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THE ROLE OF KIN IN EDUCATIONAL AND STATUS ATTAINMENT

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ABSTRACT

One of the most robust findings of sociological research is that family background is associated with children's status and educational attainment. A child with an advantageous family background is more likely to have a higher education and socioeconomic status than a child with a disadvantageous background. This phenomenon has been interpreted to indicate a lack of equal opportunities in socioeconomic attainment. In sociological research, inequality of opportunities is usually explained by unequal distribution of different socioeconomic resources between families. Modern societies function most efficiently when opportunities for education and occupational attainment of individuals are based on individuals' merits independent of family background. In addition to the parents, other relatives such as aunts, uncles, and grandparents may affect the socioeconomic achievement of children. However, social stratification research has usually concentrated on studying the associations between family resources and children's achievement. The role of extended family members has been ignored.

This dissertation analyzes the direct effects of family resources and disadvantageous events on children's education and socioeconomic status, as well as the effects of extended family members and their socioeconomic resources on children's educational achievement. The theoretical framework is based on evolutionary and social sciences of kin influences in intergenerational transmissions.

The empirical analyses of the four research articles are based on highly reliable and voluminous Finnish register data. Analyses are conducted by comparing siblings with random and fixed effect regression models. Some of the results can be interpreted as reflecting a causal relationship between parental resources and the effects of extended kin.

According to the results, parental socioeconomic resources can independently explain only a minor proportion of adult children's socioeconomic status in Finland; most of the associations of family background are explained by unobserved characteristics. Maternal education has the most substantial independent effect on adult children's status in early childhood. On average, it explains 14 percent of the family variance. The mother's or father's income has no independent effects on children's socioeconomic status or education. However, parental unemployment has a negative effect on children's general secondary attainment, grade point average at the end of compulsory school and tertiary education enrollment. High parental education entirely compensates for the negative effect on general secondary attainment and grade point average. For tertiary enrollment, the negative effect of

parental unemployment can be observed only for those children who have a highly educated parent, indicating relative risk aversion caused by parental status decline.

On average, the direct effects of extended kin socioeconomic resources are negligible. Grandparental socioeconomic status is not associated with children's general secondary attainment. When controlling for parental socioeconomic status and education, the effect of grandparental education is statistically significant but substantially meaningless. However, the results show that grandparents are important for grandchildren's general secondary attainment. Grandmothers are beneficial for children's education if they share a lifetime with grandchildren. The effect of the shared life can be observed in families who have low socioeconomic resources and families with many relatives. The results show that the total amount of aunts and uncles' education compensates for low parental education, thereby increasing the likelihood of children's higher education attainment. The association can be observed only from the maternal lineage aunts and uncles. According to the results, mothers and grandmothers who keep family networks flourishing are particularly important kin keepers within the family circle. The results provide support for evolutionary interpretations of the effect of extended kin and for the significance of social capital within the (extended) family in intergenerational effects.

According to the results of the four articles of the dissertation, socioeconomic resources of families and extended kin can explain only a small amount of the variation in children's education and socioeconomic attainment. It can be argued that equality of opportunities actualizes well in the Finnish welfare state. The association between the family background and children's socioeconomic and education attainment is largely explained by factors other than the socioeconomic resources of parents and extended kin. In the future, studies of intergenerational transmission of education and social status should consider factors other than socioeconomic resources, such as genetic endowments. Correlations between child and kin should not be interpreted to indicate direct effects of parental or other relatives' socioeconomic resources.

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TIIVISTELMÄ

Perhetaustan yhteys koulukseen ja sosiaaliseen asemaan on yksi sosiologian kiistattomimmista tuloksista. Lapsen edullinen perhetausta johtaa todennäköisemin korkeampaan koulutukseen ja sosioekonomiseen asemaan kuin epäedullinen perhetausta. Tämän ilmiön on tulkittu osoittavan, että kaikilla ei ole yhtäläisiä mahdollisuuksia sosioekonomisten asemien saavuttamiseen. Sosiologisessa tutkimuksessa mahdollisuuksien epätasa-arvon selitetään usein johtuvan sosioekonomisten resurssien epätasa-arvoisella jakautumisella perheiden välillä. Koska lapset eivät voi valita perhettään tulisi kaikille taata yhtäläiset mahdollisuudet edetä koulutuksessa ja urallaan, eikä mahdollisuuksia pitäisi rajoittaa perheiden sosioekonomiset resurssit. Vanhempien lisäksi lapsen sosioekonomiseen menestykseen voivat olla yhteydessä muut sukulaiset kuten sedät, tädit ja isovanhemmat. Yleensä sosiaalisen kerrostuneisuuden tutkimukset ovat keskittyneet tutkimaan vain perheen sosioekonomisten resurssien yhteyksiä lapsen menestykseen eikä perheen ulkopuolisten sukulaisten osuutta sosiaalisessa liikkuvuudessa ole riittävästi huomioitu.

Tässä väitöskirjassa analysoidaan vanhempien sosioekonomisten resurssien ja perheen haitallisten tapahtumien suoria vaikutuksia lapsen koulutukseen ja sosioekonomiseen statukseen sekä perheen ulkopuolisten sukulaisten ja heidän resurssien vaikutuksia lasten koulutukseen. Väitöskirjan teoreettinen viitekehys hyödyntää evolutiivisia sekä sosiaalitieteellisiä selitysmalleja sukulaisten vaikutuksista ylisukupolvisessa liikkuvuudessa.

Väitöskirjan neljän artikkelin empiiriset analyysit perustuvat suomalaisiin luotettaviin rekisteriaineistoihin. Analyysit on toteutettu vertailemalla sisaruksia satunnaisten ja kiinteiden vaikutusten malleilla. Suurin osa tuloksista kertoo vanhempien resurssien ja perheen ulkopuolisten sukulaisten suorista kausaalisista vaikutuksista.

Tulosten mukaan vanhempien resurssit selittävät vain vähän lasten tulevaa sosioekonomista asemaa Suomessa. Äidin koulutuksella on merkittävin vaikutus lapsen asemaan aikuisena varhaislapsuudessa. Se selittää perheiden välisestä vaihtelusta noin 14 prosenttia. Isän tai äidin tuloilla ei ole suoria vaikutuksia lapsen sosioekonomiseen statukseen tai koulutukseen. Vanhemman työttömyydellä havaittiin olevan negatiivinen vaikutus lasten lukiokoulutukseen, päästötodistuksen keskiarvoon ja kolmannen asteen koulutukseen. Vanhemman työttömyyden negatiiviset vaikutukset olivat kuitenkin riippuvaisia vanhemman koulutuksesta. Vanhemman

työttömyyden negatiivista vaikutusta ei havaittu lukiokoulutuksen ja päästötodistuksen keskiarvon osalta niillä lapsilla, joiden vanhemmat olivat korkeakoulutettuja. Kolmannen asteen koulutuksen osalta vanhemman työttömyyden negatiivinen vaikutus voidaan havainnoida vain niillä lapsilla, joilla on korkeakoulutettu vanhempi. Tulos osoittaa riskien karttamisesta koulutustasoa valittaessa.

Keskimäärin perheen ulkopuolisten sukulaisten sosioekonomisten resurssien yhteydet ovat hyvin pieniä tai niitä ei löydetty. Isovanhempien sosioekonominen status ei ollut yhteydessä lasten lukiokoulutukseen. Kun vanhempien sosioekonominen asema ja koulutus otetaan huomioon, on isovanhempien koulutuksen suora vaikutus tilastollisesti merkitsevä mutta sisällöllisesti merkityksetön. Tulosten mukaan isovanhemmilla on silti merkitystä lapsenlapsen lukiokoulutukselle. Isoäideistä on hyötyä, jos he ovat elossa samaan aikaan lapsenlapsen kanssa. Isoäitivaikutus lapsenlapsen lukiokouluttautumiselle havaittiin perheissä, joilla on vain vähän sosioekonomisia resursseja tai joilla on paljon sukulaisia. Tulosten mukaan setien ja tätien koulutuksen kokonaismäärä kompensoi vanhemman matalaa koulutusta, joka lisää todennäköisyyttä, että lapset kouluttautuvat pidemmälle. Yhteys voidaan havaita vain äidin puolen setien ja tätien osalta. Tulokset tukevat sekä evolutiivista tulkintaa sukulaisvaikutuksista että suvun sisäisen sosiaalisen pääoman tärkeydestä koulutuksen ylisukupolvisessa liikkuvuudessa.

Väitöskirjan neljän artikkelin mukaan vanhempien ja perheen ulkopuolisten sukulaisten resurssit selittävät lasten koulutusta ja sosioekonomista asemaa vain vähän ja syyt, miksi hyväosainen perhetausta on yhteydessä korkeaan sosiaaliseen asemaan, on enemmän muissa tekijöissä kuin vanhempien ja muiden sukulaisten resursseissa. Sosiaalisen liikkuvuuden ja mahdollisuuksien tasa-arvon tutkimuksessa pitäisikin huomioida myös muita tekijöitä, kuten perittyjen geneettisten taipumusten vaikutukset, eikä tulkita vanhempi-lapsi korrelaatioiden ilmentävän sukulaisten sosioekonomisia resursseja.

ACKNOWLEDGEMENTS

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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, Kotimäki, Sanni & Lehti, Hannu (2016). Parental education, class and income over early life course and children's achievement. *Research in Social Stratification and Mobility*, **44**, 33–43.

II   Lehti, Hannu, Erola, Jani & Karhula Aleksi (2019). The Heterogeneous Effects of Parental Unemployment on Siblings' Educational Outcomes. *Research in Social Stratification and Mobility*, **64**, 100439.

III   Lehti, Hannu & Erola, Jani (2017). How do aunts and uncles compensate for low parental education in children's educational attainment? Published in Erola, Jani & Kilpi-Jakonen, Elina (eds.) *Social Inequality Across the Generations: The Role of Compensation and Multiplication in Resource Accumulation*, Edward Elgar, Cheltenham.

IV   Lehti, Hannu, Erola, Jani & Tanskanen, Antti (2018). Tying the Extended Family Knot – Grandparents' Influence on Educational Achievement. *European Sociological Review,* **35**, 29–48.

1   INTRODUCTION

One of the most robust findings of sociological research is that an advantageous social background tends to benefit children's socioeconomic attainment (Breen & Jonsson, 2005; Erikson & Goldthorpe, 1992; Ganzeboom, Treiman, & Ultee, 1991; Hout & DiPrete, 2006). Although the association between family of origin and children's attainment varies across countries and periods – indicating that institutional factors obviously play a role in parent-child association – there are no countries where intergenerational transmission of socioeconomic resources is missing entirely. Even in the fairly meritocratic Nordic welfare states, socioeconomic inheritance has not been eliminated, although it may be lower than in countries where social benefits and subsidies for education are at a lower level (Pfeffer 2008).

This dissertation addresses the influences of extended and immediate family members on children's education and socioeconomic attainments in Finland; thus, this dissertation is about equality of opportunities. Equality of opportunities means that an individual's place in the social stratification process is determined in some form of competitive process in which all individuals of the society are suitable to compete on equal terms. It is a commonly accepted view that everybody should be given equal opportunities to achieve a position in which their own motivation, abilities and skills are adequate regardless of their families' socioeconomic resources or other characteristics. It has even been suggested that humans have a natural tendency to favor equality of opportunities (Starmans, Sheskin, and Bloom 2017). When family background plays a role in socioeconomic attainment, it has been interpreted to indicate persistence of inequality of opportunities.

In sociology, inequality of opportunity is explained by referring to children's opportunities and constraints in socioeconomic attainment. Sociological explanations are concerned with the children's life chances that are influenced by the family of origin and other ascribed characteristics that children experience during their life course. More specifically, social stratification research has been interested in how parental socioeconomic resources – be they parental class, status, education or income – influence children's opportunities, particularly for education and social status attainment (Blau and Duncan 1967).

Indeed, a vast number of studies on intergenerational social mobility have measured inequality of opportunities with parent-child associations. These studies have measured with correlations between parent's and child's education, income or social status to what extent family background is associated with children's attainment (Breen & Jonsson, 2005; Erikson & Goldthorpe, 1992; Ganzeboom et al., 1991). This approach has been called the two-generational paradigm in studies of intergenerational mobility (Pfeffer 2014). More recently, this approach has been challenged; it has been claimed that social mobility rates and equality of opportunities may have been overstated, because intergenerational mobility models have not considered extended family members or multigenerational mobility processes (Bengtson 2001; Clark 2014; Mare 2011). Recently, there has been a growing empirical literature on social mobility across multiple generations (Anderson, Sheppard, and Monden 2018; Chan and Boliver 2013; Erola et al. 2018; Erola and Moisio 2007; Hällsten 2014; Hertel and Groh-Samberg 2014; Knigge 2016; Lindahl et al. 2015; Møllegaard and Jæger 2015; Solon 2018; Warren and Hauser 1997; Ziefle 2016). While these studies have mainly considered the effect of grandparents' socioeconomic resources on grandchildren's attainment, only a small minority of studies have analyzed the importance of aunts and uncles (Erola et al. 2018; Jæger 2012) or whole family network (Adermon, Lindahl, and Palme 2016) for children's socioeconomic attainment.

In social stratification research, the intergenerational transmission of education and socioeconomic status has been explained by mostly relying on rational action of the families. Theories based on human rationality state that individuals tend to maximize their expected utility by estimating the cost and benefits of their future outcomes in view of the limits of their constraints. For example, the theory of relative risk aversion states that families do not try to maximize the upward mobility of their children but rather try to avoid downward mobility (Boudon 1974; Breen and Goldthorpe 1997). Families do not behave as risk seekers; instead, avoiding risk and thus upward mobility is only a secondary priority of families and children. This avoidance is one reason that inequality of opportunities seems to persist. Sociological theories have also emphasized the importance of the socialization process within families, where children are likely to learn certain cultural habits, but have ignored how evolutionary dispositions of individuals are associated with the socialization processes (Blau and Duncan 1967; Bourdieu and Passeron 1990).

Social stratification has not been concerned with the ultimate question – why close kin such as parents and extended family members have an incentive to influence and support their children's educational and status achievement in the first place (Boudon 1974; Bourdieu and Passeron 1990; Friedman, Hechter, and Kreager 2008; Raftery and Hout 1993). Stratification studies have mostly followed the Durkheimian rule that social phenomena must be explained with other social factors

and that there is no room for psychological or biological explanations in sociology (Durkheim 1982). Although sociological stratification studies have applied as an analytical framework methodological individualism and rational action theory rather than holistic grand theories and even taken into account some psychological mechanisms (Goldthorpe 2007), theories have largely ignored evolutionary-based explanations of human social behavior (see exception Baier and Lang 2019; Biblarz and Raftery 1999).

It is argued here that combining evolutionary with sociological reasoning, one can more comprehensively explain why parents and extended kin such as grandparents, uncles, and aunts are willing to invest time and other resources in the socioeconomic success of their descendants and are likely to influence their socioeconomic attainment. For example, Elster (1997) has pointed out that why individuals have certain goals and preferences remains the most important unsolved problem in the social sciences. An evolutionary social science perspective – the framework applied here – suggests that the intergenerational relationships and rationality behind parental and extended kin social behavior towards children have evolved through natural selection. Sociological theory would form more solid scientific foundation taking account human evolutionary adaptations. This could benefit theorizing and hypotheses formulation, for example, according to evolutionary approach sex, lineage and degree of genetic relationship are important factors in intergenerational relationships, which should be taken into account more carefully in the studies on intergenerational transmissions (Coall and Hertwig. 2010)

This dissertation studies how and why kin influence children's education and socioeconomic achievement in the context of a Nordic welfare state, namely, Finland. More precisely, articles I and II investigate the degree to which parental resource and disadvantageous events explain children's socioeconomic attainment. Then, articles III and IV study whether extended family members such as grandparents, uncles and aunts contribute to the attainment of children. Thus, the dissertation applies a two-generational approach in articles II and I. In articles III and IV, wider views on intergenerational mobility are applied, and the contribution of extended family members to the educational attainment of children is studied.

Finland's institutional context, where education is free of charge, education in the public schools is highly standardized, and social security is at a relatively high level, is well suited to study the intergenerational effects of kin with an evolutionary social science approach. Paradoxically, it can be assumed that in the relatively free society, where individuals may behave according to their own innate skill, ambitions, and preferences, differences may appear more clearly than in societies with more-restricted cultural norms, institutions and welfare resources (Falk and Hermle 2018). As an institutional context, Finland also allows testing the effects of resource investment by parents and extended kin in a context where public policies have

purposely tried to reduce the effects of family background on socioeconomic attainment.

