i.e., the social framework), and chronosystem (changes in the child and environment over time).

This study focuses on the family context, and thus it could not cover many developmentally important environments and their effects¹ on wellbeing, such as peer effects. The existing literature indicates that parents can affect their children, for example, through genes, parenting behaviours, intentional encouragement, by providing security and care, by setting an example, and through the economic environment in which children grow up. This effect of parents is indeterministic, that is, uncertain or probabilistic, varying across time, societies, and even between individuals in the same family. The role of family context in wellbeing depends on economic, social, cultural, and psychological factors, and on which dimension of it – family structure, dynamics, or resources – is studied alone or combined (Uhlenberg & Mueller, 2003).

The associations also depend on the outcome and the aspect of early environment that are examined. A study examining a variety of wellbeing outcomes showed that a parent's young age at the first child's birth and childhood poverty tend to have more severe consequences for children than individual characteristics or non-economic circumstances (Hobcraft & Kiernan, 2001). Also in a Finnish register-based study (Pitkänen et al., 2019), parental socioeconomic resources were stronger determinants of not being in education, employment or training (NEET) at age 18 than many other potentially adverse parent-related experiences, such as parental psychiatric disorders, substance use, death, or living with a single parent, which predicted NEET moderately; for example, the odds ratio for low parental education was 5.33 and 1.86 for severe parental psychiatric disorders.

Parental resources

Previous research has shown that social position is transmitted from one generation to another, affecting education (Björklund & Salvanes, 2011; Sieben et al., 2001), social class (e.g., Breen 2004; Erikson and Goldthorpe 1992), and income (Björklund et al., 2002; Mood, 2017). Parental socioeconomic resources have been shown to be

¹ In this work, the term 'effect' does not imply causality, despite its definition as, e.g., 'something that inevitably follows an antecedent (such as a cause or agent)' (Merriam-Webster dictionary).

associated with offspring's resources the strongest in the most disadvantaged and advantaged families (Esping-Andersen & Wagner, 2012; Torche, 2011). When parents influence one aspect of wellbeing, for example resources, it is typically also reflected in the other spheres, such as health. Parental resources have been related to various child health outcomes, such as mental health, mortality, self-rated health, and adjustment problems (Kestilä et al., 2006; Osler et al., 2005; Remes et al., 2018; Tolkkinen et al., 2018), although some findings suggest that this relationship is rather weak in Finland (Siponen et al., 2011).

As measures of childhood socioeconomic position, different types of resources are often used interchangeably, even though each measure reflects partly different underlying advantages and mechanisms of intergenerational transmission (Mood, 2017), predict later outcomes differently (e.g. Mood 2017), and are not equally decisive (Kallio et al., 2016). On the other hand, the role of each parental resource, such as education and occupation, seems to overlap largely (Bukodi et al., 2014), but relatively few studies on intergenerational achievement have considered this high correlation. When individually controlled, each resource thus covers the other resources with which it is correlated. For example, parental education also reflects the intellectual, material and other resources of the family (Galobardes et al., 2006a).

The independent role of parental income in child outcomes has been disputed, in particular. Parental education is said to drive intergenerational processes rather than parental income alone (Mayer, 1998). Empirical findings from Finland also support this, although no study has specifically compared the role of different parental resources in socioeconomic outcomes. The role of parental education in educational attainment has been found to be large, even net of previous educational performance (Kilpi-Jakonen et al., 2016). Furthermore, a family's poor economic resources do not explain the intergenerational transmission of disadvantages, such as school dropout after compulsory education, unemployment, and receipt of social assistance in Finland (Lehti et al., 2019; Vauhkonen et al., 2017). Parental social assistance recipiency (particularly long-term), however, is a strong predictor of completing secondary education by the age of 22 (Kallio et al., 2016).

However, higher parental income (and also parental education) has been linked to better child health, such as lower cancer mortality in children in Finland (Tolkkinen et al., 2018). Conversely, in the US, childhood poverty has predicted children's intellectual development (Guo & Harris, 2000) and socioeconomic outcomes, whereas links to health have been weaker (Duncan et al., 2010). In general, intergenerational associations, such as educational inheritance, tend to vary between countries (Pfeffer, 2008).

Finally, although parental resources (and race or ethnicity) are commonly used measures of family background, socioeconomic measures do not fully capture all resources and aspects of family background (Hauser, 1994).

Adverse early-life experiences and losses

Previous studies have shown that adverse experiences and events during childhood and youth occur more often in disadvantaged families with fewer resources (Evans & Kim, 2010; McLeod & Kessler, 1990). The effects of stress caused by these experiences should be distinguished from the effects of low socioeconomic position (Amso & Lynn, 2017), as socioeconomic measures do not completely capture their independent risks. The different exposures are often also highly correlated with each other, which makes it more challenging to examine their independent roles.

Examples of early-life adversities include parental loss, parental mental health problems and substance use, and child maltreatment. This is not a full list of potential adversities but represents the research parts of this dissertation. These experiences and events may break linearities or change the direction of developmental processes and life trajectories, adding complexity and dynamics to the role of parental resources in wellbeing. Conversely, the effects of early-life exposures can also be modified by parental resources (e.g., Lehti et al., 2019).

Parental loss is a potentially traumatic life event that has been related to short- and long-term child outcomes, including increased mental health and adjustment problems (Cerel et al., 2006; Feigelman et al., 2017; Keyes et al., 2014), and lower educational performance and attainment (Amato & Anthony, 2014; Berg et al., 2014; Prix & Erola, 2017). Experiencing loss in early childhood is often linked to slightly more adverse outcomes (e.g. Kailaheimo-Lönnqvist & Erola, 2020). Studies on the psychological consequences also show that the strength of these links is stronger for external causes of death, such as parental suicide and accident (Appel et al., 2016; Lin et al., 2004; Pfeffer et al., 2000; Rostila & Saarela, 2011). Parental death is also considered an ultimate measure of parental health.

Parental health problems may negatively affect the cognitive development and health of foetuses, newborns, and children (Gelaye et al., 2016; Gentile, 2017; Kingston & Tough, 2014). For example, parental mental health problems and parental violence, self-harm and substance use were associated with poorer health, violence, self-harm, and substance use in adolescents (Kestilä et al., 2006; Remes et al., 2018). Poor prenatal health also predicts offspring's lower education, indicating the potential relevance of prenatal health in intergenerational processes (Härkönen et al., 2012).

Furthermore, previous evidence suggests that *Adverse Childhood Experiences* (ACEs), that is, a traumatic exposure to physical, sexual, and/or emotional abuse, or emotional and/or physical neglect (Bernstein et al., 1994), pose sizeable, probably causal, risks to health outcomes, such as mental disorders, and suicide attempts (Biaggi et al., 2016; Heim et al., 2008; Kessler et al., 2010; Norman et al., 2012; Repetti et al., 2002; Teicher & Samson, 2014). Child maltreatment may also lead to lower school performance and deficits in cognitive and non-cognitive skills that

affect education (Boden et al., 2007; Currie & Widom, 2010; Gilbert et al., 2009; Matthews et al., 2010; Pechtel & Pizzagalli, 2011). Some studies indicate that adolescent maltreatment may cause even stronger and more persistent adjustment problems than ACEs (Thornberry et al., 2010).

2.3 Wellbeing as a process over the life course

Early family environment can influence wellbeing in various ways. Its effect may be direct, indirect via other factors, and moderating through strengthening or weakening the effect of other life events and exposures. Different aspects and effects of family context can also affect each other and accumulate. The idea that exposures from the first years of life can impact future experiences and outcomes is the core of the *life course perspective*, which thus provides an essential framework for this study.

One of the most important advantages of life course research is that it brings different disciplines closer, and decreases the micro versus macro distinction (Blossfeld et al., 2014; Elder et al., 2003; Mayer, 2009). This is useful, because life course models explain complex processes (such as cognitive and socioemotional development) using multiple contexts from individual and family levels to environmental and society-levels, as well as complex interactions between biological (e.g., related to genetics or living processes), physical (built and natural environment), and psychosocial (e.g., emotional, resilience, social support) factors.