This dissertation includes an introductory chapter and four articles. The introduction is structured in the following manner: I first deal with sociological theories about intergenerational transmission and children's status attainment. Next, I explain why parents and extended family members invest in their children according to evolutionary mechanisms. After the theoretical section, I review the state-of-the-art in studies of intergenerational and multigenerational effects in status attainment. I then describe how the Finnish institutional context influences the effects of parental and extended family members. The data and methods used in the four articles of the dissertation are defined. Finally, I summarize the results of the four research articles and conclude the introductory chapter.

2   THEORETICAL FOUNDATION

The theoretical framing of this dissertation is based on the evolutionary and social scientific literature and divided into two distinct parts: social mechanisms and evolutionary adaptations. Evolutionary-based explanations of a specific behavior are concerned with why that behavior evolved during natural selection, whereas social scientific explanations describe which social mechanisms enable the behavior.

Sociological mechanisms can be labeled middle-range theories, which means that they are empirically testable general statements derived from some social phenomenon (Hedström and Bearman 2009; R. Merton 1968). Social scientific theories explain how a certain behavior or trait is expressed and how contextual and environmental factors are related to it (Scott-Phillips, Dickins, and West 2011). For instance, they express how parental socioeconomic status is associated with children's education. Evolutionary explanations are based on the fitness consequences of human behavior, express why natural selection is favored for a certain trait or behavior, and indicate the evolutionary reason behind specific social behavior (Scott-Phillips et al. 2011; Tanskanen and Danielsbacka 2019). Theories that pursue high generality and universalism can be considered evolutionary explanations. For example, in this dissertation, evolutionary explanations explain why intergenerational transmission is possible and why kin feel positive emotions towards each other, leading to altruism between generations.

It is important to acknowledge that sociological and evolutionary explanations do not necessarily contradict each other but can be integrated. However, when integrating these mechanisms, evolutionary explanations should be considered to precede social mechanisms. Thus, one can believe that evolutionary adaptations guide social behavior in certain social and cultural contexts (Barkow, Cosmides, and Tooby 1995). Evolutionary explanations in this dissertation are based on kin selection, parental investment theory and paternity uncertainty; the main social mechanisms are constructed from the theory of (bounded) rationality of human actors. The main concepts that are exploited here are human and social capital, the theory of relative risk aversion and modernization theory. At the end of the theoretical sections, I introduce the kin keeper model, which is based on both evolutionary and social theories.

2.1   Social mechanisms

A long tradition of intergenerational transmission and social mobility in social sciences provides a theoretical framework for children's educational and status attainment (Becker 1991; Goldthorpe 2004; Grusky 2018; Jonsson et al. 2011). In these studies, two different factors that can increase or constrain children's attainment are usually distinguished from one another: investments and endowments (Becker and Tomes 1986; Behrman, Rosenzweig, and Taubman 1994; Musick and Mare 2006). Previous studies and theoretical models on intergenerational transfers have mostly concentrated on parental endowments and investments. However, it is important to acknowledge that grandparents, aunts and uncles also have endowments and that they use their resources to invest in their grandchildren's, nephews' or nieces' wellbeing in several ways (Adermon et al. 2016; Bengtson 2001; Clark and Cummins 2014; Milardo 2010)

In the social scientific literature, investments are defined as the intentional behavior of kin in favor of children that promote the children's wellbeing and future prospects. Investments are related to resources that are easily observable and that parents and extended kin can transmit to their children. They include factors that can be linked to time and money, for example, consumption for a child's wellbeing and time devoted to care. Endowments are nontangible resources, for example, skills, knowledge, social connections of kin, family culture, and genetics that are transmitted from parents to biological children. Endowments are resources that children may potentially benefit from without parents or extended kin purposely acting for the best interests of the children. However, endowments and investments cannot always be distinguished from each other. It can be argued that endowments can also be invested, for example, parental skills and knowledge that are transmitted to children demand teaching and parental involvement, which can be seen as investments. Furthermore, it has been shown that expression of genes is dependent on family resources (Turkheimer et al. 2003); therefore, investing in living conditions and the wellbeing of children can amplify genetic effects. Thus, it can be assumed that there are indirect effects of parental and extended kin's investments that influence via endowments.

Because endowments and investments are difficult to distinguish from each other, social scientists have mostly measured the effects of resources with income, occupational class, and education. These characteristics are applied as a proxy for family and extended family background, measuring a different aspect of background. The effects of income are most likely to define economical investments, whereas education reflects cognitive and non-cognitive traits, and occupation indicates social status.

The status attainment model has been a key paradigm to explain disparities in socioeconomic attainment since Blau & Duncan (1967) published their seminal

work, *American occupational structure*. The status attainment model assumes that children's socioeconomic attainment is dependent on socialization and the resources of the families' parents, which leads to a certain education and finally socioeconomic status. An advantageous family background can increase not only educational expectations but also social and economic resources that provide support for higher education attainment for the children. Thus, family background is associated with children's educational attainment, and achieved education level affects children's occupation and thus status attainment.

This paradigm has been described with the OED model, where O describes origin, E is for education, and D is for the destination. Figure 1 shows the associations of the basic OED model, which has been applied very widely in social stratification studies. According to the OED model, family of origin is associated with children's status attainments through education; therefore, educational transitions are the main mechanisms that generate social stratification. Furthermore, in certain institutional contexts, parental resources may also have a direct effect on children's final occupational destination (see Bernardi and Ballarino 2016).
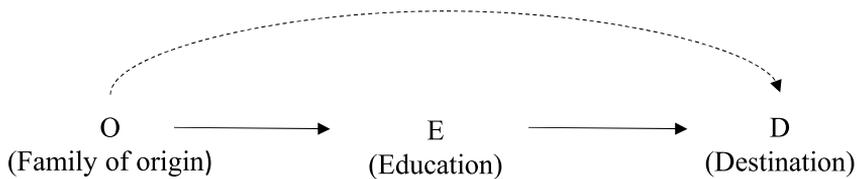
Figure 1.   OED model of status attainment

When studying the effects of the whole family network, OED with parent-child associations is not sufficient. The model can also be expanded to cover extended kin such as grandparents and aunts and uncles, as in Figure 2. It shows pathways for how extended kin (X) can influence socioeconomic and education attainment. In the figure, the larger dashed line means lower likelihood of influence; for instance, extended kin have a lower likelihood to impact focal children than parents have. Extended kin (X) may influence through parents (O), or they may have direct effects on education or final occupational attainment. The extended OED model assumes that extended kin have direct influences on family of origin, i.e., parents, because they are in fact immediate family members of the children's parents (i.e., siblings and parents). The pathway from extended kin to final occupational destination (largest dashed line) can be assumed to be the weakest one. Although the model assumes this connection to a final destination, it is out of scope of the articles of this dissertation.
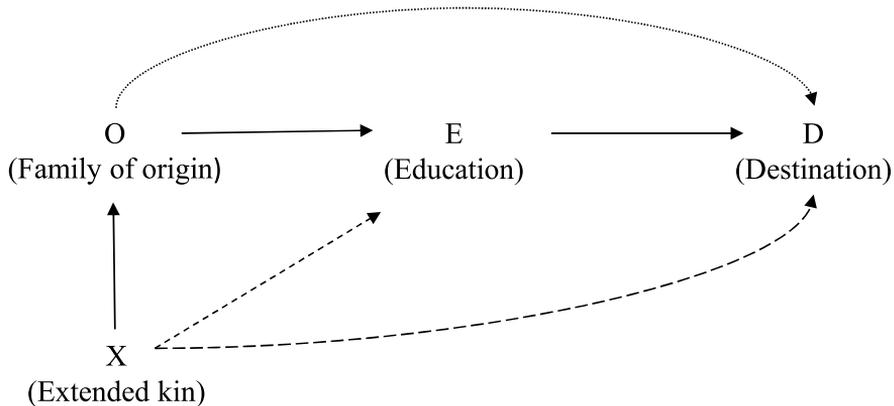
Figure 2.   Extended OED model modified with extended kin

2.1.1   Human and social capital

The standard human capital theory states that individual educational choices are determined by the discounted expected returns compared to opportunity cost of different educational choices. Although, broadly defined, returns and cost can also be considered nonmonetary, most applications of human capital theory assume that returns are expected lifetime earnings, and opportunity costs are the direct cost of education (e.g., tuition fees) and earnings that are lost during studies (Becker 2009; Davies, Heinesen, and Holm 2002).

Using the human capital framework, intergenerational effects in status attainment are explained with the parental ability to invest in children's human capital and children's inherited endowments (Becker and Tomes 1979). Human capital means all the skills and knowledge that children can exploit in the education and labor market. Because parents are concerned for their children's wellbeing, they invest in children to enhance children's skills, health, learning, knowledge, motivation and thus the welfare of the whole family (Becker and Tomes 1986). Parents maximize children's utility function by investing in them but at the same time considering children's endowments such as genetic abilities and returns on investment. The investments in children's wellbeing are also dependent on parental resources and their consumption for their own wellbeing. The total human capital of the adult children is determined by three factors: endowments (cultural and genetic inheritance), parental (and public) investments and (endowment and market) luck. Although parents make investment decisions through childhood, it has been pointed out that earlier investments have a higher return than investments made in later life (Heckman 2006). This difference exists because skill formation is cumulative in nature. Earlier skills facilitate later skill acquisition; thus, earlier investments increase the productivity of later investments (Cunha and Heckman 2008). Studies

have shown that returns on investments are even greater for children growing up in more-disadvantaged families (Heckman 2006). Investments in early childhood have been shown to be related to biological and environmental reasons; for example, brains show greater plasticity in early childhood and are therefore more prone to changes by experiences (Doyle et al. 2009). However, recent empirical evidence has shown that the effects in early life courses found in previous studies can be considered somewhat overestimated and do not support the so-called "Heckman curve" that indicates that early investments are more beneficial for children than are investments in later life (Rea and Burton 2018).

Formal human capital theory states that intergenerational effects follow a Markovian chain, which means that the grandparents do not have direct effects on grandchildren but that the effect goes through the parents' generation, regressing towards the mean, generation after generation (Becker and Tomes 1986). The correlation coefficient (the degree of regression towards or away from the mean) between parents' and children's attainments can be interpreted as a measure of equality of opportunity (see e.g., Björklund and Jäntti 1997).

According to Coleman (1988), children's human capital cannot be fully developed without other individuals' effort, because social capital reinforces the growth of individuals' human capital. Social capital can be defined as social networks and connections that individuals can use to achieve their interests (Coleman 1988; Lin 1999). In his seminal paper, Coleman (1988) integrated human capital and social capital theory. According to Coleman, "Social capital constitutes a particular kind of resource available to the actor". Social capital forms a particular (public) resource for individuals as financial capital such as income forms a private resource. Social capital functions within families and outside of families, for instance on the level of communities, neighborhoods and schools. Coleman distinguishes three major forms of social capital: The first form is linked to expectations and obligations. Social structures obligate individuals to act reciprocally, and when individuals trust one another, they correspond in the same way. The second form of social capital is linked to information that social relationships provide to individuals. Social networks can be considered efficient and cost-free information channels that amplify and guide individuals' decision-making processes. The third form of social capital is social norms, which regulate individuals' actions. Norms can amplify or reduce certain actions by sanctions that social networks hold.

Social capital can be important within the family network, and, particularly for Coleman, parental involvement for children's human capital is important. Coleman writes, "…human capital possessed by parents is not complemented by social capital embodied in family relations, it is irrelevant to the educational growth that the parent has a great deal or a small amount of human capital." Thus, social capital as an information channel from parent to children forms the most important role in the

intergenerational transmission of human capital. Social capital again depends on both the physical presence of an adult and the involvement with the child of an adult (Coleman, 1988).

Not only parents but also extended family members such as grandparents, aunts, and uncles, who are usually the closest persons within the family network, can increase children's socioeconomic attainment (Bengtson, 2001; Coleman, 1988; Milardo, 2010). Social capital available from extended kin can be associated with the human capital creation of children. Family networks provide information to navigate through certain educational institutions and in job markets (Lin 1999). Similarly to parents, extended kin may also have certain expectations for children's education and other behavior. Moreover, extended family members may act as role models for the children, or they may have human capital that children benefit from but parents do not have (Milardo 2010). It can be argued that the overall kin network provides children not only a pool of resources that can be utilized for attainment but also a normative social environment that defines constraints for the attainment. Although parental human capital might be low, an extended kin network with high human and social capital may compensate for this disadvantage for the children. For example, grandparental involvement has been shown to still be an important aspect of family life in Finland, although the welfare state has replaced some of its functions (Danielsbacka et al. 2011). Furthermore, extended kin such as aunts and uncles can have a signaling effect on nephews and nieces' education attainment. Highly educated extended kin can signal the value of an education for the children, particularly in the circumstance where own parents are lower educated (Spence 2002). The signaling effect of extended kin can give an extra push for further education attainment by helping to overcome the uncertain information regarding education choices that low-educated parents can have. The signaling effect of extended kin would not necessarily need contact between kin; thus, having only one highly educated extended kin may be sufficient to compensate for and overcome uncertainty in whether to pursue higher education.

The benefits of social capital for children are dependent on not only parents' or extended family members' investments and endowments but other individuals within the family who compete for the same scarce resources. According to the dilution effect, the investments are dependent on not only the resources of the kin and the ability to invest these scarce resources in children's human capital but also on how many children the family has. All else being equal, when the number of children increases, both parental and extended family member resources are diluted. For instance, grandparental investments in descendants can be assumed to decrease when the extended family network increases because of the greater dilution of the investments in members of the family network (grandchildren and own children).

Indeed, dilution has been shown to be associated with grandparental care (Coall et al. 2009).

However, a large extended kin network may advance children in many ways because the kin network may function as a pool of resources that children benefit from without the need being particularly strong for any individual member of the family network to invest in children. Thus, an individual member of an extended family – be it grandparent, aunt or uncle – does not have to have high resources to influence children's attainment; what matters is the resources that the whole kin network possesses as a group. The effect of the whole kin network has been described as a dynasty effect (Adermon et al. 2016; Clark 2014; Hällsten 2014). Indeed, it has been shown that individuals from larger families are more likely to display affection, obtain more support and report higher contacts to at least one sibling than are individuals from smaller families (Connidis & Campbell, 1995; White, 2001). Siblings are usually the ones who are expected to help in case of emergency (White & Riedmann, 1992). In addition, previous studies have shown that contacts between siblings appear to be rather stable over the course of life; however, events such as divorce and becoming a parent are likely to increase connections with their siblings (White, 2001).

2.1.2   Primary and secondary effects

Boudon's theory of educational attainment explains how social class background is associated with children's education and thus human capital (Boudon 1974). Theory distinguishes primary and secondary effects from each other; *primary* effects of social background influence through children's cognitive ability and school performance, whereas *secondary* effects are related to educational decisions, when cognitive abilities are taken into account. Like the human capital theory, the theory is based on utility maximization, but it states that individuals maximize not only economic but also social utility when they decide how much education they prefer. Family background constrains children's attainment economically and socially. Secondary effects explain why social capital within the family network increase and constrain children's attainment, when taking into account cognitive abilities.

Relative risk aversion (RRA) provides a mechanism for the secondary effects defined by Boudon. It explains why children with low-educated parents choose lower-level education than do children with higher-educated parents, although their school performance may be the same. RRA is grounded in the (bounded or embedded) rational choice and prospect theories (Tversky & Kahneman, 1979). In a bounded rational choice framework, individuals are assumed to behave in a somewhat rational way; however, rationality can be considered based on environmental cues and heuristics that are adapted to a particular environment,

which individuals then use to evaluate the cost and benefits of their decisions. Although individuals can be considered forward-looking, they seek to satisfy rather than maximize their preferences, and rationality is based on their beliefs about the ends, not on precisely calculated probabilities. This kind of rationality is bounded or "subjective" rationality, which is embedded in social surroundings, rather than "objective" rationality, where individuals are assumed to possess all the information to determine the optimal means of pursuing their goals (Boyd and Richerson 2001; Gigerenzer and Selten 2002; Goldthorpe 2007).

Consistent with bounded rationality, prospect theory states that people have a tendency to avoid losses rather than acquire gains when they are making an uncertain decision. The losses and gains are compared to some reference point that is based on the order of the outcomes of a decision according to some heuristic principle (Tversky & Kahneman, 1979). In educational decision making, the reference point is most likely the education level of some individual who is close to the decision maker, and the outcomes are possible future educational opportunities within the educational system. Empirical studies have shown that the reference point of children's educational decisions is formed on the basis of their parents' educational level. For example, 90 percent of British students use as a reference point their parents' socioeconomic status when they estimate their future educational attainment (Jæger & Holm 2012).

According to the RRA model, formally developed by Breen and Goldthorpe (1997), families tend to avoid downward mobility rather than maximize upward mobility, because families from different social backgrounds have different educational expectations based on costs and benefits and different perceived probabilities of successful educational outcomes when choosing among different education options. In education decisions, families use their parental education and social class as a reference point when they estimate risks and gains of the education choices; therefore, the level of parental class and education frame the education decisions of children (cf. Merton, 1968, p. 335-440; Tversky & Kahneman, 1981). Children with lower-educated parents face higher risks when continuing in higher education because they are uncertain about the risks and gains of the higher education. Instead, they are more likely to choose the option that they are familiar with, namely, their parents' educational level. Thus, parental resources constrain children's educational and further socioeconomic attainment.

Although education may be free of charge, as in Finland, parents and children may have a risk in continuing education in the form of the opportunity cost of lost earnings and time and due to psychological consequences (i.e., risk of failure). Children with lower-educated parents may also lack information about the education system, which may affect how much they perceive risk in further education choices. For example, Barone, Assirelli, Abbiati, Argentin, & De Luca (2018) showed that

information given to lower-educated parents about the educational system and average earnings of the higher educated had a positive effect on children's further education decisions. Other studies have found that relative risk aversion is an important mechanism producing persisting educational inequality even in the Nordic welfare states, where tuition fees and other obstacles related to higher education are largely removed (Breen and Yaish 2006; Davies et al. 2002; Holm and Jæger 2008; Van De Werfhorst and Andersen 2005; Van De Werfhorst and Hofstede 2007). For example, at the higher education level, students receive a study allowance and the government finances higher education. The mechanism of relative risk aversion has been proposed to explain the paradox of why educational inequality has persisted while at the same time education has expanded enormously in modern western societies (Breen and Goldthorpe 1997; Holm and Jæger 2008).

2.1.3   Compensation, multiplication and accumulation

Life-course theory states that changes in life should be considered over a long period, not just particular episodes of life (Elder, 1994). Because individuals' prior life histories are likely to influence later life, life-course transitions and events tend to vary between families and individuals (Mayer 2009). The effects of parental disadvantageous life-course events that families experience can vary according to institutional context but also children's age and parental resources. For example, educational decisions cannot easily to be postponed later in life; they are made at a certain point in life. Families can differ on how well they can compensate for disadvantageous life-course events such as parental unemployment that is studied in here. Moreover, at some point in life, parental and extended kin's socioeconomic resources are more likely to influence on children's attainment more than in other phases of life. The higher education of extended kin may compensate for low parental education but this compensation emerge only at the phases of life when these resources are needed for instance at the educational transitions. Furthermore, high parental human capital can compensate for disadvantageous events, which would otherwise influence on children's educational transitions.

Individuals can compensate for the lack of a certain resource or for disadvantageous life-course events with other advantageous characteristics that they possess. This *intrapersonal resource compensation* can be advantageous for children if their parents are able to compensate for disadvantageous life-course events or their low resources with other characteristics they possess. For example, with better coping mechanisms, parents with high social and human capital can compensate for stressful life-course events for their children such as unemployment, divorce, cognitive disabilities and poor health of the children.

According to the mechanism of compensatory advantage, children from socioeconomically advantaged families are better protected from the disadvantageous life course events that are likely to affect attainment negatively (Bernardi 2012, 2014). This intrapersonal mechanism has been shown to reduce or even remove entirely the negative effects of disadvantageous life-course events of families with better human and social capital. Empirical studies have verified the effect of compensatory advantage on various phenomena, for instance, parental divorce (Grätz 2015b), birth month and school entry (Bernardi and Grätz 2015).

Although two-generational models clearly show that children with higher parental socioeconomic resources have higher probabilities of attaining higher education and social positions, this point is not always true. One reason is that institutional context may equalize the effects of family background and increase social mobility (Marks 2010; Pfeffer 2008). As stated in the previous chapter, the other reason is that it can be assumed that children's attainment is not entirely dependent on resources possessed within their nuclear family, excluding the whole extended family network; thus, children's extended family members such as grandparents, aunts and uncles may contribute to the attainments of children. Contributions of extended family members may be even more important in times of need and when parental resources are low (Erola and Kilpi-Jakonen 2017). The compensation mechanism of extended family members can be defined as *interpersonal resource compensation*. According to this mechanism, extended kin provide extra resources to immediate family members when they lack resources; when the immediate family has plentiful resources, extended kin provide fewer resources (Erola & Kilpi-Jakonen, 2017; Jæger, 2012). For example, the pool of resources that extended kin provide as a group can be much more important in times of need, for example during a parental divorce or death or when families have low income or human capital. The compensation mechanism is explained in the left panel of Figure 3, which shows that children with lower parental resources are more likely to be advanced by extended family members' resources than are children with higher parental resources.

An opposite mechanism to the interpersonal resource compensatory mechanism is a multiplication of advantages or a multiplier effect, which means that extended family members' resources are more likely to impact children's attainment in families with more socioeconomic resources than in families with less socioeconomic resources. In other words, in the higher end of the resource distribution, extended family members' resources influence child's attainment, but this behavior is not as prevalent in the lower end of the distribution (Erola and Kilpi-Jakonen 2017). Multiplication of advantages is illustrated in the right panel of Figure 3, which shows that children with high parental resources are more likely to benefit from the higher resources of extended family members.

The multiplier effect can also appear within families; thus, an advantageous family background can amplify the effect of children's endowments. Multiplication assumes that children with the same disposition but a different family environment are likely to occupy different positions in the stratification process because innate dispositions are shown to be dependent on (family) environment (Dickens and Flynn 2001). An advantageous family environment can help children to achieve their full potential, whereas children from a disadvantageous family environment would lack the needed resources. Although some previous studies propose that individuals are selected to the different environments based on their innate dispositions such as cognitive capacity, suggesting positive gene-environment correlation (Herrnstein and Murray 2010), it has been shown that social environment still plays a substantial part in the selection process, multiplying the effects of innate dispositions (Dickens and Flynn 2001). Social environment is important in the selection process because correlation between advantageous innate disposition and environment is likely to generate further advantages in subsequent periods; thus, selection into an advantageous environment reinforces cognitive disposition, forming a positive loop between cognitive disposition and the selected environment. This kind of multiplier process has been proposed to be cumulative in nature (Dickens and Flynn 2001; DiPrete and Eirich 2006).
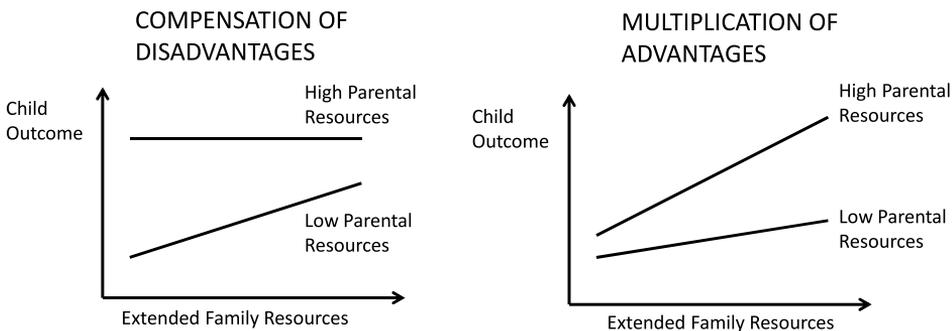
Figure 3. Extended kin compensation and multiplication effects for children's attainment
Source: Erola and Kilpi-Jakonen 2017

Cumulative (dis)advantage (CA) can be considered a mechanism somewhat similar to the multiplication effect; however, CA assumes that not only advantageous but also disadvantageous events and characteristics have a tendency to cumulate over time. Thus, cumulative effects have been seen to function in both directions. In sociology, Merton (1968) was the first to use the CA mechanism to explain the cumulative nature of scientific rewards and careers. Merton explained that

exceptional early career performance of a young scientist will lead to rewards and new resources, which facilitate continuing high performance and further rewards. Merton described the accumulation of advantages by the Mathew effect, which he coined from the Bible: "For to everyone who has will more be given, and he will have abundance; but from him who has not, even what he has will be taken away."

According to the Matthew effect, advantages and disadvantages have a tendency to accumulate; a favorable or unfavorable relative position can be seen as a resource that produces further advantages or disadvantages (DiPrete and Eirich 2006). In other words, disadvantageous life-course events such as unemployment, divorce or parental death, to which children and families are exposed, are likely to accumulate further disadvantages. For example parental unemployment can decrease family income in the long term and weaken parents' prospects in the labor market (DiPrete and Eirich 2006; Gangl 2006; Oreopoulos, Page, and Stevens 2008) Thus, the negative experiences frame individuals' future opportunities and choices (Elder 1994). The central idea in the CA is that the advantages and disadvantages of individuals or groups are likely to grow over time compared to other individuals or groups; thus, it has been interpreted that inequality over time also grows (DiPrete and Eirich 2006).

Not only successive events predicted by CA but also exposure to specific circumstances can influence an individual's life course. Time exposed to the disadvantageous or advantageous circumstance can have a negative or positive effect on children's attainment (DiPrete and Eirich 2006). The exposure effect can be described as a treatment over some possible long duration such as growing in a poor or rich family, growing in a single parent or intact family, and parental (un)employment. The exposure effect has usually been considered related to negative life events; however, children and families can also be exposed to positive circumstances and characteristics. For example, time exposed to extended kin such as grandparents is associated with a probability of benefiting from the social capital they may offer. Healthy grandparents may offer childcare help or other services for the parents, thus exposing grandchildren to grandparental involvement. If grandparents live near the grandchildren, it can be assumed that the effect would be even stronger (Anderson et al. 2018). Overall, the time exposed to different advantageous or disadvantageous circumstances can be beneficial or disturbing for attainment. Thus, the exposure effect comes close to the multiplier effect introduced earlier; exposure to advantageous family circumstances can have multiplicative effects because family circumstances are likely to interplay with children's innate dispositions, reinforcing children's traits and skills. The next section introduces modernization theory and gene-environment interplay in the modern welfare state thus, it coming close to the multiplier effect and CA.

2.1.4   Modernization and gene-environment interplay

Modernization theory states that as societies industrialize, education expands, standardizes and becomes available for the masses; the influence of family background on socioeconomic attainment declines, while educational achievement based on the individual's cognitive abilities and motivation becomes more important. Thus, in modern society, it is merits rather than the family background that are likely to contribute to socioeconomic attainment (Bell 1976; Marks 2010). Children with the same abilities from disadvantaged and advantaged families who expend the same effort have the same probabilities to succeed in the education and labor markets. It has been pointed out that the level of modernization determines the level of intergenerational social mobility in societies, and thus, mobility rates are rather similar in the western industrial counties (Erikson and Goldthorpe 1992). Modernization theory can be applied particularly for Nordic welfare states where governments have intentionally subsidized education and social security to reduce inequality of opportunities (Erikson and Jonsson 1996; Pfeffer 2008).

One aspect of modernization is that as societies become richer, greater public and private investments increase equality of opportunities, and educational achievement becomes more salient for socioeconomic attainment (Marks, 2013, 22-32). Thus, it can be assumed according to the OED model that in a more open society, in terms of social mobility, the direct relationships of the family of origin with education and origin with destination become weaker, whereas the relationship of education with destination becomes stronger (Breen and Jonsson 2005).

However, it can be anticipated that, because cognitive skills and noncognitive personal traits are transmitted from parents to children at least partly via genetic inheritance, the effect of family background does not vanish but can change its character in meritocratic societies. Endowments become more important than parental investments because investments can be assumed to follow diminishing marginal utility; a one-unit increase in investments becomes less effective when more investments are made. When parental (and public) socioeconomic investments reach their optimal level, the association of inherited, innate predispositions that increase socioeconomic attainment can be assumed to strengthen (Becker & Tomes, 1986, S31; Turkheimer et al., 2003). As a result of higher investments, heritability, which means the degree to which genes explain variation for a certain trait, is likely to increase. Paradoxically, in more meritocratic societies, associations between family background and children's socioeconomic attainment do not disappear and can even strengthen (Marks, 2013, 31-32).

Regarding modernization theory, studies show two kinds of results. First, sociological studies show that cognitive skills have indeed become more salient for educational attainment in western societies and that the effect of parental background has decreased, while societies have modernized and become more meritocratic

(Knigge et al. 2014; Marks 2013; Marks and Mooi-Reci 2016). Second, studies from the field of behavior genetics show that genes are associated with education attainment (Behrman and Taubman 1989; Branigan, McCallum, and Freese 2013) but that how much genetic endowments and environment explain children's socioeconomic attainment is dependent on institutional and family context and cohort (Baier and Lang 2019; Branigan et al. 2013).

For example, a meta-analysis of 31 twin-studies shows that across countries, genes explain an average of 50 percent of the variance between individuals on educational attainment, the shared environment on average 27 percent. However, because heritability estimates interplay with environmental factors, these numbers are likely to change when education and other socioeconomic resources become more equally available. For example, for the cohort born 1950–1960 (versus cohort born 1915–1939) in Norway, average estimates are for heritability 0.76 (0.18) and shared environment 0.09 (0.68) (Branigan et al. 2013). In Finland, for twins born before 1958, heritability for education attainment has been estimated to be on average 0.47 for men, whereas the effect of the shared environment was estimated to be on average 0.36 (Silventoinen, Kaprio, and Lahelma 2000). Unfortunately, this research is the only twin study that has been conducted in Finland for education attainment; thus, there is no further empirical evidence on how welfare policy reforms such as education expansion and primary school reform have affected these numbers.

Gene-environment interaction has been shown to be dependent on not only country context and birth cohort but also socioeconomic resources of the families. It has been shown that heritability of cognitive abilities and educational attainment are dependent on the levels of the family income and parental education (Baier and Lang 2019; Gottschling et al. 2019; Heath et al. 1985; Turkheimer et al. 2003). Higher family income and parental education increase heritability estimates and decrease shared environmental effects. Furthermore, it has been observed that heritability is likely to become stronger in adulthood compared to childhood (Bouchard & McGue, 2003). This observation implies a multiplier effect in gene-environment interaction; innate dispositions of the children are augmented by higher family resources, leading to better attainment compared to children with lower parental resources

However, critical insights about the assumptions of twin studies are raised, particularly for assumptions that the environment where monozygotic twins are raised is not more similar than where dizygotic twins are raised, and there is no assortative mating between parents. The equal environment assumption is likely to overestimate heritability and underestimate the influences of the shared environment, while the assortative mating assumption is likely to underestimate heritability but overestimate the effects of shared environment. However, when these assumptions have been tested, they have survived remarkably well (Bouchard Jr and

McGue 2003; Conley and Fletcher 2017). At the moment, genome-wide association studies (GWAS), which measure direct associations of single genes, have identified more than 1200 genes as being associated with educational attainment and explained approximately 13 percent of individual differences (Lee et al. 2018).

Because it can be assumed that expression of genetic endowments is dependent on parental and public investment, the socioeconomic resources of extended kin would have only a limited causal potential to explain children's attainment in modern Nordic welfare states such as Finland. It would be rather interaction and correlations between parental (and public) investments with a child's genetic endowments, abilities, and effort that provide or constrain socioeconomic attainment. However, if genetic endowments interact with parental socioeconomic resources (and other environmental factors), the benefits from extended kin would be highest in the families with low socioeconomic resources but nonexistent in the families with high socioeconomic resources. A twin study conducted in Germany points exactly to the direction that higher-educated parents can stimulate and guide their children according to innate preferences; however, families with low-educated parents cannot give such guidance, and children of these families cannot achieve their full educational potential (Baier and Lang 2019). The results of this study can be linked to relative risk aversion and cumulative advantages. Thus, according to this logic, the compensation of extended kin networks allows children of disadvantaged families to use all their effort to reach their cognitive potential, but children from advantaged families simply do not need any resources from extended kin.

2.2   Evolutionary Adaptations

Although sociological theories explain how parental resources are associated with children's socioeconomic attainment, they seldom consider the ultimate reason for intergenerational and multigenerational effects. Sociological theories have not taken into account the evolutionary roots of intergenerational transmissions (Nielsen 2016; Takács 2018). However, by accompanying sociological theories with evolutionary explanations, these theories would construct a more robust foundation, and a clearer picture of intergenerational relationships would be achieved. For example, evolutionary explanations express who from the kin network have been the most crucial individuals for children through evolutionary history, thus giving a new hypothesis of how kin may still individually influence socioeconomic attainment in modern society.