Interest in childhood conditions as a driver of effects and unequal opportunities has always existed in status attainment research. Later social epidemiological research showed (Case et al., 2005; Power & Hertzman, 1997) that also health disparities can be tracked to early-life circumstances, even to the foetal period (Matthews et al., 2010; Muntaner et al., 2004). The most prominent mechanisms proposed to link family background to cognitive, socioemotional, and health outcomes are access to material and social resources and the child's and parents' reactions to stressful conditions, and these links can be further moderated by other individual and family characteristics, and external support (Bradley & Corwyn, 2002).

In life course epidemiology, three main conceptual models – pathway, critical period (or biological ‘programming’), and cumulative – describe different mechanisms explaining how childhood together with later periods can affect wellbeing. In summary, these models posit that early exposures can matter later in life, because they occur in a vulnerable developmental period (critical period) and are often followed by other negative/positive experiences (pathways) or related to them, increasing the number and/or duration of similar experiences over the life course (accumulation) (Adler & Stewart, 2010; Ben-Shlomo & Kuh, 2002; O’Rand, 2009).

Figure 1 applies these life course models to present a simplification of how socioeconomic and health-related processes may affect wellbeing. It shows that the association between early growth environments and later wellbeing can be direct or indirect via multiple mediators, with a dynamic relationship and interplay between socioeconomic position and health.

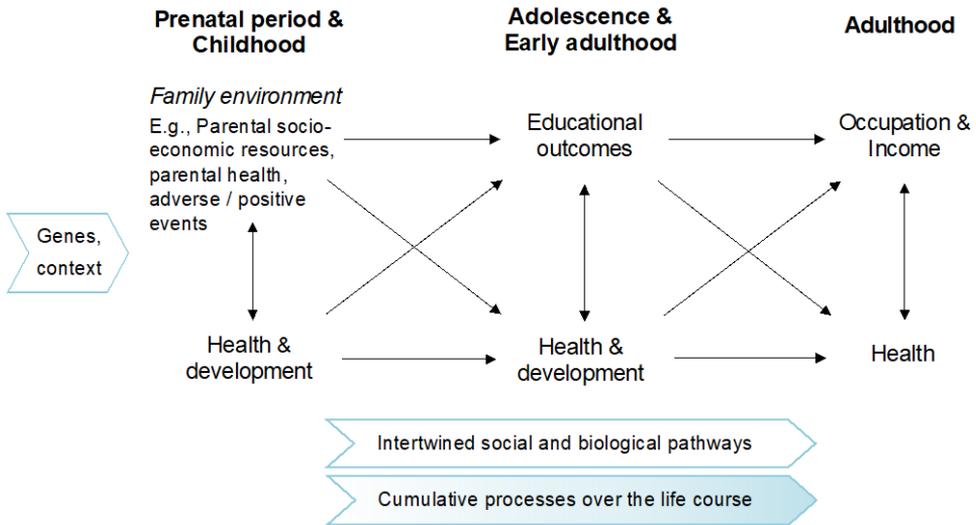


Figure 1. Theoretical framework of intertwined socioeconomic and health-related wellbeing processes over a life course.

2.3.1 Social and biological pathways

Processes can be categorised into social and biological pathways, that are separate (predominantly social or biological) and intertwined (bio-social and socio-biological) processes (Ben-Shlomo & Kuh, 2002; Kestilä & Rahkonen, 2011) (Figure 1). Various pathways to wellbeing can operate side by side and also other pathways than the ones mentioned here might be in action.

Social pathways

The pathway model or chains-of-risk model posits that an adverse (or beneficial) exposure or experience tends to lead to another and another, thus affecting outcomes later in life (Ben-Shlomo & Kuh, 2002). A predominantly social pathway stresses the importance of social or behavioural factors, such as educational level and health behaviour, in the process. For example, low childhood socioeconomic resources may

lead to adverse life events, that can lead to lower socioeconomic position, and poorer health.

Own education is regarded as an important contributing factor in the reproduction of status between generations (Blau & Duncan, 1967; Ganzeboom et al., 1991), and explains approximately half of the intergenerational associations (Breen & Karlson, 2013; Hout & DiPrete, 2006). Parental education is the strongest predictor of offspring's education, of which (partly biologically inherited) cognitive ability explains around a third (Bukodi et al., 2014). Education, in turn, is the strongest predictor of occupational class that is the best explanatory factor of income differences (Ganzeboom et al., 1992). For example, the effect of childhood poverty on socioeconomic circumstances in adulthood appeared to run primarily through problems in the educational path, whereas the effect of other social problems in the family background operated through deviant behaviour (Bäckman & Nilsson, 2010). A similar example of (educational) pathway effects emerged in the finding, in which school performance explained entirely the effect of parental employment on secondary education enrolment (Lehti et al., 2019).

Inequalities in early child development may also affect health through educational attainment, affecting individuals' occupational career, lifestyle, and health habits (Marmot, 2015). Own education is a stronger predictor of health than social origin, suggesting that pathway effects through education are operating (Power and Hertzman 1997). For example, recent findings suggesting a longer-lasting effect of parental education on physical than mental health are largely explained when own education is controlled (Arránz Becker & Loter, 2020).

Education may improve health by different routes: by preventing risky living conditions and negative life events, by providing resources to foster resilience and coping in the face of major life changes (Dohrenwend, 2000), and by improving economic security (Pulkki-Råback et al., 2012; Suokas et al., 2019) and learned effectiveness, i.e., a sense of control, knowledge, and skills, which are important for taking care of health (Mirowsky & Ross, 2005). Highly educated individuals also typically have better working conditions as a result of attaining higher occupational positions (Polvinen et al., 2013), have highly educated partners (Mäenpää, 2014), and receive more social support (Taylor & Seeman, 1999), which may improve coping and protect health (Biaggi et al. 2016).

But what do parental resources, events, and experiences during childhood and youth do specifically? What are the mechanisms involved? The well-known social scientific theories of *social reproduction* (i.e., processes replicating social class across generations) or *socialisation* posit that parents affect children through parental discipline, teaching, and setting an example for behaviour (Uhlenberg & Mueller, 2003). Highly educated parents often have more knowledge, for example, on the value of additional schooling, and they pass this knowledge to children. Furthermore,

parents and children tend to make educational choices motivated by their aspirations to avoid downward intergenerational mobility, that is, children ending up to a lower social position than their parents (Breen & Goldthorpe, 1997). This relative risk aversion theory has gained empirical support as a predictor of educational choices (Holm & Jæger, 2008). However, in some studies, it has not affected educational decisions in advantaged families (Breen et al., 2014).

Parental resources may also affect wellbeing through the *psychological home environment*. Earlier findings suggest that family background predicts cognitive outcomes, such as language ability (Barone et al., 2020), which may foster educational performance (Blums et al., 2017). Home environment has been found to be an important mediator between parental education and cognitive development (Blums et al., 2017; Ronfani et al., 2015). For example, parental involvement, including activities such as shared book reading, and parental behaviours, such as attitudes and discipline, seem to partially mediate the association between socioeconomic position and cognitive and behavioural development (Barone et al., 2020; Kiernan & Huerta, 2008).

According to the family stress model (Conger et al., 2010; Masarik & Conger, 2017), low income might negatively affect child health and development through poorer parental mental health affecting parenting and thus the quality of the parent–child relationship (see also: Kiernan and Huerta 2008). For example, postnatal depression may compromise parent–child interaction and thus affect, for example, child health (Dubber et al., 2015; Misri & Kendrick, 2008). A US study showed that cognitive stimulation, physical home environment, poor health, and to a lesser extent parenting style all mediated the effect of poverty on early intellectual development (Guo & Harris, 2000).

Low socioeconomic position is also related to a risk of adverse childhood experiences (Walsh et al., 2019), which predict poorer mental and physical health (Heim et al., 2008; Kessler et al., 2010; Repetti et al., 2002), lower school performance, and deficits in cognitive development and non-cognitive skills (Currie & Goodman, 2020; Gilbert et al., 2009; Matthews et al., 2010; Pechtel & Pizzagalli, 2011). Multiple mediators can thus work simultaneously, and their individual importance depends, for example, on the explanatory factors, wellbeing outcomes, and country context used.

Biological, socio-biological, and bio-social pathways

In a predominantly *biological pathway*, impaired foetal development is associated with a higher vulnerability for later negative exposures and a higher risk of illness or impairment later in life (Ben-Shlomo & Kuh, 2002).