Natural selection explains genetic adaptation across generations. Traits that survive and are most adaptive to constant testing of external circumstances become adaptations in a population. Natural selection is based on (reproductive) fitness, which means the reproductive success of an individual to produce fertile offspring

compared to other individuals in the population. In addition, fitness can be defined more broadly to mean the ability of one individual to enhance the survival and reproduction of another individual who is likely to share the same genes. This definition is called inclusive fitness and includes the mechanism of kin selection.

It is important to acknowledge when applying evolutionary explanations that individuals usually do not consciously try to increase their (inclusive) fitness and maximize the number of offspring as rational theories would assume. Instead, it is assumed that humans have cognitive mechanisms that guide them to put effort into things that would have tended to increase (inclusive) fitness during evolutionary history, for example, gaining resources, investing in their genetic relatives and achieving status (Hrdy, 2011). Thus, in modern societies, evolutionary-guided behavior can also lead to irrational behavior from the point of view of (strong version) rational action theory, which assumes that individuals maximize their own wellbeing. However, in the light of evolutionary adaptations, irrational behavior can be explained.

Next, I review evolutionary explanations based on human adaptations regarding the articles of this dissertation, which explain more comprehensively than sociological theories based on socialization alone why extended kin are likely to influence children's attainment and who from the extended kin network are likely to affect attainment.

2.2.1   Kin selection

Kin selection means that humans (and animals) have evolved a predisposition through natural selection to feel positive emotions towards kin; thus, altruistic behavior between genetic relatives is possible in nature. William Hamilton first formally explained how this altruistic behavior is possible (Hamilton 1964). Hamilton's rule states that – all other factors being equal – the more individuals share the same genes with other individuals, the more they are willing to provide altruistic help for the other individuals. Helping will evolve when an individual can help a related individual who has a probability of sharing the same gene by common origin to survive and reproduce. Formally, this relationship can be denoted with the inequality $rB > C$, where r means the degree of relatedness – measured with the proportion of shared genes – between contributor and recipient, B represents benefits of recipient, and C represents costs that are included in the contribution. This formula explains that in terms of an individual's inclusive fitness, it is beneficial to offer help to close relatives even if the cost is high, but it is less beneficial, all else being equal, to invest in more-distant relatives (Coall and Hertwig 2010). By helping genetically related kin, particularly in descending order, one's own genes' spread in the population in future generations is likely to increase (Hughes 1988). Thus, an

individual can increase one's inclusive fitness by supporting the reproductive success and survival of genetically related descendants at the cost of one's own individual direct fitness.

Because biological parents and children share on average one-half of their genes with one another, parents have an evolutionary incentive to invest time, care and resources in children and to promote their inclusive fitness. Furthermore, biological grandparents, aunts, and uncles share on average 25 percent of their genes with their grandchildren, nephews and nieces. This point explains why kin selection theory explains not only parental altruistic behavior towards children but also why other relatives, who share the same genes with children, such as aunts, uncles, and grandparents, sense positive emotions and have an incentive to invest in grandchildren, nephews, and nieces. Kin selection theory does not require that individuals are aware of genetic relatedness; rather, it functions through emotions and cognitive traits that have evolved by natural selection. Kin selection is an adaptation that can be found universally across cultures, societies and periods and even species (Salmon and Shackelford 2011).

However, individuals have to detect their kin to invest in them, because all the relatedness except mother's relatedness to her child among humans is uncertain. When mothers and mother's mothers can be certain of their relatedness to a (grand)child, other relatives, particularly fathers and paternal-side extended kin, have to use direct and indirect cues to detect genetic relatedness. For example, direct cues can be physical or psychological traits such as facial or personality resemblance. Indirect cues are related to proximity; individuals who live in close contact with one another over a long period of time are likely to be detected as genetic relatives. This detection is important not only for kin investments but also to avoid inbreeding.

It has been shown that incest aversion, or the so-called Westermarck effect, develops towards those family members with whom individuals are in close contact in childhood; for example, siblings detect their relatedness this way (Lieberman, Tooby, and Cosmides 2007; Westermarck 1921; Wolf 1993). Furthermore, fathers and fathers' parents have a particular incentive to guarantee the certainty of genetic relatedness with arrangements that prevent risks that children would not be genetically related to them, for example by living in the same household or near to the newly married couple.

Because humans have a predisposition to sense positive emotions for their kin, they are also willing to invest in time, care and other resources for their relatives. Investing in children, nephew, nieces, and grandchildren is one way of enhancing the inclusive fitness of an individual. Studies have concluded that humans practice cooperative breeding, where parents, particularly mothers, obtain help from the alloparents for successful childcare (Hrdy, 2005, 1999). In other words, children receive care from not only their parents but also other people, particularly individuals

from their family networks, such as grandparents, aunts and uncles. Because the human child is born premature, incredibly helpless in the first years after birth, and children's maturation period is rather slow, cooperative breeding has been the best strategy for humans to increase child survival and distribute resources to children (Emmott 2016). It can even be assumed that, because social capital has been enormously beneficial for the survivor of the child, it has evolved via natural selection.

However, investments and social support may not be symmetrical but rather heterogeneous and thus dependent on the needs of recipients. This can be assumed because it is not only the degree of genetic relatedness (denoted with r in the formula) in Hamilton's rule but also the net benefits of the recipients that determine the degree of investments. Thus, it can be assumed that (extended) kin investments are more important for the family members who are most in need (Hooper et al. 2015). In this case, Hamilton's rule can be formulated $B > C/r$ which means that formula is defined from the point of view of the benefits that the recipient is able to achieve relative to investments. According to this view, the need and relatedness interact in the determination of investments. For instance, Hooper et al. (2015) showed that in the small-scale horticulturist society investments of kin are dependent on need (that was measured relative caloric need) and life-stages of the grandchildren, nieces and nephews. Further, the strength of the effects declined with decreasing genetic relatedness, as predicted by Hamilton's rule. That is why it can be expected also in modern societies that kin support is the strongest for the disadvantageous families that lack certain socioeconomic resources. Thus, the compensation effect introduced earlier can be seen as a relevant mechanism of kin selection.

2.2.2   Kin support in modern societies

Although parental and extended kin involvement was crucial for children's survival in historical societies, in modern Western societies, these investments are not needed anymore to keep children alive (Chapman et al. 2019; Coall and Hertwig 2010; Sear and Coall 2011). Thus, the question is, do kin involvement and their resources increase and maintain children's wellbeing in other ways, for instance, improving cognitive and noncognitive socioemotional outcomes and further socioeconomic attainment (Biblarz and Raftery 1999; Sear and Coall 2011). Indeed, it has been shown that individuals' noncognitive traits such as personality and psychological wellbeing can be influenced by parental involvement and genetic inheritance (Duncan et al. 2005; Groves 2005; Loehlin 2005). Furthermore, there is associative evidence that grandparental involvement can also influence children's cognitive skills and noncognitive traits (Sear and Coall 2011). Cognitive skills and noncognitive traits have been shown to be crucial for children's human capital and

further status attainment (Bowles, Gintis, and Groves 2005; Cunha and Heckman 2008; Doyle et al. 2009). Some studies have found that noncognitive personality and behavior traits are even more important than are cognitive skills in socioeconomic attainment and that the effects of personality traits become stronger in modern societies (Bowles and Gintis 2002; Jokela et al. 2017). Obviously, when parental and extended kin human and social capital are correlated with traits that are rewarded in schools and labor markets such as conscientiousness, children's educational and socioeconomic success can be improved by the social capital of the whole family circle (Bowles and Gintis 2011).

Studies conducted in Western societies indicate that grandparental involvement is particularly important among disadvantaged families, for example, in single-parent families and low-income families compensating for low parental resources and parenting skills (Coall and Hertwig 2010; Tanskanen and Danielsbacka 2018; Yorgason, Padilla-Walker, and Jackson 2011). Furthermore, studies of intergenerational family relations in modern societies have found that not only parents but also other relatives still provide support for children's upbringing (Danielsbacka et al. 2011; Milardo 2010; Pollet, Nettle, and Nelissen 2007).

Some social scientists have claimed that in modern societies, extended family members' influences on children's wellbeing will decline because grandparents, aunts, and uncles lack incentives to invest in grandchildren, nephews and nieces (Becker 1991; Coleman 1988). For example, Becker (1991, 184) pointed out that, before modern societies, extended kin had an incentive to invest in children's endowments because they were part of the family circle and lived near the children; thus, children's better wellbeing also benefitted extended kin wellbeing by, for instance, enhancing the reputation of the family. Coleman suspected that we confront declining quantity of human capital with each successive generation because of the decline of strong families and communities due to reduced incentives to invest in children's human capital. As the empirical studies above suggest, these claims were highly exaggerated, although the institutions of modern societies would have reduced some of the earlier influences of family networks. Because of kin selection, it can be claimed that individuals still have incentives to invest in their relatives in modern society, which may increase educational and status attainment.

2.2.3   Asymmetric parental investments

In an evolutionary framework, parental investments are defined as any investment by the parent in a child that increases the child's likelihood to survive and hence reproductive success at the cost of the parent's ability to invest in another child (Trivers 1972). Thus, parental investments mean parental behavior, for example parental care, that increase a child's inclusive fit. Being evolutionary adaptations,

parental investments do not have to be conscious behavior in favor of the child but can be and are often unconscious behavior. Thus, this definition is distinct from the definition used in human and social capital theory, where parental investments are seen as intentional actions for the benefit of the child's attainment.

The survival and reproducing of human offspring very much depend on parental care; thus, the evolution of human parenting has favored parents who have been eager to make costly investments in the form of time, energy and resources. Because the human child is born as "underdeveloped" and needs a significant amount of nurturing in the early years, the best child-rearing strategy for parents is to cooperate with a wide range of other individuals. Although fathers' investment in childcare requires great amounts of resources and energy compared to other species, mothers have higher (biological) investments in a child due to gestation and lactation. Due to gender differences in these biological investments, women encounter higher parenting costs than men do. Consequently, mothers are the ones who are the most important individuals for the child's survival and wellbeing (Sear and Mace 2008). For example, according to a review study of premodern societies, fathers had only limited impact on children's survival, with influence less than that of maternal grandmothers or mothers' siblings (Sear and Coall 2011).

Asymmetric investments by parental gender are even more amplified by the fact that a father cannot be entirely certain that the child is genetically related to him as a mother can. Thus, a male can find himself in a situation in which he invests in a child that is not genetically related to him. Although investing in a nonbiological child can be favorable for a male's fitness because showing commitment to the partner is one means of enhancing reproduction, in the light of inclusive fitness, investing in a nongenetic child is not as beneficial as is investing in a genetically related child. It is highly unlikely that natural selection would have favored paternal investments over maternal investments. It is estimated that 95 percent of male mammals care for their offspring only a small amount, if at all; however, humans are an exception, because the father invests a high amount of resources in children (Geary 2000). Because of paternity uncertainty, men and men's relatives may have different strategies to monitor women. One of the strategies is patrilocality, which means that a married couple moves to live with the husband's family or near to it. This practice was very common in agricultural societies and has also been shown to be a common habit in pre-modern Finland (Pettay et al. 2016). It has been shown that patrilocality still influences the housing arrangements of paternal-side relatives in Finland, although these norms have largely faded in modern society (Ghosh et al. 2018).

Sex-specific reproduction strategies can also explain why mother, father and maternal and paternal kin have different evolutionary-based predispositions to invest in the child; thus, the effects on child outcomes can vary according to sex and

lineage. Sexual specific reproduction strategies means that because fathers have lower mandatory investments in children than mothers do, men can theoretically increase their fitness more easily than women can by mating with several partners (Buss 1989; Coall and Hertwig 2010). The mating costs of parenting are higher for men than for women because time and energy spent in parenting cannot be invested in finding additional partners (Euler, Hoier, and Rohde 2001). In other words, all else equal, men can be assumed to invest more in number of offspring, thus maximizing the number of mates. On the other hand, women can be assumed to invest in offspring quality and parenting. This means that women are on average more concerned with the wellbeing of the children than are men (Tanskanen and Danielsbacka 2019, 23)

These sex specific reproduction strategies are likely to regulate not only mothers and fathers' cognitive predispositions but also maternal and paternal kin, particularly grandparents', reproductive interest (Euler et al. 2001). Short birth intervals can have damaging outcomes for a mother's health and for the wellbeing of children to whom she has already given birth. Because short-term-interval births have a much lower cost for the father (and come mainly due to maternal health and have essentially no direct cost to the health of the father), paternal grandparents (and other paternal-side kin) have incentive to improve their fitness by increasing grandchildren quantity over quality. Maternal relatives on the other hand have higher incentive to protect the health and wellbeing of the child, which suggests that maternal grandparents favor quality over quantity and are concerned with their grandchildren's welfare.

2.2.4   Matrilater bias and kin keepers

According to kin selection theory, humans have a genetical incentive to practice cooperative breeding as a group that may still benefit offspring wellbeing and attainment in modern societies. However, some extended family members can be more important than others are to keep the extended family members together. Studies have shown, for instance, that the relationship between siblings is less obligating than that of parents and children or those with spouses; consequently, it is likely that parents and grandparents are the ones keeping the extended family networks together (Bracke, Christiaens, and Wauterickx 2008; Connidis and Campbell 1995; Rossi and Rossi 1991). For example, it has been shown that after parental death, sibling ties become weaker when parents are no longer keeping the kin network together (Khodyakov and Carr 2009; White 2001). Although parent-child associations have been shown to be more salient than other family relationships within the family network, these associations depend on the sex of the parents and extended kin. Empirical evidence shows that it is women in particular who keep a relationship flourishing within the family network (Bracke et al. 2008; White 2001).

Several empirical studies have confirmed the assumption that women have stronger ties with kin than men do and that kinship ties continue in adulthood, particularly with other female relatives (Bracke et al. 2008; Fuller-Thomson 2000; Khodyakov and Carr 2009). There is also causal evidence showing that birth of the first child increases contacts between grandmothers and their daughters who newly became mothers; however, neither contacts between grandmothers and their sons nor contacts between grandfathers and their children increase (Tanskanen 2017).

Genetic closeness, asymmetric parental investments and sexual reproduction strategies explain why genetic relatedness, sex and lineage are important factors and why kin investments are biased. According to these evolutionary-based mechanisms, extended kin from the maternal lineage are more important for a child and are more likely to offer support than are kin from the father's lineage. Maternal-side relatives can be more certain of their genetic relationship. Moreover, due to the higher cost of maternal investments, previous studies have indeed found that investments follow *matrilateral bias*. Kin from the maternal side, particularly the mother's mother and mother's sisters, invest more compared to the paternal lineage in a child's wellbeing, for example, in practicing child care (Danielsbacka et al. 2011; McBurney et al. 2002; Pashos and McBurney 2008; Tanskanen and Danielsbacka 2017). A study from premodern Finland found that grandchildren that had their maternal grandmother alive had improved survival, but paternal grandmothers did not have such an effect for survival of the grandchildren (Chapman et al. 2019). This finding can be considered evidence for matrilateral bias in kin selection. It is likely that extended family members tend to prefer more certain kin as evolutionary explanations suggest; therefore, maternal-side relatives are also the ones who most promote children's socioeconomic attainment. In modern societies, where normative constraints are largely removed, these evolutionary-rooted cognitive dispositions are even likely to amplify the preferences of extended kin. Matrilateral bias explains why women are more inclined to be in contact with relatives.

Matrilinear bias is consistent with sociological kin keeper theory. The theory of women as kin keepers is based on the observation that women are more involved in family relationships than are men. However, consistent with standard family sociological models, kin keeper theory assumes that women are socialized to behave in a more caring way; therefore, they are the ones who manage and maintain connections within the family network and with children. Thus, socialization in the certain female role is the reason that women are claimed to behave as kin keepers with the primary responsibility of holding groups together (Dubas 2001; Eagly 2013). According to sociological kin keeper theory, social norms promote women to behave more caring ways compared with men and thus women act as a primary nurturer for children.