The process through which social environment ‘gets under the skin’ and can affect health and development is described by *the social-biological pathway* (i.e., embodiment). The prevailing hypothesis is that socioeconomic position and adversities affect emotional and cognitive development, health risks and behaviour biologically via chronic, toxic stress (McEwen, 2008). Acute stress typically follows sudden events, whereas chronic stress is related to repeated problems, such as poverty or long-term illness. Persistent stress may lead to ‘allostatic load’ (McEwen, 1998), which refers to physiological consequences to neural or neuroendocrine systems that may cause disease. For example, the consequences of child maltreatment on cognition and mental health can be explained by chronic stress, which leads to post-traumatic stress disorder and adverse brain development (De Bellis et al., 2002; Korgaonkar et al., 2013; Lupien et al., 2009).

In some studies, however, the role of stress and psychosocial factors as mediating factors have been unclear (Matthews et al., 2010). When severe adversity, such as maltreatment, have not been addressed and stress and psychosocial factors have been measured by child cortisol levels, these factors have gained limited support as mechanisms of socioeconomic disadvantage on health (Malanchini et al., 2020).

According to the *bio-social pathway*, the effect of early-life circumstances on adult socioeconomic resources may be mediated via own health. Children from poorer families might experience poorer childhood health, lower education, and poorer health in adulthood, all of which predict lower earnings later in life (Case et al., 2005; Vaalavuo, 2021). Health at birth, measured by birth weight, has been positively related to education (Behrman & Rosenzweig, 2004). Poor health in childhood may also determine adult health, either directly or through lower socioeconomic resources (Case et al., 2005), contributing to health disparities. One study showed that family background, together with cognitive, noncognitive, and health endowments at age 10 were important determinants of educational disparities in adult health and health behaviour (Conti & Heckman, 2010).

2.3.2 Critical period model

Evidence suggests the first five years of life, when neurons exhibit the greatest plasticity as a period of particular vulnerability (Tierney & Nelson, 2009). Whereas exposures during sensitive periods have, on average, a stronger and more prolonged effect on development than at other times, exposure during critical periods is thought to have adverse or protective (often irreversible) effects that are impossible at other times (Ben-Shlomo & Kuh, 2002; Glymour et al., 2014; Knudsen, 2004). The critical period model (latency, biological programming) suggests that early exposure is associated with adult outcomes independent of later environment. This is the basis of the hypothesis on ‘prenatal programming’ (Champagne, 2011; Dufty et al., 2002)

or ‘the foetal hypothesis’, which posits that social, material, or other environmental exposures affect the foetus biologically via the mother, causing physiological adaptations to the forthcoming environment, which in some circumstances may lead to a disease (Barker et al., 1989; Glymour et al., 2014). Previous studies have related lower socioeconomic resources to risks in the prenatal environment, such as poorer maternal health and health habits (Bouthoorn et al., 2015; Härkönen et al., 2018), that may influence the foetus negatively (Davis & Sandman, 2010; Entringer et al., 2017).

2.3.3 Cumulative processes

The cumulative model stresses the importance of both childhood and adulthood environments for wellbeing. The *cumulative advantages and disadvantages theory* (CAD) (Dannefer, 1987), commonly used in social sciences, describes a mechanism for inequality across time and generations. It holds that a favourable relative position or early inequality relating to experiences, events, and resources, accumulate over the life course and different life domains, strengthening the favourable position or inequality (Blau & Duncan, 1967; DiPrete & Eirich, 2006; O’Rand, 2009). The idea was launched particularly in status attainment research, when Merton (1968) wrote about the accumulation of disproportionately large credit and resources to the most renowned scientists.

The *accumulation model* typically applied in social epidemiology is very similar to CAD. Its emphasis is on the importance of early social adversity in life trajectories, particularly health, because negative exposures that started early in life are more likely to accumulate. The theory stresses that the higher number of different simultaneous adversities (cross-sectional clustering) or long-term exposure to similar adverse exposures (longitudinal clustering) threaten wellbeing, as each additional risk factor increases the total risk for health problems (Glymour et al., 2014).

In the developmental science, the concept of *cumulative risks* is used to describe the robust finding that exposure to multiple risk factors typically reveals worse developmental outcomes than singular risks (DeFur et al., 2007; Evans et al., 2013). It is a certain type of *multiple risk*, which is an umbrella term that includes any model with more than one risk factor. Cumulative risk is constructed by dichotomizing (1 = risk) and summing each risk exposure additively with no interactions (Evans et al., 2013).

Exposure to adverse social and physical environments tends to accumulate in families with lower resources both over time via longer exposure to adversity and through experiencing different types of adversities at the same time (Evans, 2004). In families with higher socioeconomic position, there is a lower risk of

unemployment, parental health problems, single parenthood, substance abuse, and less insecurity and deficits in nutrition, which could alone, cumulatively, and jointly threaten children's health and wellbeing even in adulthood (Kestilä et al., 2009; Remes et al., 2018; Sands et al., 2017).

The empirical evidence on the role of cumulative disadvantages in wellbeing is relatively strong. Regarding socioeconomic outcomes, both a family's long-term receipt of social assistance and social assistance recipiency combined with poverty predicted lower completion of secondary education (Kallio et al., 2016). Also the accumulation of disadvantages, receipt of social assistance, and school dropout after primary school were inherited more strongly than merely unemployment (Vauhkonen et al., 2017).

The cumulative effect of multiple adversities experienced from childhood to adulthood also appears to increase inequalities in mental health (Muntaner et al., 2004; Power et al., 2002), even though both long-term influences from childhood and adult life factors alone can contribute to them. The life course (accumulated) socioeconomic position is also related to poorer physical health (Newton et al., 2017). Furthermore, the role of low parental socioeconomic position in mortality persisted after adjusting for own occupational class, suggesting that the risks of socioeconomic disadvantage are cumulative over generations (Osler et al., 2005). Being socially disadvantaged in early adulthood and the consequences that follow these disadvantages also predict higher mortality, in particular, among individuals with accumulated disadvantages in different life spheres (Berg et al., 2011).

Furthermore, the coincident deteriorating physical and inadequate psychosocial conditions has been suggested as a mechanism underlying the effects of poverty on child development (Evans & Kim, 2010). Having parents with both low education and health problems also showed simple cumulative effects on the risk of severe health, conduct, and substance use problems in adolescence (Remes et al., 2018).

Cumulative disadvantages may refer to risks or vulnerability, as resources and experiences can be the main (additive) determinants of wellbeing but also moderate the influence of other factors. The latter, less studied part of the accumulation theory has been called, for example, a *Matthew effect* (Merton, 1968) and a *multiplicative effect* (e.g. Erola and Kilpi-Jakonen, 2017). For example, children from less advantaged backgrounds may be more vulnerable for adverse family events (Biblarz & Gottainer, 2000; Grätz, 2015), or in contrast, high social origin can boost educational attainment among well-performing students, suggesting an interaction effect between social origin and academic performance (Heiskala et al., 2020).

Moreover, protective elements may alleviate the effect of adverse exposures that predispose the individual to poorer wellbeing (Rutter, 1985). This *protection or compensatory mechanism* is a process through which lost or lacking resources (e.g., economic, human, or social) or consequences of adverse events may be compensated

by other resources of the individual, family, relatives, friends, or society, or by protective experiences (Bernardi & Boado, 2013). However, this should be distinguished from positive experiences, which have direct and additive beneficial effects on wellbeing.

Parental resources may foster, for example, a family's resilience and ability to cope and provide support in the face of adversities, that is, alleviate their effects on wellbeing (Rutter, 1985; Schoon et al., 2004). Furthermore, studies suggest that own education may protect from the negative effects of childhood adversities. In a study on active life expectancy, education did not completely reduce the consequences of early socioeconomic disadvantage, but as education had a greater impact on health than childhood conditions, adults with disadvantaged childhoods and high education often had life expectancies similar to or better than those with advantaged childhoods and low education (Montez & Hayward, 2014).