The kin keeper model does not take into account evolutionary adaptations, although it is highly unlikely that socialization alone is the ultimate cause for women's behavior as kin keepers. Empirical evidence supports gender-specific reproductive strategies and parental asymmetrical investments among many sexually reproductive species including humans, showing a universal pattern (Buss 1989; Coall and Hertwig 2010; Trivers 1972, 1985). Furthermore, it can be assumed that the human species would have not evolved without specific cognitive adaptations, because the child needs a high amount of care, particularly during early childhood (Coall & Hertwig, 2010; Sear & Coall, 2011; Trivers, 1972). Empirical evidence also indicates that women's prolonged postreproductive lifespan is an evolutionary adaption that enhances grandmothers' inclusive fitness by increasing the success of their descendants (Chapman et al. 2019; Engelhardt et al. 2019; Lahdenperä et al. 2004). These observations support an evolutionary mechanism over the socialization hypothesis, which cannot explain why menopause evolved. It is more likely that women and men have evolutionary-rooted predispositions that can be augmented or constrained by the institutions and norms of the society, which explain how family networks function and are maintained. Evolutionary mechanisms give an ultimate explanation of why women are more likely than men in the role of kin keepers and why women may be socialized more effortlessly for the role of kin keeping.

As the matrilinear bias mechanism predicts the kin keeper role of women, mothers and grandmothers can be assumed to be more important for the accumulation of children's human capital than are fathers or grandfathers. Furthermore, if females within a kin network behave as kin keepers, it can be assumed that maternal grandmothers are closer to grandchildren than are paternal grandmothers. This point implies that mothers and grandmothers have more social capital within the kin network because women are usually the main nurturers of children, whereas men have more social capital outside of the family, for example in the labor markets. This difference is certainly pronounced in societies where men behave as family breadwinners.

3 PREVIOUS FINDINGS

3.1 Parental resources

The effects of parental resources on children's socioeconomic attainment have a long tradition in quantitative sociology. Although the empirical evidence clearly shows that family background is associated with children's socioeconomic and educational attainment, it is more debatable to what extent different parental resources impact children's attainment and whether the mother's or father's influence is more salient for children's attainment (Kalmijn 1994). Previous studies also show that it is evident that institutional context matters for the intergenerational social mobility estimates (Pfeffer 2008).

Parental socioeconomic characteristics can be used to measure diverse aspects of family background; for instance, parental education can be seen to measure cognitive and noncognitive traits, parental occupation social status and income material resources. In these three characteristics often applied in social stratification studies, parental education can be assumed to have the most salient direct influence on children's attainment because it precedes their occupation and income. Thus, the causal order of the parental socioeconomic resources plays a part in the intergenerational effects and should be taken into account in the modeling. Because all three socioeconomic characteristics are connected, controlling, for example, parental income or occupation considers parental education and all the unobserved factors that correlate with these measurements. Thus, it can be argued that taking account of only the one parental socioeconomic characteristic would highly overestimate the effects of this measurement.

Previous findings indeed suggest that the effect of parental income is less salient than are other resources for children's attainment, although some studies find that poverty in particular is detrimental in early childhood (Brooks-Gunn and Duncan 1997; Duncan and Brooks-Gunn 1995). In the US, some studies have found that family income is associated with children's educational outcomes (Duncan et al. 1998). However, some of the studies show that when controlling maternal education and family structure, the effect of family poverty during adolescence was modest or zero (Hauser and Sweeney 1995; Warren, Sheridan, and Hauser 2002). Furthermore, it has been shown that the effect of low family income on cognitive skills is mediated

by lower mental stimulation by parents (Guo and Harris 2000). Jæger (2007) found that in Denmark, the effects of family income have ceased, and he did not observe any effects of family income in younger cohorts on the educational attainment of children. Additionally, a sibling fixed effect study conducted with the Norwegian census found that parental income cannot explain children's educational attainment, although a small effect was found in the bottom of the income distribution (Elstad and Bakken 2015). In Finland, Österbacka (2001) found that intergenerational correlation is relatively low. The estimated sibling correlations for earnings were on average 0.13, and the large part of estimated results is explained by unobserved factors other than father's income. Other studies conducted with Finnish registers have found that the association between family income and adult children's income is strongest in the bottom and the upper end of the income distribution; however, after controlling several parental and children's characteristics such as own education level, associations were small (Sirniö, Kauppinen, and Martikainen 2016). Results of this study indicate that remaining associations were explained by social connections related to parental background and job performance It has been claimed that when basic needs of the children are met, higher family income does not improve child's outcomes, but other parental characteristics such as education may become more important for children's attainment (Mayer, 1998).

Indeed, previous studies have shown that parental education is a stronger predictor than parental income or social class in modern Western societies. For example, in the UK, parental education was the strongest predictor of children's education attainment, although social class also influenced (Bukodi and Goldthorpe 2012). In Nordic countries, it has been found that it is parental education, rather than economic or social status, that is most influential for children's attainment (Jæger, 2007; Jæger & Holm, 2007). In Finland, empirical evidence also supports the argument that parental education has a substantial effect on children's educational attainment (Kilpi-Jakonen, Erola, and Karhula 2016), although previous studies with Finnish data have not compared which one of the three parental characteristics – education, income, and occupational status – best explains the children's socioeconomic attainment. Empirical evidence shows that associations between parental and children's education have remained rather stable across the Western countries; however, countries differ significantly on how much parental education influences children's education (Pfeffer 2008). This result has been interpreted to indicate that the degree of educational inequality is associated with the education systems across the countries (Pfeffer 2008). In particular, early educational transfers, which sort students into different tracks, and dead-end educational pathways appear to constrain equal educational opportunities (Pfeffer 2008; Pöyliö, Erola, and Kilpi-Jakonen 2018).

At least three different explanations have been proposed for why parental education is the most influential characteristic in intergenerational attainment. First, education precedes an individual's occupation and income, thus affecting them both. Second, education is a stable measurement and does not vary across children's life-courses, as do parental income and class. Third, parental education correlates with their cognitive skills and with the child's cognitive skills, which become more important for socioeconomic attainment in modern skill-based economies (Marks 2013).

Because women's education and occupation have become more common in the 20th century in many Western countries, it is not surprising that previous studies show that maternal education and occupational status matter as much as for fathers and in some cases even more (Beller 2009; Buis 2013; Kalmijn 1994; Korupp, Ganzeboom, and Van Der Lippe 2002). For example, Biblarz and Raftery (1999) found that, although children with two biological parents had the highest socioeconomic attainment, children from single-mother families had higher attainment than children from single-father families or stepparent families. The results support the evolutionary theory of asymmetrical parental investments. Erola & Jalovaara (2016) found using a Finnish census panel sample that biological fathers are replaceable and that the effects of mothers become stronger and fully compensate for the effect of the nonresident biological father on children's status attainment. Kalmijn (1994) found that influence of maternal occupational on children's education has increased as mother's status and employment have increased across cohorts.

Although most studies find that family income has small or nonexistent effects on children's attainment, empirical evidence shows that parental unemployment may have a significantly negative effect on children's life outcomes (Brand 2015) It has been shown that unemployment is associated with stress and can affect the parent-child relationship and parental care. Parental unemployment has been associated with children's lower self-esteem and well-being, higher school dropout rates, lower academic expectations, less educational success and poorer health (for a review, see Brand, 2015). However, the causal evidence on the effects on children's life-courses and socioeconomic and educational attainment are somewhat mixed. Some studies find that parental unemployment has a negative effect on children's income, education and social status (e.g., Oreopoulos et al. 2008; Rege et al. 2011; Brand and Thomas 2014; Coelli 2011; Karhula et al., 2017); others have failed to show any effect at all (e.g., Bratberg et al. 2008; Ekhaugen 2009). Mixed results can arise from the fact that the institutional context plays a significant role in preventing or augmenting the negative effects of parental unemployment. For example, in the Nordic countries and particularly in Finland, the negative association of parental unemployment on children's attainment has been shown to be relatively small

compared to other European countries (Lindemann and Gangl 2018). Compensatory advantage can also prevent some negative effects of parental disadvantageous life events and has been previously reported in the cases of children's lower academic achievement (Bernardi 2012; Bernardi and Boado 2014), divorce (Bernardi and Grätz 2015; Erola and Jalovaara 2016) and parental death (Prix and Erola 2016). The usual finding concerning the negative effect of parental unemployment is that paternal unemployment is more detrimental for children's education than is maternal unemployment (Kalil and Ziol-Guest 2008; Rege, Telle, and Votruba 2011). It has been hypothesized that paternal unemployment is more detrimental than maternal because fathers are largely expected to maintain the role of primary provider of the family and therefor suffer greater psychological consequences of unemployment.

3.2   Extended family members

Sociologists have recently begun to study multigenerational inequalities by focusing on the direct effects of grandparents' resources on grandchildren's education, status, and income. It has been claimed that the effects of extended kin and particularly grandparents' intergenerational inequality may have been underestimated by previous studies that considered only parent-child associations (Mare 2011). There are at least three reasons to assume that grandparents would have effects on grandchildren's attainment. First, individuals live longer in present-day western societies, and they have more time to spend with their relatives, particularly grandparents. For example, grandparents and grandchildren share more lifetime than ever before (Chapman et al. 2017). Second, there are fewer children in families than previously; therefore, the benefits of relatives can be more substantial than previously. Third, standards of living have been raised enormously compared to premodern societies, and child mortality has been decreased drastically; therefore, it is likely that extended family members and particularly grandparents have more resources to support grandchildren's wellbeing and attainment. However, at the same time, public investments, particularly for families with children, have increased enormously, thus decreasing the need for investments by extended kin.

Previous studies usually separate two different mechanisms of how grandparents can influence grandchildren's attainment: influences through contact and influences without contact through durable resources and institutions (see Anderson et al. 2018; Bol and Kalmijn 2016; Knigge 2016; Mare 2011; Solon 2018). Influences without contact through durable resources mean that a grandparental legacy can have influence for grandchildren's attainment. For example, a grandchild can benefit from the reputation of her ancestor, and in particular, institutions such as schools can preserve the family's reputation generation after generation. For example, Mare (2011) has pointed out that in the US grandsons, may enter the top universities more

easily if their grandfather graduated from the school. However, in Finland, where education is free of charge at all levels, reputational advantages mediated by education institutions may have no effect. Grandparents can also transmit economic and physical capital (e.g., properties) for their grandchildren via inheritance that can help grandchildren's attainment, particularly in agricultural societies, where educational opportunities are scarce (Knigge 2016). Finally, grandparents may have social capital in the form of contacts that can remain after they are dead, or a grandparent's socioeconomic status can serve as a reference point when grandchildren are making educational decisions (see the section on relative risk aversion). However, it is more likely that social, economic and human capital is transferred to grandchildren when the grandparent is still alive.

A large proportion of the studies on grandparent-grandchild associations have studied whether grandparental resources are associated with grandchildren's educational and status attainment. In general, previous studies have shown mixed results on multigenerational effects on children's education and status attainment (Anderson et al. 2018; Solon 2018). Some studies have found that grandparental education and cultural capital still matter for children's attainment after controlling for parental resources; however, the associations are likely to be weak compared to parent-child associations (Chan and Boliver 2013; Lindahl et al. 2015; Møllegaard and Jæger 2015; Neidhöfer and Stockhausen 2018; Sheppard and Monden 2018; Ziefle 2016). It has been shown that even these weak associations can be driven by omitted variable bias because almost all studies concerning grandparent-grandchild associations are conducted with (random effect) regression analysis or log-linear models, which cannot completely take into account unobserved heterogeneity (Breen 2018). Many of these studies have been conducted with survey data that are prone to sample selection bias. For example, it has been shown that in household surveys, more-highly educated people are more likely to have available data on their parents' and grandparents' education, causing overestimation of intergenerational persistence (Neidhöfer and Stockhausen 2018). If both parents are not controlled for in the models, the estimates can be biased because of assortative mating (Anderson et al. 2018). Furthermore, mixed results can arise because institutional context matters more for multigenerational effects than for two-generation intergenerational effects (Neidhöfer and Stockhausen 2018). In other words, in the studied countries, level of modernization differed more in grandparental generations than in later parental generations. For example, modernization in Finland occurred relatively late compared to other European countries.

Because the effects of grandparental socioeconomic resources have been small or negligible, it has been suggested that multigenerational influences follow the Markovian process that the preceding generation influences the next generation, but there are no direct effects over a successive generation (Clark 2014; Solon 2018).

However, it has been emphasized that there is no reason to expect a universal pattern wherein multigenerational transmissions follow a Markovian chain across times and places; however, it seems that the role of grandparents is dependent on context and circumstances (Neidhöfer and Stockhausen 2018; Sheppard and Monden 2018; Solon 2018). For example, using data from rural China, Zeng & Xie (2014) found that grandparental education had a significant effect on grandchildren's education only if the grandparent lived in the same household with grandchildren. Knigge (2016), using data on Dutch marriages in 1812-1922, shows that the grandfather's influence was stronger when the likelihood of contact was greater. However, he also found that the great-grandfather's status was associated with the great-grandchildren's status, although in the 19th and 20th century, it was in practice impossible that there would have been any contact. Neidhöfer and Stockhausen (2018) found no direct effects of grandparental resources in the US, the UK, or Germany on grandchildren's education, but they found that grandparental exposure – whether a grandparent was alive in the same time with grandchildren – was significant in Germany. However, the exposure effect was significant only from maternal-side grandparents; thus, the results support the matrilateral bias mechanism. Other previous studies conducted with the data of modern Western countries have consistently found that grandparental contact does not matter for grandchildren's attainment (see e.g. Bol and Kalmijn 2016). However, these studies cannot give direct causal evidence, and the measures used in the previous analyses are usually crude proxies for grandparental-grandchild contacts – for instance, geographic proximity (Anderson et al. 2018). Moreover, social scientists have not systematically differentiated the gender and lineage of the grandparents, which could be one reason for the mixed results.

Grandparental influence can be stronger in the tails of the resource distributions, having effect only when immediate family resources are low or high. Indeed, this possibility seems to be true, because one of the strongest findings of the previous studies conducted by log-linear models indicates stronger multigenerational persistence at the tails of the distribution (Erola and Moisio 2007). Two mechanisms have been suggested to explain these results: multiplication of or compensation for the grandparents' resources. Studies that test interaction between parental and grandparental resources with regression analysis have found more support for the compensation mechanism than for multiplication mechanisms. According to the review article of Anderson et al. (2018), only one study of eight found a robust multiplication effect, while five of the reviewed articles found a compensation effect (neither of the other two papers found an interaction effect).

Not only grandparents but also aunts and uncles may influence nephews and nieces' attainment. For example, higher divorce rates may decrease the influences of parents on attainment while increasing the roles of aunts and uncles (Bengtson 2001;

Milardo 2010). The increased amount of childlessness in contemporary societies may increase aunts'/uncles' influence on their nephews and nieces' attainment. Aunts and uncles are likely to belong to the close social network of the family and are claimed to be "very important persons" for a child and parents, thus advancing and being role models for the educational attainment of nephews and nieces (Milardo 2010).

There are fewer studies on the effects of aunts/uncles than on the effects of multigenerational attainment. These studies suggest that aunts and uncles' direct effects on children's attainment are small or negligible. However, studies on the effect of aunts and uncles support compensation effect studies on grandparental effects on children's attainment. For example, Jæger (2012) found that not only are the effects of grandparental education significant when family resources are low but also aunts' and uncles' higher education compensates for low parental resources for children's educational attainment in the US. Similarly, using data from the US, Prix and Pfeffer (2017) found that wealthy aunts and uncles compensate for high school completion in the US. It has been shown with Norwegian register data that the impact of aunts and uncles' wealth is stronger on children's grade point averages in poor families than in nonpoor families. Compensation of aunts and uncles for adult children's education and poverty has also been found with Finnish data (Erola et al. 2018).

Overall, it seems that having extended kin is important for the attainment of children with a disadvantageous family background but not as much for children with an advantageous family background. The problem in previous studies on the effect of aunts/uncles is that the lineage of aunts and uncles have not been separated that can be important in the light of evolutionary expectations. Moreover, these studies have not investigated whether aunts or uncles are more important for children's attainment.

4   FINNISH CONTEXT

All of the analysis in the articles of this dissertation is conducted using Finnish register data; thus, it is important to be aware of the Finnish institutional context (i.e., education and social systems). Previous studies have shown that institutional context matters in the intergenerational transmission of status and education (Breen 2004; Pfeffer 2008). In particular, educational tracking has been shown to increase the influences of family background on educational and socioeconomic attainment (Betthäuser 2017; Pfeffer 2008).

In Finland, the educational system is free of charge at all levels. Secondary and tertiary studies are subsidized by monthly student benefits and loans. The Finnish education system does not include dead ends, and school differences are very small or negligible (Tervonen, Kortelainen, and Kanninen 2018). Comprehensive school reform in the 1970s that removed the two-track selective school system and early tracking from the Finnish school system strongly equalized education and income attainment. Comprehensive school reform increased cognitive skills among children with lower-educated parents and reduced the effect of family background on children's education and income attainment, increasing equality of opportunities (Pekkala Kerr, Pekkarinen, and Uusitalo 2013; Pekkarinen, Uusitalo, and Kerr 2009). All the cohorts analyzed in the articles of this dissertation went through this one-track comprehensive school.