2.3.4 Social causation, selection, and confounding

The hypotheses on the relationship between socioeconomic resources and health can be classified into social selection and social causation perspectives (Berkman et al., 2014). According to the *social causation* hypothesis, health inequalities result from the uneven distribution of resources, support, and knowledge, and differences in behaviour between different socioeconomic groups (Kröger et al., 2015). A higher socioeconomic position can affect health, for example, by providing or enabling a healthier environment with better nutrition and health habits or by better access to healthcare. The *selection mechanism* refers to a process in which better health supports achieving a better socioeconomic position. This is possible, because socioeconomic position is not an ascribed status, such as ethnicity, but it is partially affected by behaviour (Dohrenwend, 2000). For example, evidence from Finland shows that severe mental health problems may lead to lower education and poorer labour market outcomes (Hakulinen et al., 2019, 2020) and that cancer in adulthood has a negative impact on earnings (Vaalavuo, 2021).

Previous literature and reviews support quite equally both selection and causation hypotheses, depending on outcome, age, and the socioeconomic measure used (Adler & Stewart, 2010; Dohrenwend et al., 1992; Kröger et al., 2015). Some studies find that they are equally important between childhood and adulthood, but social causation becomes the dominant mechanism in older adults (Hoffmann et al., 2019). One study on the origins of health disparities found that selection in pre-existing cognitive and non-cognitive traits explained over half of the educational differences in poor health, and that education had a causal effect on smoking (Conti & Heckman, 2010). It is important to test empirically both explanations, regardless of its challenges, such as measurement error and confounding.

Further, omitted variables correlated with socioeconomic resources and health may contribute to health disparities. Genes are evident confounders, as they may affect cognitive and non-cognitive skills, health behaviours, health, and choosing beneficial or detrimental environments. For example, some evidence based on an instrumental variables approach suggests that education does not protect from depression (Viinikainen et al., 2018). Another study showed that a higher polygenic score for income in siblings caused better socioeconomic position and health, partly via education, and the returns for schooling remained high (Kweon et al., 2020).

Moreover, shared genetic dispositions may explain intergenerational correlations by affecting both parental characteristics (e.g., resources and health) and offspring's wellbeing. Gene-environment correlations (rGEs) can emerge through different mechanisms (Plomin et al., 1977). For example, in passive rGE, parental genetic dispositions are both passed on to children and affect the home environment, causing a spurious relationship between environment and child outcome. In one study, genetically transmitted cognitive deficits explained the link between parental substance use and early cognitive function (Khemiri et al., 2020). Another study found that depressive symptoms in youth are heritable (i.e., much of its variation is attributed to genetic variation instead of environment) and that genetic effects contribute to poor parenting and family chaos, making the environment 'depressogenic' (indicating rGE); however, the results suggested stronger genetic effects on depressive symptoms for children in poorer family environment, indicating a gene-environment interaction (GxE) (Wilkinson et al., 2013). In the GxE, different genotypes react to environmental variation differently. For example, education can improve health only in individuals with genetic health risks (Barcellos et al., 2018). The growing literature (Bowles & Gintis, 2001; Mills & Tropf, 2020; Thompson, 2014) suggests that both genes and environment matter and that environment can mediate and moderate the genetic effects on socioeconomic and health outcomes.

2.4 Finnish welfare context

The institutional context, referring to certain societal characteristics, such as educational and social security systems, plays an important role in the processes behind health and socioeconomic attainment (e.g. Pfeffer, 2008). All the articles in this dissertation use Finnish data, and this section briefly describes the institutional setting to facilitate the interpretation of the results.

Finland is a Nordic welfare state that has high quality universal healthcare and provides fairly equal opportunities for all. The welfare system already affects individuals in utero, when unborn babies and their families are monitored and taken care of by the child healthcare clinic system called Neuvola. This careful monitoring

continues until the child reaches school age. Furthermore, the Finnish subsidised daycare and pre-school systems are universally accessible and of a high quality, potentially moderating the influence of parents and childhood circumstances on children (Duncan & Magnuson, 2013).

Finland has a free and relatively open educational system with no dead ends, which reduces the importance of family background in socioeconomic attainment (Pekkarinen et al., 2009). In particular, if the sorting of students occurs early in the educational pathway, dead ends appear to impede equality of educational opportunities (Pfeffer, 2008). In Finland, educational tracking starts only in the upper secondary level. Non-compulsory education is also financially supported, which makes education accessible regardless of parental economic resources.

Educational levels are divided into comprehensive, upper secondary, and tertiary (post-secondary) education, of which the latter two include both academic and vocational tracks. The nine-year comprehensive school starts around the age of seven and has worked quite well as an ‘equaliser’, as it can narrow the gaps in life chances between children from more and less advantageous backgrounds. The Finnish population is generally highly educated, partially resulting from the broad educational expansion. In 2019, 85 % of individuals aged 20–29 and 74 % of the population (aged 15 or older) had a secondary degree, and 32 % of the population had completed a tertiary qualification (Statistics Finland, 2019). Formal educational qualification plays a strong role in providing access to many public sector occupations, but it is also important in the private sector (Kivinen et al., 2001). Education is completed later than in most European countries but usually before entry into parenthood around the age of 30, on average (Statistics Finland, 2017).

In Finland, the population is relatively healthy compared to many other European countries, and individuals live longer than ever. However, disparities between educational and income groups – already present in children’s health (Tolkinen et al., 2018) and growing with age – have remained or even increased in many indicators, including life expectancy, long-term illnesses, occupational health, and subjective health (Jokela et al. 2021; Karvonen et al., 2019; Lahelma et al., 2017). For example, moderate educational differences in mortality have remained (Mackenbach et al., 2017), and differences in life expectancy between the lowest and highest income quintile were 11.4 years for men and 6.3 years for women in 2003–2007 (Martikainen et al., 2014), mostly explained by socioeconomic differences in smoking and alcohol consumption. In general, health disparities tend to be more pronounced in men than women. Further, there are also regional differences in the level of wellbeing, which is lower, for example, in the rural areas of Finland (Karvonen, 2019). Health disparities are, however, smaller in high-income European countries, such as Finland (Mackenbach et al., 2017).

The universal health care system is mainly financed through general taxes, but user fees and other out-of-pocket costs are relatively high (OECD, 2019). Income inequalities in accessing a doctor (> 15 % difference) and availability-related unmet needs for health services are also among the largest in Finland (OECD, 2019). Finland also has a universal social security system, including various income transfers targeted particularly at low-income, vulnerable families to prevent disadvantages caused by economic deprivation. The society also provides financial aid after negative family events. For example, after the death of a family member, the survivor's pension covers part of the economic loss for the remaining spouse and children under the age of 18 (Hietaniemi & Ritola, 2007). The Finnish social security system is also relative well able to alleviate the consequences of severe diseases for individuals' economic wellbeing (Vaalavuo, 2021). For example, a disability pension can be granted from the age of 16, based on a medical statement, but a year-long sickness absence is typically required before being eligible for it.

These institutional characteristics should reduce the role of socioeconomic resources, especially economic ones, in wellbeing.

3 Research Design

3.1 Research questions and study aims

The mechanisms behind wellbeing are not fully understood from an interdisciplinary and intergenerational perspective in a Nordic welfare state context. In social sciences, psychological or health-related measures are used less frequently to elucidate wellbeing processes across generations. For example, poor parental health or child maltreatment are typically not measured directly, which can lead to interpreting their influences as direct effects of other factors (e.g., economic stress). The effects of different parental resources can also be mixed due to their high correlation or biased due to life course variation in resources or their importance, if these are not considered. Furthermore, studies have less used longitudinal register data than survey-based information on socioeconomic position, particularly in social epidemiology (Cable, 2014). Moreover, registers are less often linked to birth cohorts to compile datasets that include both reliable measures of socioeconomic resources and non-socioeconomic measures which are difficult to capture using registers.

This dissertation examines the role of parental resources and early-life exposures in health and socioeconomic outcomes, with a focus on exposures in the prenatal period, childhood, and youth and their accumulation as potential mechanisms fostering intergenerational processes. The research questions in Articles I–IV (summarised in Table 1) are as follows:

- I. How do parental socioeconomic resources over the early life course explain occupational position in adulthood?
- II. Is early parental loss related to health, educational performance and educational attainment, and do these relationships vary according to the cause of death and parental resources?
- III. Are there educational differences in women’s anxiety and depressive symptoms during pregnancy, and do childhood circumstances explain these differences?

- IV. Is maternal education related to early language development alone or cumulatively with exposure to high maternal depressive symptoms in the prenatal and/or postnatal periods?

Article I contributes to the literature by showing the overall scope of the intergenerational transmission of socioeconomic resources in Finland. Articles II and IV examine the role of early potentially adverse exposures and accumulation versus compensation mechanisms in wellbeing and development; Articles III and IV contribute to the discussion about the prenatal environment as a mechanism of intergenerational effects, although mediation is not directly tested using a formal mediation analysis; and Article III shows the role of negative early-life exposures in educational disparities in prenatal mental health.

Article I demonstrates how much parental education, occupation, and income during childhood and youth alone and together explain adult occupational position and at which age the resources matter the most. In particular, it pinpoints both the direct and shared (i.e., cumulative) importance of each parental resource, thus suggesting the most important mechanisms in intergenerational socioeconomic wellbeing.

Article II examines grade point average in compulsory education, secondary education, university enrolment, and the receipt of early disability pension (measures severe health problems) after maternal or paternal death. The article focuses on whether these outcomes vary by the cause of death, education of the deceased and the surviving parent, and family income. Analysing expected adversity related to causes of death jointly with parental resources makes it possible to assess the moderating aspect of cumulative processes (natural/external death + lower/higher resources). An important question is whether higher resources predict better (suggesting protection) and lower resources poorer (suggesting vulnerability) wellbeing.

Article III focuses on educational differences in prenatal distress. Previous evidence on this is inconsistent (Biaggi et al., 2016; Gelaye et al., 2016), potentially because studies have typically included possible mediators of the effect of education, increasing the risk of overadjustment (Schisterman et al., 2009). The causality of these differences is assessed by controlling for early-life circumstances, measured by parental social class, parental mental disorders, and adverse experiences.

Article IV examines how maternal education and elevated prenatal and/or postnatal maternal depressive symptoms are related to a child's language development at 30 months of age. It focuses on the cumulative disadvantages (both cumulative, i.e., additive risk and moderation) related to socioeconomic factors and parental depression in the context of language development. Early language ability has been related to both socioeconomic background and later attainments and health, thus potentially mediating the intergenerational processes.

3.2 Data

Articles I–II are based on Finnish population registers obtained from Statistics Finland. Article I uses the Finnish Census Panel (FCP), including a 1 % random sample of the population residing in Finland in 1970 and the sample persons' family members linked to the sample. The dataset runs from 1970 to 2005, and includes observations in five-year intervals from 1970 to 1985 and yearly between 1987 and 2005. Article I uses cohorts born in 1966–1975.

Article II uses the Finnish Growth Environment Panel (FinGEP), based on a 10 % representative random sample of the Finnish population in 1980. The sample was expanded to include the sample persons' family members and relatives, eventually covering approximately 2,000,000 cases. The data include information for years 1980, 1985, and 1987, after which it runs annually until 2014. Article II uses cohorts born in 1982–1990.

Articles III–IV use the prospective FinnBrain Cohort Study data on pregnancy and early life outcomes, conducted at the University of Turku, Finland (Karlsson et al., 2018). The original sample consists of 3,808 families from South-Western Finland. Recruitment took place at a free-of-charge ultrasound visit at gestational week 12 between 2011 and 2015. The questionnaire data were collected using self-report questionnaires filled in at home. The FinnBrain data were linked to the Finnish population registers to include high-quality data on socioeconomic and demographic factors.

3.3 Measurement

Socioeconomic measures

Article I uses the *International Socio-Economic Index of Occupational Status* (ISEI) scores, measured at the ages of 25–29 and 30–34. The reason for using ISEI is its multidimensionality, as is constructed by regressing occupations with education and income, making it related to these both (Ganzeboom et al., 1992). The ISEI also serves as a proxy for social class. The ISEI scores were z-standardised separately for men and women to normalise the score distribution and to fix the mean at zero. *Parental resources* are measured by education (compulsory, vocational secondary, general secondary, lower tertiary, or higher tertiary), occupational EGP (Erikson-Goldthorpe-Portocarero) class: higher professional, lower professional, routine non-manual, self-employed, farmers, skilled workers, and other workers), and logged individual income at the ages 0–4, 5–9, 10–14, 15–19, 20–24, and 25–29.

Article II uses three measures of education. *Grade point average* (GPA) is a continuous variable that measures the mean grade for all school subjects at the end

of compulsory school. *Secondary education* is a binary variable indicating whether the child has completed secondary education or more by the age of 19. *University education* is a binary variable measuring whether the child has enrolled in/completed university education by the age of 24. Parental resources are measured by the highest level of *parental education* (primary, secondary, or tertiary) when the child was 0–18 years old, and by *family income* (all taxable income) at a child’s age 5–18, divided into 1000 categories to balance the effect of the highest and the lowest income.

Articles III and IV measure the last completed *educational degree* before childbirth, following the International Standard Classification of Education 2011 (UNESCO, 2012). Information was provided by Statistics Finland, or in the case of missing data, the FinnBrain questionnaire. In Article III, education is coded as primary, vocational secondary, general secondary (incl. combination degrees), and tertiary (university or vocational), and in Article IV, as secondary or lower, high vocational, and high university. Article III also controls for *childhood socioeconomic position*, measured by register data on household’s reference person’s occupational class (upper-level employees, lower-level employees, manual workers, or others/not classified).

Measures on health and child development

Articles III and IV measure psychological distress using two validated measures. *The Anxiety subscale of the Symptom Checklist -90 (SCL-90)* (Derogatis & Cleary, 1977) is a widely used measure for current symptoms of trembling, sudden fright without reason, insecurity, heart palpitations, tension/agitation, fear/panic, restlessness, common things feeling weird and absurd, feeling of being pressured, nervousness/inner restlessness. *The Edinburgh Postnatal Depression Scale (EPDS)* (Cox et al., 1987) has been identified as the best screening tool for prenatal depression and measures the ability to laugh, to be amused, and to feel positive about future events, self-accusation, irrelevant fear/distress, the feeling of growing burden, sadness, sleep disturbance, tearfulness, and thoughts of self-harm.

Table 1. Summary of the articles.

ARTICLE	<i>I. Parental education, class and income over early life course and children's achievement</i>	<i>II. Cause of parental death and child's health and education: The role of parental resources</i>	<i>III. Educational differences in prenatal anxiety and depressive symptoms and the role of childhood circumstances</i>	<i>IV. Maternal education, prenatal and postnatal maternal depressive symptoms, and early language development</i>
MAIN RESEARCH QUESTIONS	How much do parental education, class, and income during early life course explain adult children's occupational achievement?	Is (cause of) parental death associated with early disability pension and educational outcomes? Do these associations differ by parental resources?	Are there educational differences in anxiety and depressive symptoms during pregnancy? Are the differences explained by childhood circumstances?	Is maternal education related to a child's early vocabulary? Does maternal education and prenatal and/or postnatal high depressive symptoms have cumulative associations with vocabulary?
EXPLANATORY VARIABLES	Maternal and paternal education, occupational EGP class, and family income	Cause of parental death (external vs. natural), father's and mother's education, family income	Education, childhood SEP, parental mental disorders, adverse childhood experiences	Maternal education, prenatal and postnatal depressive symptoms
OUTCOME VARIABLES	International Socio-Economic Index of occupational status (ISEI)	Early disability pension, GPA in compulsory education, secondary education, university enrolment	Prenatal anxiety and depressive (distress) symptoms, clinical levels of prenatal distress	MCDI (MacArthur Communicative Development Inventory) at 30 months
BIRTH COHORTS	1966–1975	1982–1990	1969–1995	2012–2015
DATA	Finnish Census Panel	Finnish Growth Environment panel (upgraded version)	FinnBrain Cohort Study data linked to Finnish registers	FinnBrain Cohort Study data linked to Finnish registers
SAMPLE SIZE	N = 29,282 children	Paternal loss: 90,620 children; Maternal loss: 88,859 children	2,763 pregnant women	971 mother-child pairs
METHOD	Multilevel linear RE regression, variance decomposition	Multilevel linear regression and LPMs (RE), interactions	Simultaneous equations linear RE regression and LPMs, E-values	Linear regression, interactions
RESULTS	The effects of parental resources on ISEI did not depend on child's age, they overlapped largely, and direct effects were rather small. Parental education explained ISEI the best (esp. maternal: 14 %) and income the weakest.	Different causes of death had moderate or weak associations with child outcomes. Associations differed by parental education but not by income. Higher educated surviving parent may protect from negative outcomes after the loss.	More educated mothers had lower distress symptoms, particularly clinically significant symptom levels. The differences were partly attributable to child maltreatment, but they might also be causal, suggested by sensitivity analysis.	Mother's education was positively related to child vocabulary. Low maternal education and postnatal depressive symptoms had additive cumulative associations with vocabulary, but their interaction was statistically non-significant.
MAIN CONTRIBUTION	Examining the direct and shared effects of different parental socioeconomic resources at different stages of childhood and youth on socioeconomic position.	Analysing the coexistent role of cause of parental death and parental resources in offspring's health and various educational outcomes.	First study to focus on educational disparities in distress symptoms in pregnancy. Measuring childhood adversities. Sensitivity analysis of unmeasured confounding.	Analysing maternal education and child language in early childhood. Considering the duration of maternal depressive symptoms and its cumulative effects with education.