In Finland, mandatory comprehensive school begins at age 7 and continues through the year children reach the age of 16. The most significant transition occurs after this period, when children apply for an academic (general upper secondary) or vocational track, each lasting approximately 3 years. Entry to the academic track is almost solely based on the GPA of the final year of compulsory school. It is also possible to drop out after completing compulsory education and not continue with secondary education; however, only a small minority drop out at this point. After general secondary education, students often continue on to study at universities (mostly master's-level courses) or polytechnic schools (mostly bachelor's-level courses).

As in other Western countries, in Finland, education has also expanded rapidly in recent decades, when Finland transformed from an agricultural society to a

modern information society. Figure 3 shows the education structure of the population aged 15 or over from 1970 to 2017 in five-year intervals. It shows that from 1970 to 2017, Finnish education has expanded at all levels. In 1970, on average, only 9 percent of Finland's population were tertiary educated, whereas in 2017, 30 percent on average had a tertiary education degree. Thus, from 1970 to 2017, the proportion of the tertiary-educated population increased more than threefold. Additionally, the population with secondary education increased from 16 percent to 41 percent. In 2017, 72 percent of the Finnish population on average had some education qualification compared to 1970, when, on average, only 25 percent had such a qualification.
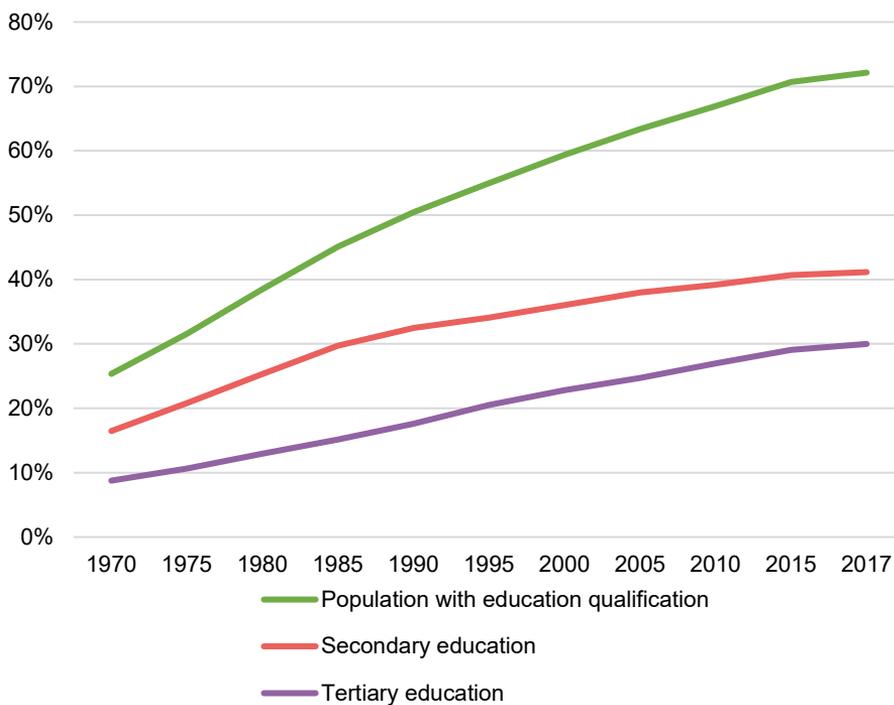
Figure 4. Finnish education structure aged 15 or over 1970 – 2017. Source: Official Statistics of Finland 2017

Compared to liberal European and North American regimes, Finland has a generous social security system. In addition to unemployment funds, the state provides social security for unemployed individuals. If the duration of employment before the start of unemployment has been at least ten months, the employee is entitled to an earnings-related unemployment allowance, which was for 500 days of continuous unemployment during those years when the studies in this dissertation were

conducted[1]. Typically, the amount of this benefit is approximately 70 percent of the recipient's pay prior to the start of unemployment. After 500 days, the benefits decrease to approximately one-third of the individual's average salary. This amount is assumed to meet the family's minimum economic needs. In Finland, every family is entitled to receive a child allowance until the child reaches age 18. Although daycare is not completely free of charge in Finland, fees are based on family income; thus, low-income families have lower fees, or they are exempt from daycare fees entirely.

Gender equality is relatively high, and women have a long history of labor-force participation in Finland. Even in 1970, the female labor-force participation rate was the highest among the OECD countries (66 percent), and it increased to 73 percent by the end of the 1980s (OECD 2019). According to the Global Gender Gap Report 2018, Finland is the fourth most gender-egalitarian country in the world. In Finland, women's labor-force participation rate is almost as high as for men (women 74 percent and men 77 percent) (World Economic Forum 2018). Women are better educated than men, and 57 percent of tertiary graduates in 2017 were women. Furthermore, on average, 42 percent of members of parliament are women, and dual-earner families are the prevailing family form; however, women's income is approximately 16 percentage points less than men's income (Statistics Finland 2018).

International comparisons of socioeconomic inheritance have found the Nordic countries, including Finland, to be among the most egalitarian (Björklund et al., 2002; Breen, 2004; Erola, 2009). Figure 4 shows this point, where I have calculated percentage point differences (average marginal effect, AME) for tertiary education attainment between tertiary educated and lower than upper secondary parental background for individuals aged 25-44 by country. The difference between individuals with high- and low-education backgrounds in attaining tertiary education in Finland is 28 percentage points, the lowest among the OECD countries, whose average among reported countries is 44 percentage points.

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[1] In 2017 onwards, the earnings-related unemployment allowance has been decreased to 400 days.
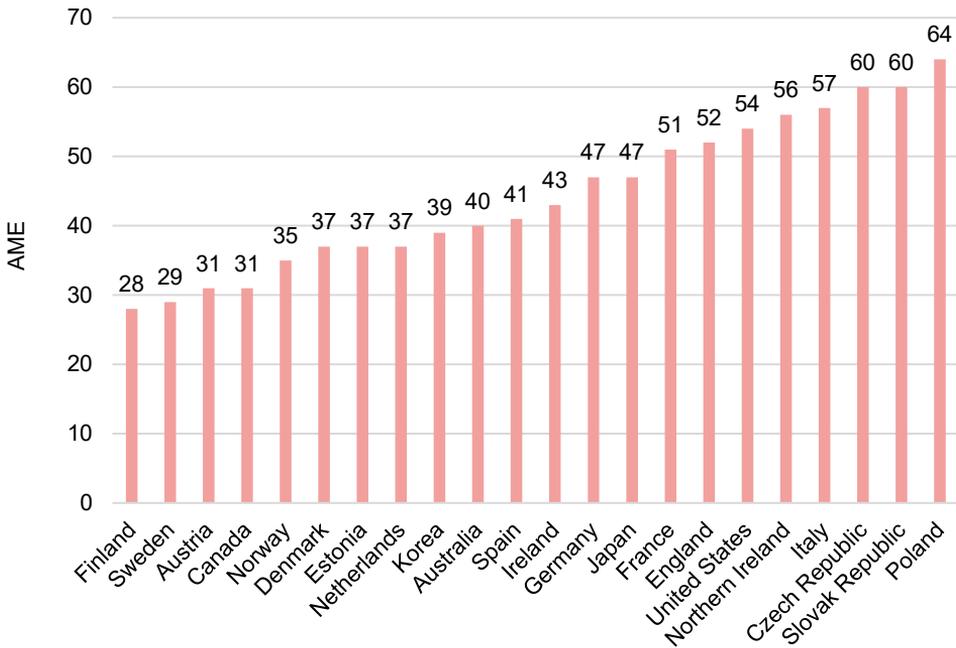
Figure 5. Percentage point difference (AME) in tertiary education attainment between high-educated parents (tertiary) and low-educated parents (lower than upper secondary) among ages 25-44. Source: OECD 2016 and own calculations

Because of the low level of socioeconomic inheritance, the effects of extended kin may also be less important for children's socioeconomic attainment than in countries where the educational system includes fees and has more dead ends. However, one could also expect the opposite. Recent studies suggest that, in Nordic countries, economic resources have a weak direct impact on intergenerational attainment and that other resources matter more (Møllegaard and Jæger 2015). However, in the Finnish context, educational compensation may be relatively strong because financial barriers to education have been largely removed, thus emphasizing the benefits of parental and extended family members' education and involvement. Furthermore, innate cognitive abilities, skills, and personalities that are inherited from parents via genetic inheritance, may have become more important than family resources and resources from extended family members (Zwir et al. 2018).

5 RESEARCH DESIGN

5.1 Research questions

This study investigates the effects of immediate and extended family members on children's socioeconomic and educational attainment. The general question of this dissertation is, how do kinship ties and socioeconomic resources of kin influence children's socioeconomic and educational attainment in Finland. The purpose of this dissertation is to bring forth mechanisms of intergenerational attainment of immediate and extended family members and interpret the results of the four articles in the light of an evolutionary social scientific framework. In the articles of this dissertation, the effects of mothers, fathers, grandparents, aunts and uncles are studied. Although many studies have already been conducted on the social inheritance of status and education in the field of stratification research, few studies have considered causal effects of parents on children's attainment (see Grätz, 2015a). The same applies to multigenerational effects of grandparents, which are usually conducted with random effect models that do not take into account unobserved heterogeneity on the parental and grandparental levels and thus can be biased (Breen 2018). More-specific research questions by article are as follows:

1. To what extent do parental socioeconomic resources (education, class, and income) explain children's socioeconomic attainment? (Article 1)

2. Does parental unemployment influence children's educational outcomes in the early life-course? (Article 2)

3. How do extended family members such as grandparents, aunts and uncles influence children's educational attainment? (Articles 3 & 4)

4. Do extended family members compensate for low parental socioeconomic resources for children's educational attainment? (Articles 3 & 4)

Two-generation effects are analyzed in articles I and II. In the first article, we studied how much parental socioeconomic characteristics over the early life-course explain children's socioeconomic status (SES) in adulthood. To answer this question, we

used three-level random effects linear regression models to decompose the family-level variance of siblings' ISEI by maternal and paternal education, class and income.

In the second article, we studied the effects of parental unemployment on siblings' educational outcomes within the family. Because parental unemployment may vary depending on family resources and parental human capital, we studied heterogeneous effects according to children's ages and parental level of education. Furthermore, we studied whether family income mediates the effect between parental unemployment and children's education. Three educational outcomes were analyzed in this study: GPA at the end of compulsory school, entry into general secondary education and entry into tertiary education. Because we can control for family-level unobserved heterogeneity by applying a sibling fixed effect models in this study, estimated results can be interpreted as causal effects.

In the next two articles, we turn to study extended family members, grandparents, aunts, and uncles. In the third article, we study the interpersonal compensation effect of aunts and uncles. The research question of this study is, do aunts' and uncles' higher education compensate for low parental education for children's educational attainment? Furthermore, we investigate whether compensation effects differ according to father and mother's education and paternal and maternal lineages. Lineages were separated because evolutionary assumptions suggest that maternal aunts and uncles are more important than paternal aunts and uncles. We analyzed associations of aunts' and uncles' education on nephews' and nieces' education by two different outcomes: having a degree higher than compulsory education and having a higher education degree (Bachelor or higher). The first outcome measures how aunts' and uncles' compensation contributes to the probability of avoiding dropping out of school when children transfer to secondary education (vocational or academic track). This measurement can be considered an indicator of marginalization. The second outcome measures children's educational advantage attained.

In the fourth article, we investigated whether grandparents influence grandchildren's general secondary attainment, and if they do, how they influence. We have four potential explanations for the grandparent effects on multigenerational attainment: legacy effect, stabilizer effect and exposure effect, which we divided into the two submechanisms, extended family network and kin keeper effects. By legacy effect, we mean that grandparental resources would have a direct effect on the grandchildren's education net of parental resources. Stabilizer effect means that grandparental resources influence only in turbulent times and when parental other resources are low – for example, when parents have separated or when family income is low. The extended family network hypothesis means that grandparental exposure has an effect on educational attainment because of the grandparents providing a link to the extended family; this effect should become stronger as the

family network grows. Kin keeper effect means that, because women act as kin keepers and are involved with family relationships more than men are, grandmothers and maternal grandmothers in particular demonstrate a stronger commitment to grandchildren than grandfathers do.

5.2 Data

High-quality Finnish population-based register data provided by Statistics Finland are used in all the articles of the dissertation. The data used in the articles are entirely based on administrative registers. In the first article, we used the longitudinal Finnish Census Panel (FCP) dataset, which runs from 1970 to 2005; it includes information every five years from 1970 to 1985 and yearly from 1987 to 2005. The FCP dataset was collected by taking a one-percent random sample of the Finnish population in 1970. The FCP dataset has been expanded to cover all the family members between 1970 and 2005 that lived in the same household with the sample person. The whole FCP sample covers approximately 1,000,000 cases. The analytical sample of the first article consists of 29,282 observations (children) who were born in 1966-1975.

In articles II, III and IV, we used the Finnish Growth Environment Panel (FinGEP), which runs from 1980 to 2010 (the upgraded version used in article 2 runs until 2014). FinGEP includes the years 1980, 1985 and 1987; thereafter, it runs annually. The FinGEP dataset is based on a 10 % representative random sample of the entire population residing in Finland for at least one year in 1980; the sample is expanded with sample persons' children, partners, and partner's parents. Thus, it is well suited to also study the intergenerational effects of grandparents, aunts and uncles. The whole FinGEP sample covers approximately 2,000,000 cases. In the second article, we analyzed cohorts born in 1986-1997, and the analytical sample includes 113,100 cases in total. In the third article, we analyzed cohorts 1972–1982, and in the fourth article, cohorts 1972-1990. The third article includes 19,233 cases and the fourth article 70,845 cases in total.

Both datasets, FinGEP and FCP, include individual-level records from censuses – for instance, birth and decease years – and from administrative sources such as tax, employment, and education registers, providing information on the socioeconomic, educational and demographic characteristics of each case included in the data. An upgraded version of FinGEP, which is used in article II, also contains grade point averages (GPAs); thus, we were able to analyze children's school performance in this article. All persons are followed until the final year of the dataset, or when they dropped out of the data because of either death or moving abroad. Due to the low rate of immigrants in the Finnish population, our register-based samples do not include many immigrants; thus, the ethnicity in the samples is very homogeneous. Conducting analyses with register data has many advantages. Samples based on registers are very

large and allow interaction between variables, partial analyses and other methods that need a large dataset, for instance, sibling fixed effects regressions. This approach allows life-course analyses because with panel data, individuals can be followed year after year. Register data can be considered very reliable because, unlike survey data, the register data do not suffer from respondents' misreporting, memory errors or nonresponse, and the attrition rate is very small. A limitation of the register data is that it does not include attitudinal information or data based on a questionnaire.

5.3 Methods

The studies of this dissertation are conducted with multilevel modeling, where siblings are clustered according to their families. Multilevel models can be divided into random and fixed effect models. The simplest multilevel model can be described with two hierarchical levels (Rabe-Hesketh and Skrondal 2008:123-172). For example, in the models conducted in the articles, family constructs are higher-level, and children within family are lower-level. However, it is also possible to include more layers to models, and some of the articles utilized three-level models.

Multilevel models where both levels are allowed to vary are called random intercept models. A random intercept model can be described as a mixed model that combines a variance component model and a single-level regression model. Models assume that intercepts across the levels vary but that slopes are fixed. Variation for a dependent variable across the levels can be interpreted as being generated by some unmeasured processes. In the models, where children are clustered according to their families, higher-level variation in outcome reflects heterogeneity across families, while lower-level variation reflects heterogeneity across children. Thus, unobserved family-level heterogeneity can be derived from the characteristics that children in the same family share (i.e., common genes or shared environment) and unobserved individual heterogeneity from individual characteristics that children do not share. The advantage of the random intercept model is that it allows controlling for variables that are constant between siblings (or vary only a small amount), for instance, parental education and SES. The caveat of this modeling strategy is that if the independent variables are correlated with unobserved factors, parameter estimates may be biased because models do not control unobserved heterogeneity. In the articles, the estimates of the random intercept model cannot be given a causal interpretation because we cannot be entirely sure that all unobserved heterogeneity is controlled, although many control variables are used.