In Article III, the measures are observed at gestational weeks 14, 24, and 34 and used as continuous and dichotomized (cut-offs: ≥ 13 EPDS points and ≥ 10 SCL-90 points). In Article IV, the EPDS is used as a binary measure (cut-off: ≥ 12 EPDS points) to indicate high depressive symptoms prenatally and when the child is three and six months old. Continuous measures are common screening tools in non-patient populations and produce more robust associations between mental health and socioeconomic position (Miech et al., 1999), whereas binary measures are of practical importance.

Disability pension (DP) in Article III is a binary variable measuring the receipt of DP at ages 18–24. DP is a financial compensation for the loss of income due to long-term health problems that prevent from participating in work or studies. DP is measured at the end of each calendar year. The different types of/reasons for DP are not separated. Individuals who received a DP continuously from the age of 16 or 17 were excluded, as most of them were diagnosed with malformations or chromosomal abnormalities.

Parental psychiatric problems (i.e., mental disorders) in Article III are based on a woman's report on whether her mother or father had depression, anxiety disorder, substance use disorder, schizophrenia or other psychosis, or other psychiatric problems, when she was 0–6, 7–12, and/or 13–18 years old.

Early language development in Article IV is measured by vocabulary (the number of words understood and produced) at 30 months, using the Finnish version of the MCDI (MacArthur Communicative Development Inventory), a widely used tool for assessing a child's language (Mayor & Plunkett, 2011).

Measures on early experiences

Parental death in Article II is measured by the cause of paternal and maternal death between ages 0–16, classified according to the International Classification of Diseases (ICD-10) as natural deaths (diseases) or deaths by external causes (accident, violence, or suicide). A similar classification has been used in many earlier Nordic studies (e.g. Burrell et al., 2020; Rostila & Saarela, 2011). Based on the primary causes of death, the variables consist of the following values: no parental death, external death, and natural death,

Childhood adversity in Article III is measured using the Trauma and Distress Scale (TADS), a valid and reliable instrument for assessing childhood maltreatment retrospectively (Salokangas et al., 2016). The TADS evaluates emotional neglect and/or abuse, physical neglect and/or abuse, or sexual abuse at ages 0–6, 7–12, and 13–18. To measure early traumatization and its duration, the sum of all five domain scores in TADS at different ages is used as a continuous variable, centered at its mean for regression.

3.4 Methodology

The studies were primarily conducted using multilevel random effects modelling which takes into account the clustering in the data by families or within an individual. The simplest multilevel model has two hierarchical levels (Rabe-Hesketh & Skrondal, 2012). In Articles I and II, the siblings were clustered according to their families, where families constructed the higher level and children within families the lower level. The models in Article III included four layers. The outcome variable had three observations for each person and was thus clustered in time, which is regarded as a nested structure, and the fourth level was generated when the two outcome variables were analysed in the same model.

In Articles II, III, and IV, it was also tested whether the effect of one independent variable depends on the level of a second independent variable, referred to as interactions or joint effects/associations. This improves an understanding of how the examined variables are related and provides an empirical basis for generalising the effect of one independent variable to individuals at all levels or only some specific levels of the second variable (Kasim, 2008). These results were presented as predicted values for continuous outcomes or predicted probabilities for binary outcomes for each category combinations of the two independent variables. The article-specific methodological notes are as follows:

In Article I, three-level random effects linear regression models were applied to decompose the family-level variance of siblings' occupational position (ISEI scale) by maternal and paternal education, EGP class, and income. The unobserved family-level heterogeneity should include all background variation that is not yet controlled for in the model, and controlling for anything shared among siblings, such as parental resources, reduces this variation. We calculated how large a portion each parental resource alone, all their pairwise combinations, and all resources together explain of the ISEI. For example, if the family variance in the baseline model at 0–4 years was 0.27 and dropped to 0.14 after controlling for paternal resources, any aspect related to paternal resources was interpreted to contribute $0.27 - 0.14 = 0.13$ to (explain $0.13/0.27 = 48\%$ of) the family-level variation. The models were run separately for both parents and for each included age period.

In Article II, multilevel linear probability models (LPMs) for the binary (secondary education, university education, DP) and linear models for the continuous (GPA) outcomes were run. Interaction terms were added for the cause of parental death, parental education, and family income to investigate their interactions. To estimate and interpret nonlinear interaction effects for binary outcomes, we used average marginal effects, estimated by first calculating a marginal effect for every observation and then averaging these effects (see e.g., Mize 2019).

In Article III, a simultaneous equations estimation of the two distress outcomes (anxiety and depressive symptoms) was performed in a multilevel framework to acknowledge the co-morbidity between these symptoms, while analysing them separately. Linear models were run for continuous outcomes and LPMs for binary outcomes. Furthermore, a sensitivity analysis for unmeasured confounding was performed using the E-values (VanderWeele & Ding, 2017), that show the minimum strength of association that an unmeasured confounder would need to have with both exposure and outcome, to explain away their association.

In Article IV, two-level linear regression models were used to estimate the link between maternal education and early language development. Separate interaction terms were added to calculate the cumulative association of maternal education and maternal depressive symptoms during the prenatal and/or postnatal period with early vocabulary.

A considerable limitation of random effects and ordinary least squares regressions is that the estimates might be misleading if important unobserved factors producing selection are missing from a model. Even though all available relevant controls were included, and a sensitivity analysis for unmeasured confounding was used in Article III, the associations observed in the four research articles of this dissertation should not be interpreted as causal effects. This should be acknowledged when interpreting the results.

4 Results and Conclusion

4.1 Parental resources and adult socioeconomic position

This article examined how much parental education, class, and income during early life course explain adult socioeconomic position (SEP, measured by ISEI) together (cumulatively) and separately (directly). As parental resources are highly correlated, the direct effects were estimated by decomposing family variance according to each parental socioeconomic indicator. Thus, the correlations of the other two resources were omitted, showing an independent effect separated from the shared part of the correlations.

The results showed that all parental resources together explain approximately 50–60 % of the family-level variance in adult SEP, paternal resources 50 %, and maternal 40 %. Therefore, approximately half of the family background variation in socioeconomic outcomes could not be effectively separated out by parental education, class, and income. *First*, the proportion of family variation explained by all parental socioeconomic resources did not depend on age when the resources were measured, suggesting that the role of parental resources in adult SEP remain relatively stable over the early life course.

Second, the effects of parental characteristics overlapped largely, and the direct, non-shared effects were rather small. *Third*, our results underlined the importance of parental education for both mothers and fathers. The mother's education explained most in infancy (14 %) and father's education in early adulthood. The effects of class and income were minor and dependent on education. The role of parental income alone in SEP was negligible over the entire follow-up period.

Conclusion: The results suggest that to a large extent it does not matter at what age and what parental resources are observed in studies analysing the role of social origin in socioeconomic achievement. If one measure should be chosen based on these results, it would be maternal education. The findings indicate that ignoring the inseparability of parental resources can lead to misplaced conclusions of the mechanisms in the intergenerational transmission of SEP. A large part of SEP was not explained by parental resources, indicating that some unobserved, latent factors not captured by parental resources affect in the background. One evident candidate

based on the literature is the shared genetic dispositions between parents and children. We encourage making an effort to identify such factors to better understand how the family background effect operates.

4.2 Cause of parental death, parental resources, and child's health and education

This study analysed whether the cause of parental death is associated with educational outcomes and severe health problems (disability pension, DP), and whether the associations differ by parental resources.

First, the results indicated lower educational performance and attainment and a higher probability of DP in the bereaved offspring, especially after external parental death. Parental death had the strongest associations with grade point average (GPA) and completing secondary education, and the weakest with university education, and particularly DP. The weakest associations were not surprising, as the bereaved children are then generally older and have had, on average, more time to recover.

Half of these connections were explained by various childhood family characteristics, after which the estimates between causes of death did not differ significantly from each other. The associations between both maternal and paternal death and the child's health and education were moderate, which is in line with previous findings from the Nordic countries (Berg et al. 2014). This suggests that different safety nets work in Finland and that parental death has a limited role in the intergenerational transmission processes. These findings are likely to replicate in welfare states, where family background matters less in education and, for example, in access to health services.

Second, the associations between the cause of parental death and child outcomes differed by parental resources. We often observed less negative educational and health outcomes in families with higher resources, in line with some previous findings (Prix and Erola, 2017), but only if both parents or the surviving parent were highly educated. This could be explained by a larger quantity of no longer available resources in the better-off families, such as human capital and support, possibly leading to a steeper decline in educational aspirations and capacities, and health (Maier & Lachman, 2000). In some cases, external causes of death were related to worse child outcomes than natural deaths, when examined by parental resources; however, lower GPA and higher DP were also observed after maternal natural death, if the mother was the only highly educated parent. This suggests that surviving parents with a higher level of education might protect from negative consequences after early parental death. For secondary education, we did not find variation by parental resources, perhaps because most individuals attain a secondary degree in Finland (Statistics Finland, 2014).

Conclusion: The negative association between parental death and child wellbeing differs by cause of death and parental resources. The cause of death and overall family circumstances should be considered when analysing child outcomes after parental loss. Support and help should be targeted at families with low educational resources. However, the results on maternal death should be interpreted with caution because of their lower numbers. Social selection may also explain some of the observed negative outcomes. Unmeasured confounders, such as inherited genetic dispositions, presumably account for some of these results, although some previous findings suggest the existence of a causal component (Rostila et al., 2015). Unobserved protective factors can also moderate the stress caused by adverse life events, such as high resilience that supports successful coping (Rutter, 1985; Schoon et al., 2004), and the social support from friends and relatives.

4.3 Educational differences in prenatal mental health and the role of childhood circumstances

The first objective of this study was to document the scope of educational differences in anxiety and depressive (distress) symptoms in pregnant women. The second objective was to assess the causation and selection processes involved by analysing the extent to which the educational differences are confounded by socioeconomic background, parents' psychiatric problems, and adverse experiences in childhood and adolescence.

First, the more educated mothers had lower anxiety and depressive symptom scores, particularly when examining the clinically significant levels of distress measured by binary outcomes. These results are in line with the findings of such disparities in the general population.

Second, the relationship between education and prenatal distress symptoms was partly attributable to childhood maltreatment, measured by the TADS. It was the most important factor explaining the educational differences and controlling for it attenuated the disparities by up to a half, suggesting that early adversities affect both educational attainment (and possibly through education on health) and prenatal mental health. Here, controlling for education has also likely explained part of the 'effect' of early trauma. Parental social class or mental disorders did not account for the educational differences in prenatal distress.

Third, based on the sensitivity analysis on unmeasured confounding using E-values, we ruled out the possibility of complete confounding by anxiety and depression in adolescence.

Conclusion: The results support both social selection and social causation perspectives. Education and the resources it provides are likely to protect from prenatal distress, in line with results concerning distress in the general population

(e.g. Pinto-Meza et al. 2013). Even though this supports the social causation hypothesis, the available data and methods are limited in providing conclusive evidence, as multiple unmeasured factors during the life course can alone or cumulatively explain the remaining educational differences. The results also underline that undisturbed psychological growth environment might protect mental health in pregnant women. This is a highly relevant finding for both research and policy. Childhood maltreatment can leave long-term scars, the effects of which may extend to the next generation.

4.4 Maternal education, maternal depressive symptoms, and early language development

The objective of this study was to analyse the role of maternal education in children's early language development (parent-assessed vocabulary at 30 months) and whether maternal education and high prenatal and/or postnatal maternal depressive symptoms have cumulative associations with early language development.

First, higher maternal education was associated with a child's larger vocabulary at 30 months, suggesting that socioeconomic differences are already present in early language development. In line with previous findings from countries with higher social inequality and using self-reported measure for education, the differences between educational levels were quite large and remained so after controlling for important maternal and child characteristics.

Second, child vocabulary was smaller if the mother had depressive symptoms only postnatally, but the depressive symptoms reported during pregnancy or both prenatally and postnatally was not related to child vocabulary, despite the expected more harmful role of persistent maternal distress in child outcomes (Kingston & Tough, 2014). The importance of postnatal depressive symptoms might relate to the stronger role of postnatal period in language development when parents (including their health status) can have more influence on this development.

Third, the results showed smaller vocabulary particularly among children of low educated mothers who reported high depressive symptoms postnatally, whereas the vocabulary scores did not vary by maternal depressive symptoms in children of mothers with university education. However, the interaction was statistically non-significant, potentially due to a lack of power due to a limited number of women with elevated depressive symptoms and cumulative risks.

These results remained after conducting several sensitivity checks, except for the non-significant differences in language development at 14 months by maternal education. Further, the sensitivity analysis indicated that maternal education is related to vocabulary only among boys, which has also emerged in previous studies on maternal depression and cognitive development (Kurstjens & Wolke, 2001).

Conclusion: These findings suggest that low maternal education and elevated postnatal depressive symptoms constitute a cumulative risk in early language development, in line with the earlier findings showing that multiple (additive) negative factors typically reveal poorer developmental outcomes (Evans et al., 2013). The association between maternal education and language development might also be more pronounced, if the mother has mental health problems postnatally, but the interaction was statistically non-significant and requires further examination in other, preferably larger, samples. Considering the uncertainty of this finding, this could suggest a compensatory advantage of the highly educated families to protect from the effects of adverse life events or low resources (Bernardi & Boado, 2013; Evans, 2004), for example, higher awareness of the harmful effects of depression on child development (Mirowsky & Ross, 2005).

These results suggest the role of cumulative risk in early language development that needs to be considered when planning measures to support the wellbeing of families. However, the results may be affected by the potential measurement error related to parent-reported vocabulary, the systematic attrition of more disadvantaged and symptomatic women (Karlsson et al., 2018), or by the unobserved factors.

5 Discussion

This dissertation examined the role of parental resources and early-life exposures in health and socioeconomic wellbeing. It approached the topic particularly from the perspective of how exposures during the foetal period, childhood, and youth and their interplay participate in the processes of wellbeing across generations. Despite wellbeing is one of the most studied topics in social sciences and also interdisciplinary research has increased, the complex mechanisms linking different aspects of wellbeing to early environment and to each other are still not clear (Uhlenberg & Mueller, 2003). Examining these complex processes is also methodologically demanding.

The four research articles (summarised in Table 1) provided new insights into the mechanisms of wellbeing with intergenerational and interdisciplinary twists in a Nordic welfare state context. *First*, the findings indicated a moderate positive relationship between parental education, occupational class, and income and adult socioeconomic position. The main contribution here was showing the direct and shared effects of each parental resource at different stages of childhood and youth on socioeconomic outcomes. In particular, the importance of parental education emerged, although the effects of different resources were mostly inseparable. The role of parental income was small, in line with previous findings from Finland, although other evidence has shown its importance, for example, in child health (Tolkkinen et al., 2018). Furthermore, parental resources did not have significantly higher correlation with socioeconomic position at any specific age. Moreover, the results also suggested the positive role of parental resources (education) to be already present in early language development.