A random intercept model with siblings clustered according to their families is described in equations 1 and 2. In the equations, residual u_i varies between families, thus reflecting variation in the dependent variable due to family-level unobserved heterogeneity, which does not vary between children clustered according to families.

Residual ε_{ij} refers to unobserved individual-level heterogeneity between children within a family. Equation 1 describes a variance composite model that is a so-called "empty" model because no independent variables are included in the model. Equation 2 introduces a "full" random intercept model, where X_i denotes the vector of observed family-level variables, and Z_{ij} denotes the vector of observed individual-level characteristics.

$$y_{ij} = \beta_0 + u_i + \varepsilon_{ij} \qquad (1)$$

$$y_{ij} = \beta_0 + \beta X_i + \beta Z_{ij} + u_i + \varepsilon_{ij} \qquad (2)$$

Random effect models are computed in all the articles, although in articles 2 and 4, the main analytical method is sibling fixed effect models. In article I, we included the third level, which captures temporal variance between the two age phases when we measure socioeconomic status in adulthood (at ages 25-29 and 30-34). In article IV, where the effects of grandparental resources are analyzed, a third hierarchical level is also included. In addition to individual and family (across sibling clusters), we also have a variation on the grandparental level (across cousin clusters). Three-level models are based on the same random effect identification strategy as two-level models are; they only add a new level k and the residual component δ_k in the formula.

In article I, we utilized random effect models by studying to what extent we can explain family level unobserved heterogeneity by parental socioeconomic resources. This identification strategy is called the variance decomposition method (VDM). Our results show the proportion of variance explained by parental education, status, and income. However, because these socioeconomic resources correlate with each other, we calculated uncorrelated direct effects of each parental resource. Uncorrelated direct effects are calculated as follows: we omitted proportions that are shared with other characteristics; for example, when the direct effect of parental education is calculated, the correlated share of parental income and status are omitted from the proportion that is explained by the family-level variance. With this method, we can estimate the direct (or independent) and shared effects of parental education, occupational status and income for children's socioeconomic status attainment. The same method would have been obtained by decomposing intra class correlation (ICC), which it is possible to calculate by dividing family-level variance (σ_i^2) with total variance ($\sigma_{ij}^2 + \sigma_i^2$). However, decomposing family-level variance – but not individual level – gives us needed estimates to determine the effects of parental resources, which influence equality of opportunities. Thus, we did not need to calculate ICC (or sibling correlation) in this article. Furthermore, in our models, the individual level did not even change when we include parental-level variables, which further supports the decomposing of only family-level variance (σ_i^2). Instead, we calculated ICC for siblings and for cousins in article 4.

Sibling fixed effect models that are also based on the multilevel statistical family are computed in articles II and IV, where parental (or grandparental) characteristics vary over the siblings' life course. Compared to random intercept models, sibling FE-models allow controlling unobserved family-level heterogeneity; however, models can be used only when explanatory variables vary between siblings. While controlling all the characteristics that siblings share, FE-models do not control unshared (or individual) unobserved heterogeneity between siblings. Thus, it is important to include control variables in the models that can be considered to bias the fixed effect estimator (Frisell et al. 2012). The fixed effect estimator can be assumed to yield causal estimates when the explanatory variable is uncorrelated with the individual-level error term (Cameron and Trivedi 2010).

We used sibling fixed effect models in article II, where we analyze the effects of parental unemployment on children's educational outcomes, and in article IV, where we analyze the effects of grandchildren shared life with a grandparent on children education attainment. Age exposed to parental unemployment and shared lifetime between grandparent and grandchild vary between siblings and can be used in the fixed effect models while controlling all the characteristics that siblings share. Sibling fixed effects that are computed in the articles can be formalized as follows:

$$y_{ij} = \beta X_{ij} + \gamma Z_{ij} + \alpha_i + e_{ij} \qquad (3)$$

In the equation, i refers to a cluster of biological siblings who share the same parents, and j refers to siblings within this family. X_{ij} denotes a key explanatory variable that varies between siblings, and β is its slope. Z_{ij} refers to the vector of specific sibling-specific control variables that are controlled in the models and can vary between siblings. γ is the slope for the control variables. α_i is the family-specific fixed parameter (i.e., family identification variable), which represents all the factors that are constant between siblings, and e_{ij} is the within-sibling error term. In article II, slope β is estimated for age exposed to parental unemployment, and in article IV, slope is estimated for a shared lifetime between grandparents and grandchildren within families.

In the articles II & IV, where we used sibling fixed effect design, we are not able to control for reverse causality and all the variables that differ between siblings. For example, parental health can affect that parent become unemployment and health is also associated with children's educational attainment. In addition, children's emotional problems may precede parental unemployment and these problems do not fade away when the parent is employed again. Grandparental death can affect stress for the families and this stress can influence child's educational outcomes. Thus, some of the events that are measured may be in fact processes, which we are not able to take into account in the FE models.

In random and fixed effect models, we use linear modeling. In other words, when we have a binary outcome variable when studying children's education outcomes as in articles II, III and IV, we use linear probability modeling (LPM) instead of logistic models. These models do not suffer from the unobserved variable bias as the logistic models do, which is why the LPM coefficients are comparable between models and groups (Mood 2010). LPMs also allow us to interpret interactions as they are interpreted in any linear regression models, something that is not that straightforward in the case of logistic models (Ai and Norton 2003). Furthermore, the estimated results of LPMs are substantially intuitive and transparent because they present marginal changes of probabilities in the outcome variable (or a percentage point difference between groups in the outcome) and thus between groups differences can be interpreted as average marginal effects (AME). However, a misspecified functional form for a binary outcome is a commonly assumed problem of LPMs. It is possible that LPMs do not fit the data as well as the logistic model does, in which case logistic modeling should be preferred. This usually applies when the true probabilities are at the extreme, for example, .99 or .01, which does not apply to outcomes used in the articles of this dissertation (Mood 2010). LPMs are preferred over logistic regression because the linearity assumption does not change the results.

5.4   Variables

In article I, we measured socioeconomic attainment by the Intergenerational Socioeconomic Index (ISEI), which we observed twice, at the ages of 25–29 and 30–34. ISEI is a widely used measurement of socioeconomic status in social stratification research. ISEI scores can be considered a multidimensional measurement of SES. ISEI scores form a scale of occupations that is constructed by regressing occupations with their income and education, thus making them closely related to both (Ganzeboom, De Graaf, & Treiman, 1992) As the scale is constructed from occupational data, it is also a good proxy for social class. Occupational data are also less sensitive to short-term variation than income is, but they include more long-term variation during the phases of life other than education. It may also be argued that occupational status is a more direct measurement of social status than education; the latter merely reflects a person's success potential rather than success itself. As explanatory variables in article I, we used parental education (5 categories), socioeconomic class measured by EGP class scheme (7 categories) and income. We separated maternal and paternal effects and control for child's sex, mother's age at birth, and child's year of birth.

In article II, where we study the effect of parental unemployment on children educational outcomes, we measured educational outcomes of the children with three different outcome variables: 1. Enrollment in general secondary school (ISCED 3)

at age 16 (dummy); 2. Academic grade point average (GPA), which is given at the end of compulsory school at age 15; 3. Tertiary (ISCED levels 6 and 7) educational enrollment (dummy) at ages 19-21.

Our main explanatory variable is age exposed to parental unemployment for the first time. In the sibling fixed effect models, our baseline models control for the child's sex, year of birth, siblings' birth order, and duration of parental unemployment in months. Furthermore, we control average family income, GPA and secondary school selection to study the different mechanisms. In the sibling fixed-effect models, we are unable to control the parental educational level because it is a constant among siblings. To compare the results by level of parental education, we conducted separate sets of models for them; thus, we distinguish parental education into two levels: compulsory or vocational degree and academic track degree. In the random effect models, we also control for parental education and parental separation.

In article III, where we measured the compensation effect of aunts and uncles, we have two outcome variables: 1. Having an education degree higher than compulsory (dummy) (ISCED 2 or higher) and 2. Tertiary education attainment (ISCED 5-6). Having an education degree higher than compulsory measures the probability of avoiding dropping out of school when children are moving to secondary education. Dropping out from secondary education can be considered an indicator of marginalization, while tertiary education attainment can be considered an educational advantage. As an explanatory variable, we use the interaction between parental and aunt's and uncle's educations. In this article, we adjusted models with the following variables: child's sex, parental separation, child's year of birth, number of siblings and cousins, and the highest education level of grandmother and grandfather in years.

In article IV, where we analyze the effects of grandparental exposure and resources on children's education, we use as an outcome variable children's general secondary attainment at the age of 20. We use general secondary attainment because it indicates higher educational attainment. Other possible measures for children's educational attainment such as GPA were unavailable, and higher education enrolment was difficult to measure for the younger cohorts born in the 1990s because the dataset only reached to 2010. Our key explanatory variables are grandparental socioeconomic resources measured by education and social status (ISEI) and grandparental shared lifetime with grandchildren (grandparental exposure). In the FE models, where we study the effects of grandparental exposure, we control for child's birth order, sex and year of birth, family income, and mother's age at birth. In the random effect models, where we study the association of grandparent's resources, we control for the same variables as in the FE models but also include parental education in years and ISEI, aunts' and uncles' educations in years, grandparental lineage, number of siblings and cousins and whether children live in an urban or rural area.

Table 1. Summary of the articles

TITLE OF THE ARTICLE	Parental education, class and income over early life course and children's achievement	The heterogeneous effects of parental unemployment on siblings' educational outcomes	How do aunts and uncles compensate for low parental education in children's educational attainment?	Tying the extended family knot – grandparents' influence on educational achievement
BIRTH COHORTS	1966–1975	1986–1997	1972–1982	1972–1990
DATA AND SAMPLE SIZE	Finnish census panel	Finnish Growth Environment panel (upgraded version)	Finnish Growth Environment panel	Finnish Growth Environment panel
SAMPLE SIZE	N=29,282	Total N=113,100, FE models N=2,508/1,855	N=19,233	Total N=70,845, FE-models N=5,117/3,053
METHODS	Variance decomposition method	Sibling random and fixed effect	Sibling random intercept models	Sibling random and fixed effect
EXPLANATORY VARIABLES	Maternal and paternal education, social class (EGP) and income	Age exposed to parental unemployment for the first time	Parental and aunts' and uncles' educations	Grandparent's social status (ISEI), education and shared lifetime with a grandchild
CHILD'S OUTCOME	Socioeconomic status (ISEI)	GPA, entry into general secondary and entry into tertiary education	Education level higher than compulsory and tertiary education attainment	General secondary education attainment
MAIN RESEARCH QUESTIONS	How much do parental education, class, and income explain adult children's socioeconomic status?	Does parental unemployment negatively affect children's education?	How do aunts' and uncles' educations compensate for low parental education?	Do grandparental socioeconomic resources or shared lifetime with grandchildren influence grandchildren's general secondary attainment?
RESULTS	Parental resources have only small direct effects. Maternal education explains most (14 %) and parental income least. The effects of parental socioeconomic resources do not vary over the children's life course.	Yes, at ages 14-15 and 18, when further educational choices are made. The negative effect is explained by a compensatory advantage for general secondary school and GPA and risk aversion for higher education	The social and human capital of aunts and uncles (pool of resources) benefits children's educational attainment in the families where parental education is low. Kin selection and matrilateral bias explain the results.	Grandparental socioeconomic resources have only a limited effect, but grandparental and grandchildren's shared lifetime impacts grandchildren's education. Paternal grandmothers influence when the number of relatives increases and maternal grandmothers' influence when parental resources are low.

Research design

6 RESULTS

6.1 Parental socioeconomic resources

In article I, we studied how much parental socioeconomic characteristics over the early life-course explain children's socioeconomic status (SES) in adulthood. The results show that all parental socioeconomic characteristics together (maternal and paternal) explain approximately 50–60 % of the family-level variance. Paternal characteristics explain approximately 50 % and maternal 40 %; however, differences between paternal and maternal are not statistically significant. The results also show that the effects of maternal and paternal characteristics on children's SES are relatively stable during children's early life course. Thus, by ignoring life-course, the variation of intergenerational transmissions is likely to be small. However, because parental socioeconomic characteristics are highly correlated with each other and other unobserved characteristics (for instance, neighborhood, genes, and peers), we measured the direct (or independent) effects of each parental characteristics by omitting the correlations of the other two characteristics. Thus, these direct effects are cleaned from the shared part of the correlations.

When we decompose family variance according to different parental socioeconomic characteristics, we find that parental education explains adult children's SES most and parental income least. Direct, noncorrelated associations of observed parental indicators do vary somewhat over children's early life course. On average, mothers' education independently explains 14 percent of adult children's SES, mostly in early childhood at age 0-4, whereas fathers' education explains approximate 9 percent, mostly in early adulthood over 20 years of age. The independent effect of maternal and paternal social class alone is marginal and time constant over the children's life course (on average, 4 percent). We found no independent effect for either paternal or maternal income over the entire follow-up.

Overall, the independent effects of parental socioeconomic characteristics are relatively small, and it seems that endowments, which are highly correlated with these parental socioeconomic characteristics, play a larger role in explaining adult children's SES. Thus, the largest proportion of children's SES cannot be explained by parental socioeconomic characteristics, which indicates that a great proportion of the intergenerational transmission is explained by a latent unobserved factor that

parents and children share. This factor would most likely be shared genes; however, with this study, we are not able to confirm this assumption. However, previous twin-design studies have concluded that approximately one-half of the variation in intergenerational transmission of income/education comes from the genetic background that parents and children share.

6.2   Parental unemployment

In article II, we studied whether parental unemployment in the children's early life course affects educational outcomes. The results show that parental unemployment has a negative effect on all three educational outcomes. For children's GPA, parental unemployment is adverse if it is experienced at the end of compulsory schooling, which suggests that unemployment does not have cumulative effects regarding a children's age but rather that children's education performance is more vulnerable to parental unemployment in adolescence. The effect of parental unemployment in early childhood can be explained by selection into unemployment.

Similarly to GPA, with general secondary education enrollment, parental unemployment has a disadvantageous effect at the end of compulsory schooling at age 14. When we control for children's GPA in the model, parental unemployment explains the negative effect entirely. Therefore, parental unemployment affects children's educational performance, not by making children perceive general secondary as the more risky choice. These results are consistent with previous studies (Andersen, 2013; Kalil & Ziol-Guest, 2008; Bratberg et al., 2008; Brand and Thomas 2014). However, we do find a compensation mechanism for the negative effects of children's GPA and general secondary education; children with higher parental education – and thus higher human capital – do not experience the same negative effects of parental unemployment as do children whose parental education is low.

For tertiary education enrollment, parental unemployment has a negative influence when children are 18 years old and thus at the very end of secondary school, even after controlling for GPA and school track; however, this observation holds only among the children of the higher-educated parents but not among the children of lower-educated parents. Furthermore, we find evidence that at age 18, only paternal unemployment is detrimental for children's tertiary enrollment. These analyses indicate that the most plausible explanatory mechanism behind the negative effects of unemployment is (relative) status deprivation and the risk aversion that it induces. The children of highly educated parents exposed to parental unemployment and thus their family's status decline perceive uncertainties in higher education and are less likely to enroll in higher education as a result. This result also comes close to the results of some previous studies (Andersen 2013; Brand and Thomas 2014). Overall, for all three outcome variables, we do not find any support for the

importance of reduced family economic resources due to unemployment. Furthermore, we did not find support for the claim that long-term parental unemployment would be more disadvantageous for children's educational enrollment; however, we found evidence that longer parental unemployment spells are disadvantageous for school performance. Thus, the duration of parental unemployment seems to have cumulative effects only by having a negative effect on school performance.

6.3   Aunts and uncles

In article III, we studied the interpersonal compensation effect of extended family members. Specifically, do aunts' and uncles' higher educations compensate for low parental education for children's educational attainment. The results show that children that have low-educated parents benefit from having highly educated aunts or uncles, indicating that interpersonal compensation of aunts and uncles does take place. It is stronger in the case of continuing education beyond compulsory school than having a higher education degree. The results suggest that pool of resources (total amount of years of education) has the strongest and educational signaling (only one aunt and uncle higher educated) association on the educational attainment of nephews and nieces. Nor do we find clear, empirical, normative theory evidence that the norms of a family network would be the key mechanisms behind compensation. However, we cannot exclude this explanation entirely.