Second, adverse exposures during childhood and youth were negatively related to later education and health. Parental loss (also measuring parental health) had rather moderate associations with children's education, and the associations were stronger in earlier outcomes, such as GPA in compulsory level, than when children were older. Its role in early disability pension reciprocity was small. In general, the moderate role of parental death in education and health is in line with previous findings (Berg et al. 2014). It also suggests that different safety nets work in Finland and that parental death has a limited role in the intergenerational processes.

Furthermore, child maltreatment was negatively related to both education and mental health in pregnant women and largely explained their association.

In general, the results suggested maternal distress, particularly during pregnancy, to play a relatively small role in intergenerational processes, although mediation through maternal distress was not specifically addressed. The question is whether this slight role can be explained by using subjective rather than objective measures, that have had stronger associations with development (Laplante et al., 2008) and whether this finding applies to non-cognitive child outcomes. However, these findings do not imply that prenatal mental health should not be protected, as its effects are shown in numerous studies (Van den Bergh et al., 2020). It has also been argued that ‘absence of evidence is not evidence of absence’, referring to problems relating to misinterpretation of non-significant findings and using it to justify inaction (Altman & Bland, 1995). Furthermore, the results suggested, however, that postnatal maternal depression is related to child (language) development and may thus potentially mediate intergenerational inequalities. Postnatal mental health should be considered when planning measures to support families’ wellbeing.

The *third* main finding was that the role of negative early-life events and parental health problems were more pronounced in less educated families and vice versa. The results showed that the educational and health outcomes were less negative after parental death in families where both parents or the surviving parent were highly educated and more negative in families with lower educational resources. The findings also suggested slower language development when the less educated parent reported depressive symptoms postnatally; however, we were unable to show this, potentially due to a lack of statistical power.

This provides new evidence in the crossroads of socioeconomic factors and health on the potential consequences of multiple risks and thus the hypothesis of cumulative disadvantages in the intergenerational processes – that living in ‘risky families’ has a greater impact on development and wellbeing than a single disadvantage – underlining the effectiveness of well-targeted policies (Ben-Shlomo & Kuh, 2002; Evans et al., 2013; O’Rand, 2009). These findings also suggested highly educated parent to ‘protect’ against adverse outcomes, supporting the theory of cumulative (dis)advantages (e.g., Bernardi & Boado, 2013).

It is hard to differentiate whether these results reflect cumulative processes in a multiplicative manner, where negative exposures strengthen each other’s effects, or cumulative risks, where exposures and their effects sum up to multiple additive risks, or whether the results rather reflect a chain-of-risks mediating pathway, where previous exposures only play a role through the later outcomes but do not add to or strengthen effects, or whether the compensatory advantage of the higher educated families widens the gap in wellbeing between children from different backgrounds and explains the differences. Finally, it might be that all of these mechanisms are

working, instead of one dominating over the others. This uncertainty does not change the implications for policy, in which accounting for both socioeconomic and psychosocial (e.g., health-related) family disadvantages could protect children. However, certain methodological issues, for example relating to unobserved heterogeneity discussed below, prevent drawing strong conclusions of each scenario described above.

In this study, all parental resources and early-life experiences did not show as equally important. Children exposed to low parental education and maltreatment were more vulnerable, in addition to children having more than one family-related risk. These findings support the idea that policies should improve families' wellbeing in several domains, not only one, to prevent the accumulation of disadvantages. Universal policies, such as high-quality day-care (that, on average, supports especially the disadvantaged children) and social security, should be combined with interventions targeted at the most vulnerable families (Duncan & Magnuson, 2013).

The findings indicating that child maltreatment can leave life-long scars and affect even the next generation, implies high relevance for both research and policy. Childhood adversities have become a policy priority in many countries and some argue that there has been less discussion regarding the role of childhood socioeconomic situation in addressing them, despite its potential (Walsh et al., 2019). The results suggested that supporting individuals in their educational paths may help to protect later mental health. This support might also have implications on the growth environments these individuals are able to provide for their children in future.

As mentioned earlier, the results suggested the importance of family's resources both during childhood and youth. Heckman (2006) argued in his famous article in *Science* that interventions targeted at the youngest and disadvantaged children have the highest returns, that steeply decline by age. However, later evidence has indicated that returns actually remain large for education and health policies across childhood and youth (Hendren & Sprung-Keyser, 2020). In light of this evidence, the results of this study suggest policies targeted at families with adolescents to be important as well.

Strengths and limitations

In order to build evidence-based policy to support child development and prevent intergenerational inequalities, more research using rich, reliable longitudinal data that captures the dimension of time and both socioeconomic and non-material aspects of family is needed (Amso & Lynn, 2017). This study used both population-based longitudinal register data on individual life courses with representative samples and data linkages between population registers and birth cohort data. Registers enabled objective measurement of socioeconomic position, life events, and

severe health problems, with multiple measurement points, no reporting bias, and little missing data. Two studies used register data linked to cohort study on mental health, early experiences, and child development. Combining these two types of data sources both increased the accuracy of socioeconomic measures and provided more comprehensive sets of variables to study wellbeing with low disciplinary boundaries. Child maltreatment, for instance, is difficult or impossible to capture directly using registers alone.

The statistical methods used are sophisticated and the regression models were built using the available important covariates. In future, formal mediation analysis techniques could also be applied to further disentangle and test the mechanisms explaining how early-life exposures may influence socioeconomic and health inequalities over the life course. In some cases, more causal methodology (such as fixed effects modelling to control for unobserved family heterogeneity) might have improved this study, for example, the articles examining language development (IV) (e.g., Rogers et al., 2015), and child outcomes after parental death (II) (e.g., Amato & Anthony, 2014), if the data or study designs would have allowed this.

Following mainstream empirical research, the studies may include unobserved heterogeneity due to the lack of measures on all potential confounders, despite the efforts to tackle this issue. For example, the studies could not consider the extent to which genetic dispositions explain the relationships between parental resources, early exposures, and child outcomes. Previous genetically informed research proposes that genes can explain a larger share of wellbeing than family environment (e.g., evidence on education: Lyngstad et al., 2017). Inherited vulnerability for mental illness, for example, may show in poorer resources and health both in parents and children, bringing challenges for causal inference in studies without causal design or proper data. To understand the interplay of biological and social (cultural) pathways over generations requires longitudinal, genetically informed research (Branje et al., 2020), that also carries a potential for the evaluation of policies and interventions (Bakermans-Kranenburg et al., 2008; Campbell et al., 2014).

Furthermore, as a common feature in the third and fourth studies, measures based on self-reports may include bias. Results based on the recall of childhood adversity and the parent-assessed vocabulary, in particular, should be interpreted with caution. The non-random drop-out of more disadvantaged and symptomatic women in these two studies may also have caused bias in the estimates. A larger sample in the fourth study would have provided better statistical power for calculating the interactions.

The results of this dissertation describe the role of family context in wellbeing in Finland. Findings based on a Nordic welfare context with relatively high equality and societal support are likely to be more conservative and less pronounced than in societies with greater social inequality and different policy environments. For example, health disparities would probably be overall much larger in Eastern Europe

and in the US (also when compared to Europe), although there is variation in trends and between regions (Mackenbach et al., 2018). Furthermore, also many other important environments had to be excluded from this study (e.g., Bronfenbrenner 1979), including school, friends, and society. In the future, it would be informative to elucidate the interplay between these environments (Patel, 2011) and consider these findings more in the light of other aspects of family context than resources, such as family structure, and differences between men and women.

Final remarks

Overall, the findings of this dissertation provide useful insights into the mechanisms and processes across generations and life courses that shape wellbeing, including the potential protective elements involved. The results also underline the inseparability of health and socioeconomic wellbeing over the life course. The steps taken towards interdisciplinary research to better understand these complex processes, together with social and health policy actions and interventions targeted particularly at the most vulnerable families, are important for tackling inequalities and their accumulation to protect wellbeing.

Abbreviations

ACE	Adverse childhood experiences
DP	Disability pension
EGP	Erikson-Goldthorpe-Portocarero classification for social class
EPDS	Edinburgh Postnatal Depression Scale
GPA	Grade point average (here, from compulsory education)
ISEI	International Socio-Economic Index of Occupational Status
LPM	Linear probability model
MCDI	MacArthur Communicative Development Inventory
RE	Random effects
SCL-90	Anxiety subscale of the Symptom Checklist -90
SEP	Socioeconomic position
TADS	Trauma and Distress Scale

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