The results indicate that the accumulation of human capital within an extended family network seems to be the most plausible explanation behind the interpersonal compensation. Moreover, the kin network includes human capital in the form of education that is more likely associated with one's own education when one's parental education is low. Thus, children receive beneficial investments and endowments not only from their biological parents but also from other individuals in their family network such as aunts and uncles, indicating that the social capital of a family network is important for educational attainment in modern societies. However, this mechanism becomes visible only in low-educated families, because children from the higher-educated families already have all needed resources and do not need any extra investments from outside of the immediate family.

The results of the article support the evolutionary hypothesis. We find that only maternal-side aunts and uncles compensate for low parental education. This finding is consistent with parental investments and paternal uncertainty theories, which predict that kin from the maternal lineage are more important for children because they are more certain about their biological relationship with children than kin from the paternal lineage is. Furthermore, the results show that the conventional two-generational models might be insufficient to capture some of the key effects of

educational inheritance at least at the lower end of the parental education distribution.

However, results must be interpreted cautiously, because we could not control for all the unobserved heterogeneity although we adjusted the models with many confounding variables. It is important to point out that uncles and aunts' education could be a proxy for parental cognitive skills or cultural capital they possess although parental education is lower than aunts or uncles. For example, if a child's mother could not achieve higher education for some reason but her talents and skills would be as sufficient as her sisters, who did achieve higher education; it could be possible that sisters' educational achievement would pick up the effect of a mother. In this case, the compensation effect of aunts and uncles would be based on spurious correlation.

6.4   Grandparents

In article IV, we studied whether grandparental resources or grandparent-grandchild shared lifetime affect the educational attainment of the grandchildren. The results provided only very weak support that grandparental socioeconomic resources (occupational status or education) have direct effects on grandchildren's general secondary attainment. Once the Markovian observed effects were controlled for, the positive association between grandparents' and grandchildren's education becomes very small, and the influence of grandparental status vanishes entirely. This finding is consistent with the previous results, showing only a small positive effect of grandparents' resources on grandchildren's adult attainment in Finland (Erola and Moisio 2007) and other countries (Anderson et al. 2018).

However, we found evidence that grandparental and grandparental-shared lifetime (i.e., grandparental exposure) is more important than grandparents' resources for grandchildren's general secondary school attainment. The effect of grandparents' exposure is conditional on the grandparent type, family resources and number of relatives. Furthermore, our robustness analyses show that grandparental exposure is dependent on grandparental age. We did not find an effect for older grandparents.

The effect of maternal-side grandmother exposure varies according to the resources of the parents (family income and socioeconomic status). Hence, maternal grandmother exposure influences only families with low income and socioeconomic status. This point is partially consistent with Bengtson's (2001) assumption about the importance of grandparents in times of need but more in a way that is expected by the kin keeper hypothesis. This finding also provides evidence for interpersonal compensation (see Erola and Kilpi-Jakonen 2017). Linking this compensatory effect

directly to grandparents is consistent with the previous findings on the compensatory effects of extended family members from the US (Jaeger, 2012).

Most interestingly, and as a new contribution to the literature, we found a positive interaction between the shared life of the paternal-side grandmother and the number of relatives (cousins and aunts/uncles). These findings specifically indicate the importance of paternal-side grandmothers in maintaining the extended family network. The finding suggests that paternal grandmothers provide access to the family's pool of resources through the relatives, while the maternal-side grandmother seems to be more important when family resources are low. These kin-specific differences may explain why grandparents, on average, matter only slightly for grandchildren's education.

While the effects of grandfathers are somewhat similar to those of grandmothers in the case of exposure, the effects of the grandfathers are nonsignificant in all cases, which is consistent with studies that have shown that grandmothers typically are more inclined to invest in grandchildren than grandfathers are (e.g., Perry & Daly 2017).

While supporting aspects of the importance of grandparents as stabilizers for increasingly turbulent immediate families, our findings limit the original (rather broad) argument in an important manner. There was only a weak interaction between parental separation and grandparental education, and the other interaction effects between parental resources and the grandparent's resources were both small and statistically insignificant. Additionally, the resources of the grandparents themselves in the sibling fixed effect models were insignificant.

Previous multigenerational stratification studies have investigated associations between the socioeconomic attainments of grandparents and grandchildren, with mixed results. The current results suggest that perhaps the most important reason for the mixed results is that the previous multigenerational stratification studies have almost solely concentrated on the socioeconomic characteristics of the grandparents, which tend to be relatively small. Furthermore, although previous studies have found consistently null results for the physical proximity and contact between grandchildren and grandparents, they have missed the exposure effect, not requiring direct contact or resources of the grandparents themselves at all but relying on grandparents' importance in maintaining the extended family network.

7   CONCLUSION AND DISCUSSION

In the articles of this dissertation has been studied to what extent parental socioeconomic resources and unemployment explain children's socioeconomic and educational attainment. Furthermore, it has been investigated whether grandparents, aunts and uncles influence children's educational attainment. Previously, social stratification studies have not considered evolutionary reasons why immediate and extended kin would invest in children's attainment in the first place. I formed an evolutionary social science perspective to explain how and why children benefit from their parents and extended kin in socioeconomic attainment. This theory takes into account not only sociological explanations but also evolutionary adaptations of human behavior, both of which can be assumed to explain the effects of parental and extended kin on children's attainment. The results support an evolutionary social science approach to socioeconomic attainment, but with certain limitations.

In the first article, we find that, although maternal or paternal status characteristics (income, education, and social class) together explain a large part of the family-level variance, independent effects of these characteristics can explain only a minor part of the children's status attainment, and most of the family-level direct effect remains unobserved. The results show that maternal education has the highest explanatory power in early childhood. The results of the article indicate that mothers in particular are significant for children's socioeconomic and educational attainment because mothers usually interact and invest more in children, particularly in early childhood, compared to fathers. Mother's education can indicate cognitive, noncognitive and parenting skills that are salient traits for children's socioeconomic attainment (Bates et al. 2019).

In the studied cohorts, mothers were almost as educated as fathers and already participated in the labor markets, although in early childhood, they usually stayed home with children. Because mothers have higher biological investments in children compared to fathers, it is likely the mothers who influence children's cognitive and noncognitive traits and further attainment. This influence happens particularly in circumstances where women's socioeconomic resources are almost as high as men. The results also show that the effect of maternal education decreases but that the effect of occupational status increases during children's course of life, whereas the

effects of paternal education increase. This can indicate that when mothers gain more status in the labor markets, their occupational status rather than their education begins to contribute to children's attainment. At the same time, children enter the labor markets and higher education (at the age of 20 or older), which can indicate that maternal occupation influences the preferences and beliefs of the children for example in the form of relative risk aversion. In late adolescence, paternal education can contribute more because the father's education is an important signal for the children when they decide to enter into the labor markets or continue to higher education. However, to confirm these mechanisms, further study is needed. In this study, deeper mechanisms how maternal and paternal education is linked to children's socioeconomic attainment could not be tested comprehensively. The best way to test the mechanisms even further would be link survey data that include information on parental involvement to registers and use twin data to control genetic dispositions.

In a modern, relatively gender-equal society, where education becomes important to socioeconomic attainment, the correlation between maternal education and children's attainment increases. This result provides support for both evolutionary and modernization mechanisms. However, we did not control for parental divorce in the models. Previous studies show that maternal effects become stronger than those of fathers when parents separate because after parental separation, children usually stay in the same household as the mother (Biblarz and Raftery 1999; Erola and Jalovaara 2016). Thus, the result of maternal direct effects being greater than those of fathers may reflect the fact that mothers are more likely to live with children and that they can interact with their children more than fathers can. This explanation does not contradict the evolutionary social science approach, because when women on average are able to possess at least part of the socioeconomic resources, polygamy becomes stronger and thus also divorces (Dunbar, Dunbar, and Barrett 2007). Nevertheless, it is much more common that children live with their mothers rather than with their fathers, thus supporting matrilateral bias in housing arrangements.

The second article, on the effects of parental unemployment on children's education attainment, supports the interpersonal compensatory advantage and relative risk aversion theory. It shows that parental high human capital can compensate for the risks of unemployment for children's school performance, most likely due to better coping mechanisms and parenting skills. However, the study shows that in some situations, parental declined status can affect children's educational choices, probably because parental status is used as a reference point when educational outcomes are estimated. A finding consistent with the observation that, in general, individuals tend to be risk-averse in situations where they have something to gain but are risk-seeking in situations where they have something to

lose (Tversky & Kahneman, 1981). Children and families take into consideration environmental cues when choosing higher education and avoid risky choices. However, this study shows that parental income does not affect or mediate the negative effect of parental unemployment.

According to formal rational choice theory, this kind of framing based-behavior is not rational because it violates assumptions of preference relations, meaning that in the gain and lose mode, individuals are ordering preferences differently, although the decision framework would be identical. However, evolutionary theory could provide the ultimate reason for this kind of irrational behavior. Avoiding risk by behaving conservatively in the gaining mode and risk-seeking behavior in circumstances where gains are almost certainly not achievable may have been an advantageous strategy for the survival and reproduction of humans in evolutionary history (Roberts 2012). For example, it would not have been an advantageous strategy to take a high risk in circumstances where there are high amounts of resources such as food. However, it can be argued that it is rather "rational" to take a high risk when the food supply is scarce or diminishing rapidly. Thus, even some sociology scholars have proposed that human "rationality" or cognitive architecture, so to speak, has been programmed by natural selection to calculate cost and benefits of one course of action over the other (see Goldthorpe 2007, 179-183). However, a universal human cognitive architecture would not eliminate the fact that social environment determines the cues that an individual is likely to follow, and these cues have altered dramatically from the pre-modern to modern societies.

The third and fourth articles show that extended kin (i.e., aunts/uncles and grandparents) are associated with children's educational attainment; however, the association is identified only in the families with low parental resources and large family networks. We find that the aunts' and uncles' total human capital is associated with children's educational attainment in families where parents are low educated. This finding offers support for compensation theory; having extended kin compensates for low parental human capital, which benefits nephews and nieces' attainment. However, this association is observed only from the maternal lineage, thus supporting the evolutionary social science approach that mothers are the ones who act as kin keepers in the family network. This study also indicates that large family networks can be beneficial for children because not only human capital but also the quantity of aunts and uncles matters for attainment. The obvious limitation of this study is that we cannot identify the causal effect of the aunts and uncles' human capital on nephews and nieces' education attainment. However, the results indicate that kin networks have some latent, underlying factors that disadvantaged children can benefit from, be it investments, higher culture endowments, genes, or other favorable endowments.

In the fourth study, where grandparental effects were studied, we find that overall grandparental socioeconomic resources were not associated with grandchildren's attainment. However, the maternal grandmother's shared lifetime with grandchildren influenced grandchildren's educational attainment in families with poor socioeconomic resources, which is consistent with evolutionary mechanisms. Furthermore, paternal grandmother's lifetime and a number of relatives (aunts/uncles and cousins) influenced higher educational attainment of the grandchildren. This pattern is consistent with the observation that, when the paternal grandmother dies, connections with other family members usually decrease because paternal grandmothers act as a kin keepers (Connidis and Campbell 1995; Fuller-Thomson 2000). Therefore, the death of a paternal grandmother influences the social capital of the families and children's attainment. However, it has to take into consideration that grandparental exposure was measured using shared lifetime between grandparent and grandchild as a proxy. This is not based a real exposure that could be obtained for example measuring contact or proximity between grandparents and grandchildren's course of life. Further studies should consider this and use grandparental proximity as well as contact frequencies to estimate the effect of grandparental exposure on children's educational outcomes

As found in article III and IV, the results show that particular mothers act as kin keepers within the family network and that having several relatives is beneficial for children. Thus, both studies support the evolutionary social science approach and, in particular, the role of women and the advantages of extended kin social capital in social attainment. Social and human capital within the family network forms a pool of resources that is advantageous for children's attainment, and mothers and grandmothers, in particular, are the ones who increase human capital creation for children.

Although we are not able to distinguished investments and endowments and therefore give an exact mechanism of how parents, grandparents, as well as aunts and uncles, influence attainment, the results of the studies, indicate that both are important. According to study IV, grandparents' resources are not associated with grandchildren's education attainment; however, we found that grandchildren's exposure to grandmothers is important within low socioeconomic families; indicating that parents, for example, can obtain practical help from the living grandmothers, thus indicating that grandparental investment in grandchildren is salient for attainment. In the case of aunts and uncles, whether their investments or endowments matter for nephews and nieces' attainment is less certain. However, the compensation effect from the maternal-side aunts and uncles that we find indicates that maternal aunts and uncles' social capital somehow enables nephews and nieces from disadvantaged families to reach their full potential similar to children with advantaged family backgrounds. The involved mechanism should be studied in a

more detailed manner using information from the surveys, where the involvement and thus investments of extended family members can be identified. Unfortunately, with register data alone, this study cannot be done.

Previous studies have usually expected that paternal socioeconomic status in particular is salient for children's attainment; consequently, maternal socioeconomic characteristics are studied less (see exception (Beller 2009; Kalmijn 1994). This study shows that maternal characteristics and mothers, in general, can be more important than those of fathers, particularly in the context where women are relatively equal with men. However, more studies should be conducted in different contexts to obtain additional empirical evidence for the effects of mothers and fathers. Furthermore, the results of the studies support the idea that mothers act as kin keepers within family networks; however, it is difficult to detect with this study whether kin keeping is based solely on evolutionary adaptations or socialization; both probably matter.

In the modern welfare state, where women are as educated as men and the socioeconomic resources are relatively equally distributed, women usually still interact more with family members than men do, although in these circumstances, the effects of socialization should be diminished. Biological differences such as biased parental investments clearly explain at least part of this behavior; however, how much institutional context is related to the socialization of women as kin keepers should be studied in more detail. Therefore, future research on the role of extended kin in attainment should take into account sex and lineage more carefully to identify the effect on intergenerational attainment. The liberation of familial and gender roles and of strict norms related to behavior has decreased the influences of cultural practices in integrational relations in countries such as Finland. Some sociologists have argued that because of individualism, the roles of biological traits and kinship have also diminished and may disappear entirely (Coleman 1988; Giddens 1991, 147). However, recent empirical evidence indicates the opposite; for example, gender equality appears to increase rather than decrease gendered behavior and preferences (Falk and Hermle 2018). Thus, the opposite can also be argued; biologically rooted dispositions can become apparent in the modern individualistic society, where cultural restrictions have largely faded.

One caveat of the articles is that we are not able to consider how much genetics – and therefore selection into different positions – is involved with the intergenerational inheritance of socioeconomic status and education. However, it can be assumed that genetics play a role here, because previous studies have indicated that in the context of Nordic welfare states with free education and increased social security, family environment can explain a much smaller part of the children's attainment than heritability can (Heath et al. 1985; Lyngstad, Ystrøm, and Zambrana 2017). Future research should distinguish more carefully how much genetic and

parental socioeconomic resources explain intergenerational attainment to established a more robust picture of equality of opportunities in Finland.

Finally, the lack of an association between parental income and children's education or socioeconomic attainment has certain implications. First, this result shows that giving money to disadvantaged families might not be an ideal option in Finland. Rather, the results indicate that in the long term, children would benefit more from increasing their cognitive and noncognitive traits – for example, offering quality daycare for the children of disadvantaged families in early childhood or other means of improving their chances to quality care. It is obvious that not all disadvantaged families have a large family network and grandmothers to take care of them when the parents fail. Second, the fact that we did not find an effect for parental income can be a relieving result for children from low-income families because it indicates that they have the same opportunities for socioeconomic attainment as children from high-income families, all else being equal. Therefore, the often-heard public discourse that implies that children with disadvantaged backgrounds lack the same opportunities as children with an advantaged background because of parental incomes being asymmetrically distributed is out of scope. Even worse, moralistic "inequality discourses" can enhance rather than reduce inequalities, producing self-fulfilling prophecies; some children from low-income families begin to believe the discourse that they do not have opportunities to attain because their parental income is low, although this belief would not accurate. In general, it has been shown that people are more worried about the fair distribution of economic resources according to merits and skills than about economic inequality itself (Starmans et al. 2017). The preference for meritocracy has universally been found among human cultures, and even young infants show sensitivity to a fair meritocratic distribution over an exactly equal one. Thus, if something is asymmetrically distributed, it does not necessarily mean inequality in terms of opportunities.

This dissertation shows that in Finland parental and extended family members' material resources do not matter for children's educational or occupational attainment. However, the effects of (extended) family members can be considered as psychological or normative in nature, which can be understood to be embedded in family and kin structures. Social and human capital within families are particularly salient for compensating children's attainment when parents lose or are lacking some of the socioeconomic resources that can advance children's attainment. For social capital and compensation of the disadvantages, the key persons seem to be mothers that can behave as kin keepers within the family circle.

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